



MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN



Pharmacy Annual Report
2018-2019

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It gives me great pleasure to present this report of achievements from the University of Michigan Health System Pharmacy Department. It is impossible to recognize and acknowledge all of the blood, sweat and tears that our staff has put into making our department better this past year. But this report will capture a lot of those efforts.

The mission of the pharmacy is to provide safe, high quality, and cost effective care for the patients we serve, conduct and support research efforts, and train future pharmacy practitioners. We can only achieve this mission through the work of our people – both managers and staff alike.

At a high level some of our most strategic achievements are as follows:

- ◆ Onboarding a new Chair for the P&T Committee, Robert Chang, MD. Robert will also be serving in the Medical Director of Pharmacy role – a newly defined position that will be instrumental in optimizing our influence and relationships with prescribers.
- ◆ The management team participating in a series of development sessions led by professor of organizational effectiveness, Morgan Milner, PhD.
- ◆ Holding a strategic planning meeting with pharmacy managers and several stakeholders external to our department.
- ◆ Finalizing the RFP for technology resulting in a decision to change from Omnicell to BD.
- ◆ Starting construction on our sterile compounding facilities in preparation for USP 800 requirements.
- ◆ Finalizing our memorandum of agreement with the DEA.
- ◆ Responding to compounding inspections from the Joint Commission and FDA.

The remainder of this report provides more detail on accomplishments of each of our teams. In that regard, I extend my personal gratitude to the entire staff of the health system and college of pharmacy for supporting our mission and day-to-day work of the department. I am optimistic about our plans for the future. I am still excited to be a part of one of the best health systems in the world, and will continue to work to make us better. Thank you to all who read this for your continued support.

Go Blue!

Stan Kent, RPh, MS

Our Leadership



Jeffrey Desmond , MD is the Chief Medical Officer at Michigan Medicine and an Associate Professor in the Department of Emergency Medicine. Dr. Desmond received his B.A. from Williams College in 1982 and his degree in medicine from University of Texas Health Science Center in Houston, Texas in 1987. Dr. Desmond completed a residency in Emergency Medicine at the University of Massachusetts Medical Center where he served as Chief Resident in 1992-1993.

In 1993 Dr. Desmond joined the University of Michigan faculty in the Department of Surgery, Section of Emergency Medicine. During the time he has served as the Service Chief and then Associate Chair for Clinical Operations for the Department of Emergency Medicine the faculty grew from 15 to over 60. Dr. Desmond led a number of process and quality improvement efforts in the Department of Emergency Medicine. Dr. Desmond is the developer and co-leader of the University of Michigan Health Administration Scholars Program (HASP).

In 2011, Dr. Desmond became Associate Chief of Staff in the Office of Clinical Affairs and served in that role until 2013 when he was appointed the first Director of Clinical Quality for the Health System. Dr. Desmond served as Interim Chief Medical Officer in 2015, and was named Chief Medical Officer in January 2016.

As a member of the senior leadership team for the health system Dr. Desmond has participated and or lead a number of health system initiatives related to patient safety, clinical care improvement, capacity management, and organizational structure. Dr. Desmond's research interests focus on the application of operations management principles to healthcare and specifically Emergency Department operations in order to improve patient care.



Stan Kent, RPh, MS, FASHP is the Chief Pharmacy Officer at Michigan Medicine and Associate Dean for Clinical Affairs at the University of Michigan College of Pharmacy. He is also the program director for the Health System Pharmacy Administration and Leadership residency. He received his B.S. in Pharmacy from the State University of New York at Buffalo and an M.S. in Hospital Pharmacy from the University of Wisconsin. He completed a 2-year residency in hospital pharmacy administration at the University of Wisconsin Hospital. Mr. Kent has worked as a clinical pharmacist, clinical manager, assistant director, director, and assistant vice president in academic and teaching hospitals.

Mr. Kent has been active in health-system pharmacy organizations including service as past-president of the Wisconsin Society of Health System Pharmacists. In 2008 he received the Illinois Council of Health System Pharmacists Pharmacist-of-the-Year Award. He has also been active in the American Society of Health-System Pharmacists (ASHP). Service to ASHP includes membership on the Council on Legal and Public Affairs, the Commission on Credentialing, the Board of Directors. He is a Fellow of ASHP and was president from 2011-2012. Practice interests include use of technology to improve medication use, residency training, and leadership development. He has presented nationally and internationally on topics related to residency training, medication safety and pharmacy practice leadership.

Personally, he spends his spare time keeping tabs on his family of 3 daughters and 4 grandchildren, playing golf, traveling and skiing.



John S. Clark, PharmD, MS, FASHP practices, teaches, and researches in the area of pharmacy practice management and leadership. He is the Associate Chief Pharmacy Officer at Michigan Medicine and Clinical Associate Professor, University of Michigan College of Pharmacy. Additionally, he is the PGY-1 Pharmacy Residency Director.

At Michigan Medicine, John is responsible for inpatient and outpatient, clinical and distribution pharmacy practice. John graduated from the University of Toledo and completed a PGY1/2 Health System Pharmacy Administration Residency from the University of Wisconsin with a Master of Science Degree. He is a past chair of the ASHP Commission on Credentialing. John is currently on the Vizient Pharmacy Network Consortium Executive Committee and is the current President of the Michigan Society of Health-System Pharmacists. John also serves as Chair of the ASHP Practice Advancement Initiative (PAI) Advisory Group.

John has been honored as a Fellow of the American Society of Health-System Pharmacy and Distinguished Alumni of the University of Toledo College of Pharmacy.

Our Leadership (continued)



Robert Chang, MD, is an Associate Professor in the Department of Internal Medicine in the Division of Hospitalist Medicine. His area of practice includes inpatient care as well as Informatics. Dr. Chang graduated from the University of Michigan Medical School in 2002, and completed his Internal Medicine residency at the University of Michigan in 2005.

Dr. Chang currently serves as the Associate Chief Medical Informatics Officer (Inpatient) Service Chief, Division of Hospital Medicine and is the Medical Director of Pharmacy and the Chair of the Pharmacy and Therapeutics Committee (P&T Committee).



Bruce W. Chaffee, Pharm.D., FASHP, is the Assistant Director of Pharmacy Analytics, Quality, Regulatory, and Safety and an adjunct clinical professor at the University of Michigan Health System and College of Pharmacy. Dr. Chaffee received his Doctor of Pharmacy degree from the University of Michigan and completed a PGY-1 pharmacy practice residency at Lutheran General Hospital. Over his career, Dr. Chaffee has also worked as a clinical pharmacist, satellite supervisor, director of pharmacy, business systems analyst, and strategic project coordinator.

Dr. Chaffee has authored many peer reviewed journal articles on informatics, pharmacy analytics, clinical interventions, hazardous drugs, and clinical decision support. He has authored textbook chapters about pharmacy informatics and serves as faculty for two sessions in the American Society of Health-System Pharmacists (ASHP) Pharmacy Informatics Essentials education series. Dr. Chaffee is a member of the ASHP Section of Pharmacy Informatics and Technology and of the Clinical Information Systems Section Advisory Group. He also served as chair of the inaugural IT Committee for the Michigan Society of Health-Systems Pharmacists.

In his current role, Dr. Chaffee is responsible for strategic leadership for various programs related to medication use policy, regulatory compliance, diversion prevention, patient safety, patient care outcomes, and is the lead for incorporating data visualization technology and business intelligence into daily pharmacy practice, which is used to enhance clinical practice, optimize pharmacy workflow and improve the quality and reduce the cost of patient care.

Dr. Chaffee has practice interests in informatics, medication safety, patient outcomes, leadership development, and student and resident education. In his spare time, Dr. Chaffee enjoys his 30+ year project renovating his cottage, road & mountain biking, creative writing, & watching or coaching sports.



Rachel Cortis is the Business Operations Director for Pharmacy Services at Michigan Medicine. She is a graduate of the University of Michigan's school of LSA and has a Master's in Accounting from the Ross School of Business. Rachel passed the CPA exam on her first try and spent several years in public accounting before joining Michigan Medicine.



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Our Leadership (continued)



Jacob (Jake) Holler, PharmD, MS is Director of Acute Care Pharmacy Services at Michigan Medicine at the University of Michigan. He has worked at Michigan Medicine since 2014 when he was hired as the Assistant Director of Adult General Medicine and Pediatric & Emergency Medicine services. Prior to his employment at Michigan Medicine, he worked for two years at Henry Ford Hospital in Detroit as a Pharmacy Manager and Clinical Team Leader, serving a variety of patient care populations. After graduating from University of Michigan's College of Pharmacy, he practiced at the University of North Carolina Health System, where he completed two years of residency, obtained his M.S., and qualified to become certified by the Board of Pharmacy Specialties.

Jake was born and raised in Grand Rapids, Michigan where he enjoyed beautiful summers and braved some long, cold winters. He is married to Marcy Holler (formerly DelMonte), Pharm.D., BCPS, who also works at Michigan Medicine. His interests include transitions of care, medication safety, Lean thinking, process/quality improvement, human resource management, and professional development. He has three daughters and outside of work he enjoys spending time with his family, watching college football and professional baseball, playing softball, reading, playing video and board games, and using his big screen TV.



Lindsey R. Kelley, PharmD, MS, FASHP is Director of Ambulatory and Oncology Pharmacy Services at Michigan Medicine. She serves as Program Director for the PGY1 Community Pharmacy Residency and adjunct faculty at the University of Michigan College of Pharmacy. Dr. Kelley earned her Doctor of Pharmacy degree from The University of Arizona in Tucson. She completed a pharmacy practice residency at Abbott Northwestern Hospital in Minneapolis, MN and received her MS from the University of Minnesota College of Pharmacy while completing a two-year health-system pharmacy administration residency at University of Minnesota Health.

Dr. Kelley has been an active member of the American Society of Health-System Pharmacists and state affiliates. She was recently elected to serve as Director-at-Large for the Section of Pharmacy Practice Leaders (SPPL). She has also served on both the ASHP Section of Pharmacy Practice Managers Advisory Group on Manager Development and Leadership Development. She served as chair of the ASHP New Practitioner Forum Executive Committee and as a member of the ASHP Council on Pharmacy Practice. Dr. Kelley was honored with the ASHP New Practitioners Forum Distinguished Service Award in 2010 and recognized as a fellow in 2019.



Michael Kraft, PharmD, BCNSP is a Clinical Professor at the University of Michigan College of Pharmacy and Assistant Director-Education and Research in the Department of Pharmacy Services at Michigan Medicine. He earned his Doctor of Pharmacy degree from the University of Michigan College of Pharmacy, and then completed a Specialty Residency in Critical Care and Nutrition Support at the University of Tennessee at Memphis. He returned to the University of Michigan and been there for the past 18+ years.

In his academic role, Dr. Kraft provides education in the didactic and experiential settings to pharmacy, medicine, nursing, and other students, residents, and healthcare professionals on career and professional development topics; parenteral nutrition therapy; fluid and electrolyte disorders and acid-base disorders. In his role as Assistant Director-Education & Research, he has been involved in oversight and improvements in the recruiting, on-boarding and training of new employees; oversight of the Research Pharmacy (Investigational Drug Service); oversight of department educational and professional development efforts; oversight of the pharmacy internship program; oversight of residency training/residency coordinator; oversight, expansion and improvements in experiential education opportunities for pharmacy students; and oversight of the department parenteral nutrition process. His research areas of interest include nutrition support; parenteral nutrition and parenteral nutrition safety; educational, clinical, and safety applications of informatics and information technology; integration of pharmacy students into practice; and surgery and critical care topics. He has authored over 40 peer-reviewed articles and book chapters, and he regularly makes presentations at local, regional, and national conferences. He is also a Board Certified Nutrition Support Pharmacist.

Dr. Kraft is an active leader in several professional associations, including the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) and the Michigan Pharmacists Association (MPA). He has been recognized by his colleagues with several awards and recognitions for his efforts, dedication and accomplishments with A.S.P.E.N., including the A.S.P.E.N. Distinguished Nutrition Support Pharmacist Award and the A.S.P.E.N. Excellence in Nutrition Support Education Award.



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Central Pharmacy

Central Pharmacy services is comprised of our Medication Use Systems (MUS) services and our Clean Room (CR) services. These two groups are based in the B2 pharmacy area. These groups are responsible for a wide variety of services to both internal (inpatient satellite pharmacy staff) and external (ADC end users & clinic staff) pharmacy customers. MUS staff procure, receive, process, repackage, and distribute the majority of medications (controlled and non-controlled) from wholesalers and direct manufacturers for inpatient and infusion pharmacies, health system clinics, and research laboratories. The CR staff produce sterile compounds for use within University Hospital, CVC, CW, and multiple offsite locations throughout the Michigan Medicine Enterprise. We coordinate and manage the majority of drug shortages incurred by the health system and continue to develop processes to reduce any changes in practice observed by our customers. MUS staff assure that products are ready for barcode scanning at the point of administration. MUS staff also manage the majority of the pharmacy databases that are not directly related to prescriber order entry. MUS staff process all emergency drug box supplies for the health system and local EMS/Ambulance services. MUS staff repackage bulk oral tablets and compound many of the oral suspensions and topical products that are not commercially available for distribution to both the inpatient satellites and multiple outpatient locations throughout the enterprise.



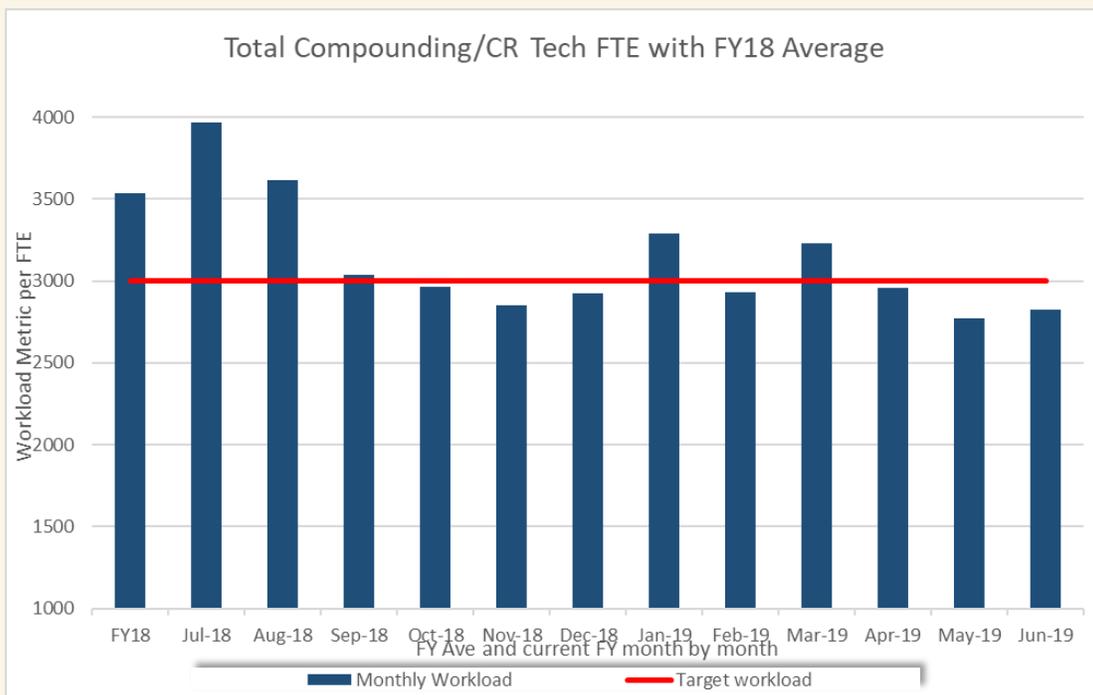
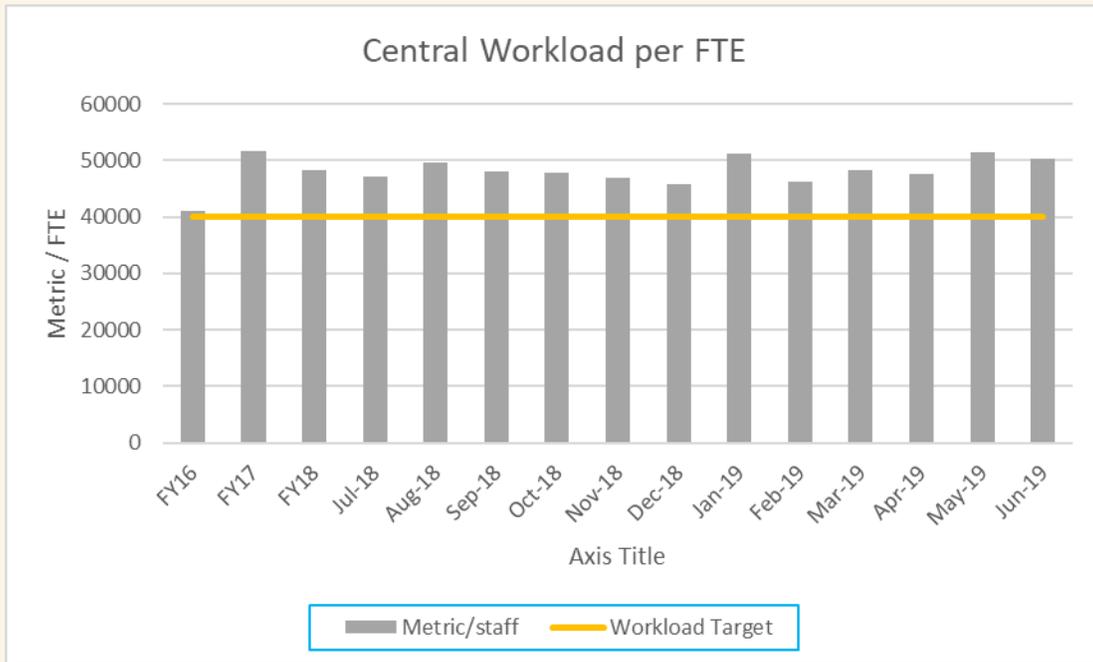
Highlights/Accomplishments

- ◆ Completed remodel of B2 clean room space to comply with USP 797/800 standards
- ◆ Revamped sterile compounding practices and training to increase compliance with USP 797
- ◆ Completed construction of hazardous drug storage to be compliant with USP 800 standards
- ◆ Managed and mitigated multiple extensive shortages with limited impact on end users
- ◆ Planned and started implementation of BD software/hardware for inventory and distribution



Central Pharmacy (continued)

Central Pharmacy Metrics





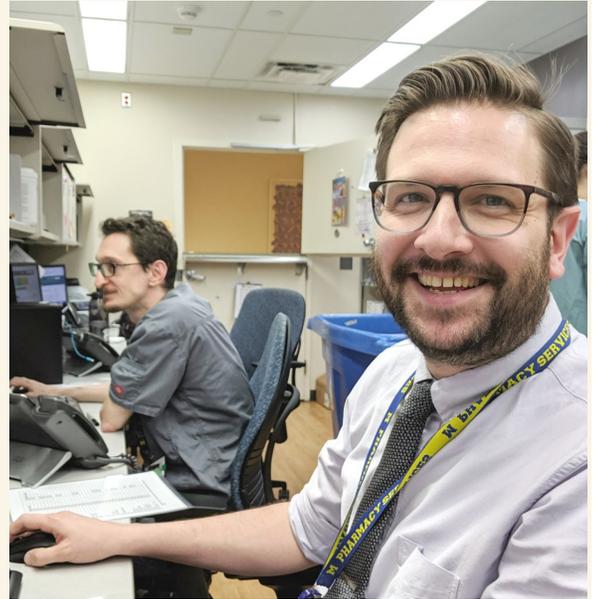
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University Hospital & Cardiovascular Center

The University Hospital (UH) and Cardiovascular Center (CVC) pharmacy teams include medicine, surgery, cardiology, and oncology service lines. Pharmacists working on these teams perform daily reviews of all patients to assess for appropriateness of drug therapy, manage pharmacokinetic dosing and monitoring of antibiotics and anticoagulants, assess parenteral nutrition, perform patient education, and participate in medication reconciliations and code response.

Pharmacists and technicians working in the UH 6th floor, 8th floor, OR and CVC satellite pharmacies work in collaboration with team members to ensure timely preparation and delivery of medications. These pharmacies provide services to all admitted patients in UH and CVC. Services offered by pharmacists and technicians include medication order review and verification, medication preparation and delivery, drug information, code response, and other services as needed. The 6th floor pharmacy promptly prepares and delivers first dose and STAT medications. The 8th floor satellite pharmacy has a focus on hazardous and investigational drugs. The OR pharmacy services adult surgical cases, and the CVC pharmacy services cardiovascular inpatients and surgical cases.

Together, these pharmacies work to ensure appropriate medication therapy is ready and available for patient care.



Joel Tallman and Kyle Quirk



Laurie Hernandez, Julie Lampert, and Brittany Cole



University Hospital & Cardiovascular Center (continued)

Highlights/Accomplishments

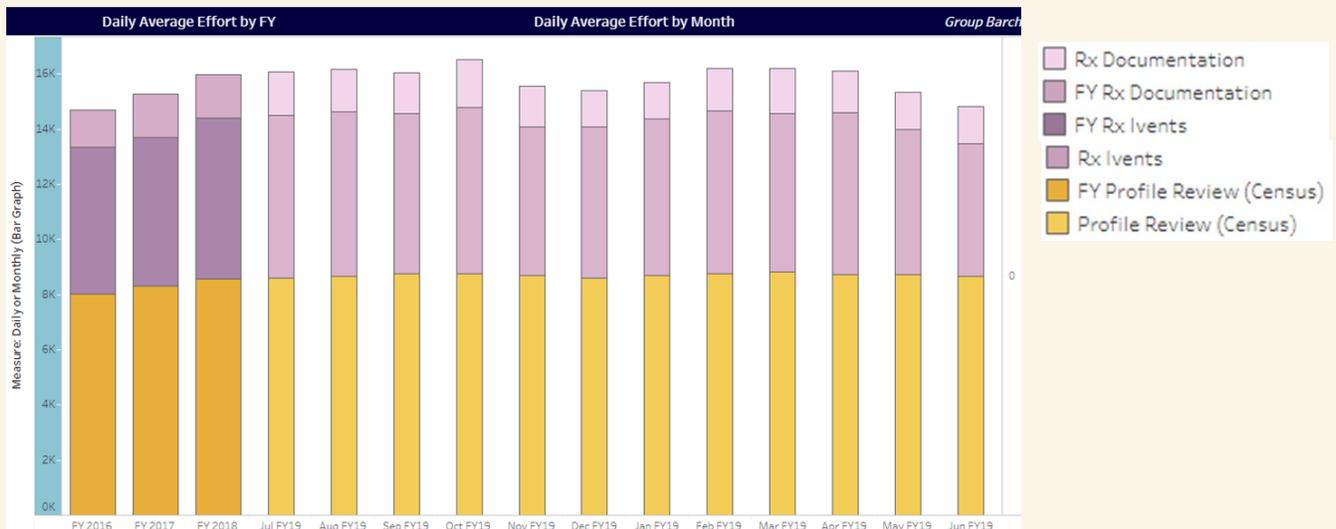
- ◆ Implemented Dispense Prep barcode scanning into medication dispensing process
- ◆ Expanded CVC satellite pharmacy hours to 24/7
- ◆ Improved security of propofol by handling as a controlled substance
- ◆ Standardized OR infusion concentrations
- ◆ Implemented spectrophotometry testing of controlled substance waste in the OR as part of diversion prevention program
- ◆ Identified and implemented various cost savings initiatives through pharmacist partnerships with MPLAN medical and nursing directors
- ◆ Contributed to scientific literature through collaboration of pharmacist specialists, generalists, residents, interns, students, nurses, and providers
- ◆ Supported health care education by providing learning experiences to pharmacy, nursing, physician, dentistry, and other learners



Latifa Sharker

Brittany Cole

Daily Average Clinical Workload (All Inpatient Services)

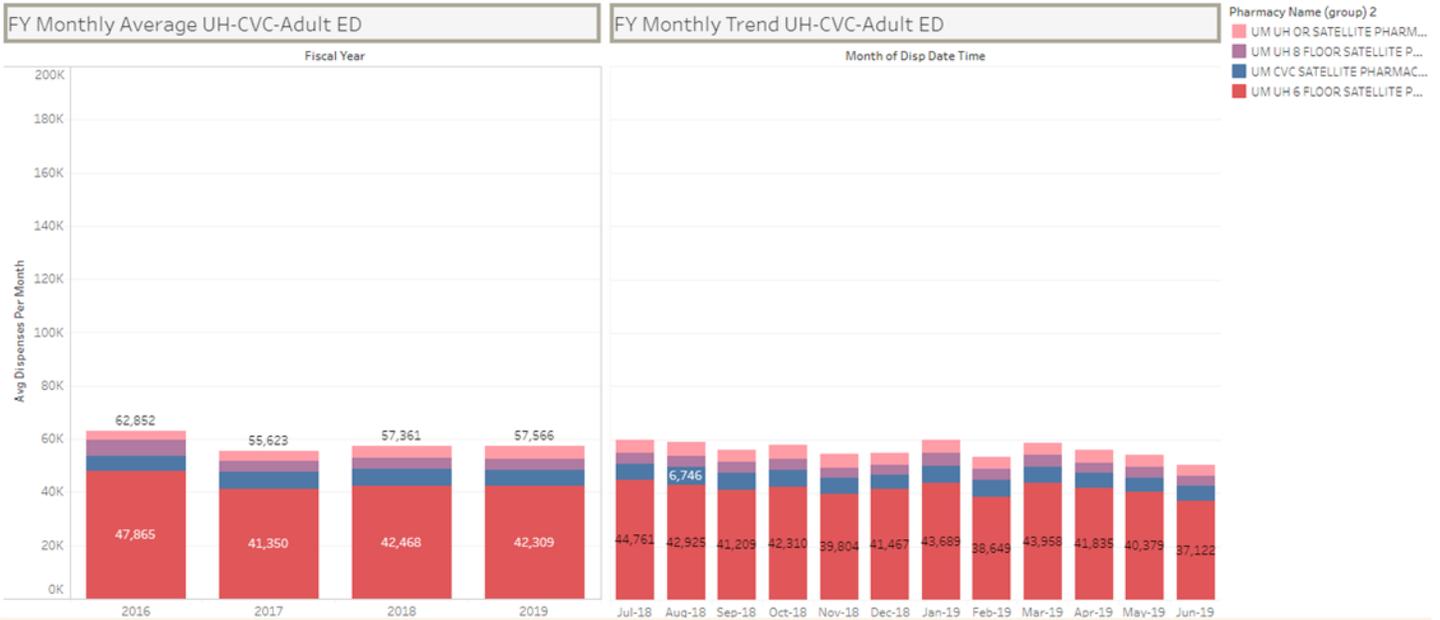




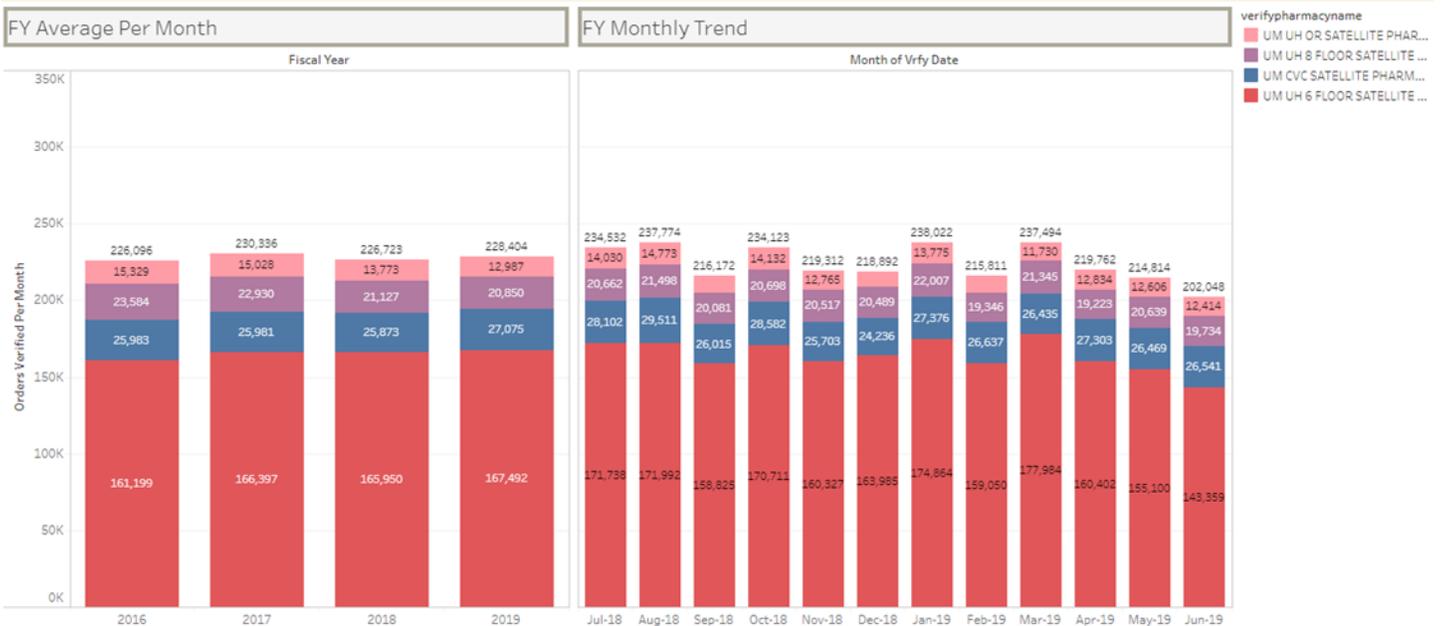
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University Hospital & Cardiovascular Center (continued)

Doses Dispensed by Pharmacy



Orders Verified by Pharmacy





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C.S. Mott Children's and Von Voigtländer Women's Hospital

C.S. Mott Children's and Von Voigtländer Women's Hospital with the University of Michigan – Michigan Medicine, a 350-bed acute care academic medical center, is a top pediatric hospital in the State of Michigan and one of the highest ranked pediatric medical centers in the United States according to US News and World Report. Mott pharmacy provides services for a wide variety of diverse pediatric disease states as well as maternal fetal medicine and women's health, and adult oncology. As the top performing children's hospital in Michigan, Mott was the only hospital ranked in all ten pediatric subspecialties (cardiology, urology, endocrinology, neonatology, pulmonology, oncology, gastroenterology, neurology, orthopedics, and nephrology) as evaluated by the 2018 Best Children's Hospitals rankings.



Responsibilities of pharmacists for the CW team include pharmacokinetic dosing and monitoring, anticoagulation dosing and management, cardiac arrest team participation, nutrition support, medication dosing, patient and parent education, and the verification and dispensing of approximately 1 million and 800,000 medication orders, respectively. The General Pediatrics, Critical Care Pediatrics, and Oncology teams are made of a combination of clinical pharmacist generalists, pharmacy technicians, and clinical pharmacist specialists who work together to support pharmacy clinical and operational pharmacy services. The CW Pharmacy Team services four different pharmacy satellites providing inpatient, outpatient infusion, operating room, and emergency room services. The Mott pharmacy team adheres to a set of core values including **teamwork**, **continuous improvement**, and **dedication** in everyday work to provide world class care and to ensure safe medication practices.





C.S. Mott Children's and Von Voigtländer Women's Hospital (continued)

Highlights/Accomplishments

- ◆ Began the FY19 USP 797 and USP 800 construction projects to achieve sterile compounding regulatory compliance in the CW10 clean room and CWOR pharmacy
- ◆ Added four new pharmacy technician FTEs to support sterile compounding operations
- ◆ Implemented Dispense Prep barcode scanning technology for unit dose and nonsterile medication dosage forms
- ◆ Added a new pediatric clinical pharmacist educator position to support professional development and education for pharmacy staff
- ◆ Extended business hours of the CWOR pharmacy and added two technician shifts to support evening sterile and nonsterile compounding activities
- ◆ Enhanced controlled substance monitoring and audit processes in the CWOR pharmacy
- ◆ Implementation of Project NINJA: a quality improvement program aimed to reduce medication-associated acute nephrotoxic injury
- ◆ Decreased use of opiates in VVH by implementing the Enhanced Recovery After Surgery (ERAS) protocol and improved turnaround time via implementation of conditional antibiotic orders
- ◆ Implemented a new discharge education service to provide teaching for safe and appropriate use of insulin pens in pediatric patients
- ◆ Increased compliance with appropriate use of prophylactic antibiotics in the CWOR via implementation of order-sets, automated Epic reports, and pharmacist review/intervention
- ◆ Standardized several OR and ICU intravenous infusion concentrations to improve patient safety (i.e. epinephrine, norepinephrine, midazolam, insulin, and others)
- ◆ Created and implemented new standardized training curriculum for pediatric pharmacists, including pharmacokinetic monitoring, anticoagulation, parenteral nutrition, and code/trauma education
- ◆ Formed a new technician training team to standardize on-boarding and training of new staff
- ◆ Implementation of a CW employee engagement committee and professional development book club to engage and develop all team members
- ◆ Restored the pediatric PGY2 residency program and established a residency coordinator and committee structure with the goal to recruit a resident for 2020-2021 residency year
- ◆ Converted anesthesiology to products in RTU form if available
- ◆ Reviewed and revised contents of supplemental code bag
- ◆ Collaboration of ICU's, APS, and clinical specialists to enhance ordering of PCA's
- ◆ Support of staff to participate in Event Mapping for serious medication safety events





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Ambulatory Pharmacy Services

Our team members provide high-quality, patient-centered services across the care continuum, including medication use and regulatory support to our ambulatory clinics. Our pharmacists, technicians, residents, and interns are involved in direct patient care, medication provision, and initiatives to improve cost and quality. Staff collaborate with teams of healthcare providers to provide the best care to all. Ambulatory Pharmacy Services partners and provides care across five outpatient pharmacies, seven infusion pharmacies, specialty pharmacy services, pharmacists embedded in clinics, and transitions of care services.

Community Pharmacy Services

The five outpatient pharmacies at the University of Michigan Health System provide services to patients receiving care from University of Michigan Hospitals and Health Centers, patients discharged from UMHS hospitals, emergency departments, and surgery centers, along with University of Michigan employees, retirees, and dependents. Many patients and family members find it convenient to get their prescriptions filled at these pharmacies, as UMHS pharmacies specialize in carrying medications not found in local community pharmacies, including compounded medications.



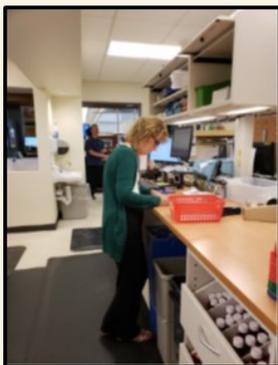
Trudy Mosley

Brittany Weber

Community Pharmacy Locations

Main Campus Pharmacies—Taubman Center, Cancer Center

Offsite Pharmacies—East Ann Arbor, Kellogg Eye Center, Brighton Center for Specialty Care



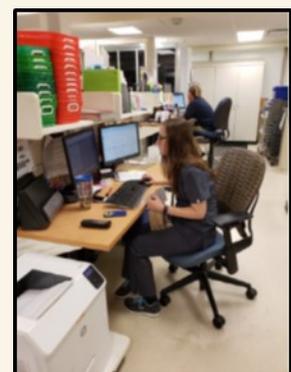
Gayle Miller



Steve Davies



Karen Dunlap



Danielle Devlin



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Ambulatory Pharmacy Services (continued)

Transitions of Care

The vision of the transitions of care pharmacy team is to ensure all patients discharging from our institution leave our care with a discharge medication plan in place, with focus on ensuring patient ability to gain access to their medications in a timely manner. Our services include the identification and resolution of medication access barriers and the processing of discharge prescriptions. Our team currently serves patients discharging from University Hospital. The transitions of care pharmacy team has played an integral role in the UMHS MiPART Priority Discharge program, a capacity management program focused on discharging a targeted number in order to free up inpatient beds. Most recently, our services expanded into the Taubman Pulmonary, Dyspnea, Assisted Ventilation, and Nephrology Clinics.



From left to right:
Conor Tuohy, Gayle Miller, Frank Pawlicki, Steve Davies, Doug Wojciechowski, Widad Alchurbaji, Jennifer Baldrige, Amelia Reese, Alyssa Poyer, Erin Hennessey, Audrey Yeiter, Renee Wolfenbarger

Highlights/Accomplishments

- ◆ Filled **257,472** prescriptions from July to June across 5 pharmacies for a total of **\$219,531,735** in sales.
- ◆ Continued growth of the medication therapy management (MTM) program to include medication synchronization for patients with complex care needs.
- ◆ Expansion of immunization services to include Tdap and influenza vaccinations to patients of Mott Children's hospital and caregivers/family. Plan to include Shingrix vaccination in 2020.
- ◆ Implementation of insulin syringe/needle standing order, which allows pharmacists to dispense insulin syringes/needles to patients who require them.
- ◆ Expansion of the priority discharge program to include more than 50 multidisciplinary teams across the hospital.
- ◆ Expansion of the transitions of care team for the meds to beds program to deliver discharge medications to patients—currently servicing 10 units with plans to continue expanding.
- ◆ Provide comprehensive medication reconciliation and education to patients discharging from the hospital, including pediatric counseling to patients < 17 years of age and dispensing of Deterra Drug Deactivation Systems to patients receiving opioid prescriptions.
- ◆ Installation of opioid take-back receptacle located in the neurology clinic of Taubman Center, Reception C.
- ◆ Continued integration of automation into the dispensing process using both ScriptPro with the collator and RxSafe to monitor controlled substance use in the Taubman pharmacy.



Felicia Ziesmer, Julie Habitz



Doug Wojciechowski



Kimberly Parker

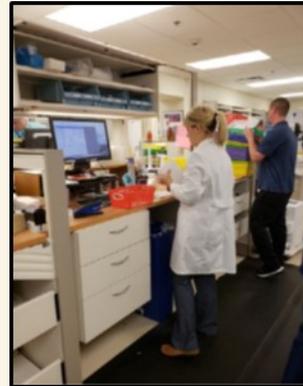


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Ambulatory Pharmacy Services (continued)

Highlights/Accomplishments

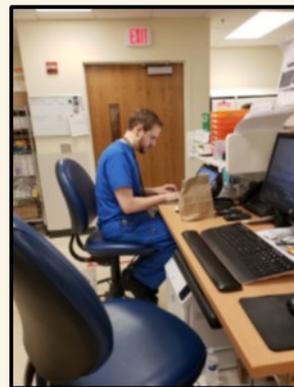
- ◆ Reworked the controlled substance procedure to conduct quarterly inventories in all 4 pharmacies.
- ◆ Poster presentations at ASHP Midyear in San Diego, CA: “Evaluating the dispensing of medications after discontinuation in the electronic medication record at a large academic medical center” by the ambulatory pharmacy intern, Sabrina Miller, and “Evaluation of a specialty HCV pharmacy service” by the PGY-1 community resident, Ashley Sabourin, were received with great interest.
- ◆ Hired and integrated into a very active and energetic team 4 new members to deliver exceptional patient centered care.
- ◆ New community pharmacy site opened September 4, 2018 in the Brighton Center for Specialty Care.
- ◆ Continued integration of automation into the dispensing process using both ScriptPro with the collator and RxSafe to monitor controlled substance use in the Taubman pharmacy.
- ◆ Reworked the controlled substance procedure to conduct quarterly inventories in all 5 pharmacies.
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Lindsay Dudek



Johnny Bansfield



Conor Tuohy



Widad Alchurbaji



*From left to right:
Alex Shingleton, Sarah Lakehal-Ayat, Aislynn Barron, Karin Dunlap, Danielle Devlin*

Specialty Pharmacy

Specialty Pharmacy Services provides high-touch services to patients with specialty medication needs including medication fulfillment, financial coordination, and clinical patient management. Specialty medications are generally high-cost medications used to treat patients with specialized diseases requiring complex treatment and coordinated care (eg, transplant, hepatitis, oral chemotherapy, multiple sclerosis).

These services include: financial coordinators to improve patient access and affordability to their specialty medications; monthly refill reminder calls; mail order delivery of their prescription medication(s) within the state of Michigan; a pharmacist on call 24/7; and medication therapy management.

	FY19
Patients	~4,100
Rx Volume	~137,000 (~80% transplant)
Packages Shipped	~40,736
Call Center	~79,000 (total inbound and outbound call, specialty plus transplant) <u>Specialty (excludes transplant):</u> Call abandonment rate: 4% Average speed to answer (ASA)*: 76%
Prior Authorizations	~4,000 PAs <u>Turnaround times</u> ~3 days for PA approval ~5 days for medication to patient
Copay/patient assistance	~\$20M offset for patient out-of-pocket specialty/transplant medication expense

*ASA, % calls picked up within 30 seconds

Highlights/Accomplishments

- ◆ This year, we welcomed a new Clinical Pharmacist Generalist and several new Pharmacy Technicians, Pharmacy Financial Coordinators, and learners to our team.
- ◆ We diligently developed ~80 P&Ps and adapted new workflows for specialty pharmacy accreditation, and submitted our application to URAC in April. This included: completion of an external mock audit; development of a full patient management program; completion of ~700 legacy patient assessments to ensure appropriate therapy, side effects, and medication reconciliation; and staff training.
- ◆ Our specialty pharmacy Quality Management Committee maintained two active quality improvement projects: ensuring adequate temperature control in the specialty pharmacy for medication storage; and, assessment of pharmacy financial coordinator workload. New quality metrics include health-related quality of life, improvement in patient comfortability with self-injections, complaint turnaround time, and evaluation of drug utilization review flags.

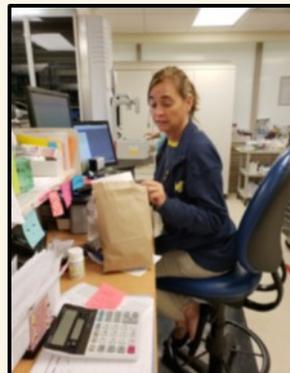
Specialty Pharmacy (continued)

Highlights/Accomplishments (continued)

- ◆ We implemented Asembia1, a new case management platform to support specialty pharmacy patient documentation, reporting, and accreditation requirements.
- ◆ We maintained ongoing collaboration with the transplant, hepatitis, MS, PAH, rheumatology, GI, Ortho, and pulmonary/CF clinics as well as our oral chemo and transitions of care colleagues to expand, refine, and coordinate our services.
- ◆ Selected outcome measures from our pharmacist-provided clinical services include:
 - ◆ Hepatitis C SVR rates were greater than 98% for patients completing treatment.
 - ◆ Patient adherence rates for Enbrel and Humira: PDC 0.89 and 0.92, respectively.
 - ◆ Adherence (based on PDC threshold of $\geq 80\%$) for multiple sclerosis, 90%; rheumatoid Arthritis, 81%; and, HIV, 88% (PDC threshold $\geq 90\%$)
- ◆ We re-signed a 2-year MOU with U-M Prescription Drug Plan to provide ongoing partnership as the dedicated specialty pharmacy provider for our employee/retiree patient population. This includes quarterly meetings and service of ~14,400 specialty medications for nearly 1,400 patients, most of which required prior authorizations. Additionally, we resourced ~\$382k in copay assistance for these patients.
- ◆ Patient satisfaction results from this year indicate 96% of patients are satisfied with our services and 96% would recommend our Specialty Pharmacy.
- ◆ Served on the Vizient/Acentrus specialty pharmacy benchmarking, payer, and clinical workgroups/committees and Michigan Medicine's specialty program liaison to other health system specialty pharmacy collaborative members.
- ◆ Consistent with the institution's educational mission, we engaged 13 pharmacy students (IPPE and APPE), 3 interns, and 5 residents in pharmacy administration, specialty, and clinical service experiences.



Caitlin Hill, Amanda Helinski, Scott Jones



Shawn Race

Infusion Pharmacy

The infusion team is located in the Ann Arbor and surrounding suburbs and is composed of roughly 58 team members (pharmacists 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
- ◆ A. Alfred Taubman Health Care Center
- ◆ Rogel Cancer Center

The infusion centers located in Ann Arbor suburbs with a dedicated pharmacy include:

- ◆ Brighton Center for Specialty Care
- ◆ Canton Health Center
- ◆ East Ann Arbor Health Center
- ◆ Northville Health Center
- ◆ West Ann Arbor Health Center

There are additional sites supported by the infusion team members for either infusion medications or intra-bladder BCG preparation.

- ◆ Clark Road infusion—supported by Canton Health Center
- ◆ Livonia Surgery Center—supported by Northville Health Center
- ◆ West Shore Urology—supported by Canton Health Center

Key Changes in Cancer Center Infusion Pharmacy Procedures/Workflow for the Fiscal Year

- ◆ **December 2018:** Began infusion pharmacy paperless workflow. Optimized pharmacy communication between pharmacists and technicians.
- ◆ **January 2018:** Increased the number of infusion medications that are prepared ahead of the patient's infusion appointment time (Expansion of Make Ahead Drug List). Expanded infusion pharmacy make ahead list for medications compounded in a segregated compounding area (SCA).
- ◆ **Mid-March 2018:** Infusion pharmacy construction began. Cancer center infusion pharmacy began operating out of CW7 and B2 cleanrooms. Utilized cleanroom extended stability for compounded products to increase number of medications compounded ahead of patient's infusion appointment time. Further expanded infusion pharmacy make ahead list for medications compounded in a cleanroom.

Clinical Orders Team

The University of Michigan continues to optimize workflows with the EPIC Beacon product for chemotherapy CPOE. Much of this work is supported by a clinical orders team, which provides evidence-based reviews for treatment protocol requests and leads a standardized approach to the build for orders templates.

Infusion Pharmacy (continued)

Pharmacist-Run Anemia Management Clinic

This is an ongoing pharmacist-run clinical program, which functions under a collaborative drug therapy management (CDTM) agreement to provide laboratory monitoring, medication dosing and ordering for iron supplementation and erythropoietin stimulating agent use. MiChart is utilized for patient tracking. 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. Anemia Management Clinic team members also have clinic hours with the Cancer Center Symptom Management and Supportive Care Clinic, where they work in close collaboration with the physician-led team to provide recommendations on dose changes, alternative therapies, medication titrations, and drug interactions. The pharmacists also precept third-year pharmacy students, who provide Medication Management Services to new Cancer Center patients. These students conduct medication reconciliations, where they review a patient's medications, including herbal and dietary supplements, and assess for drug- or disease-interactions. Any recommendations or potential issues are then communicated with the patient's primary oncologist.



Jane Crawford

Oral Medications for Cancer Therapy Program

The Oral Medications for Cancer Therapy Program was initiated in 2012 and follows all patients receiving oral anticancer medications. The focus of this program is on streamlining and providing support for medication access, providing medication reconciliation, patient medication education, patient compliance/adherence information, drug-drug interaction review and medical record documentation. This team also works on creating and providing the health system with oral medication education, to empower patients in self-care management of adverse effects yet know when to contact their clinic providers. Clinical and quality outcomes are continuously assessed and we evaluate and care for more than 3500 patients/year. This year the program has contributed to high performance on many of the ASCO QOPI quality metrics. The oral chemotherapy team has worked with specialty pharmacy towards URAC accreditation during the past year.



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Infusion Pharmacy (continued)

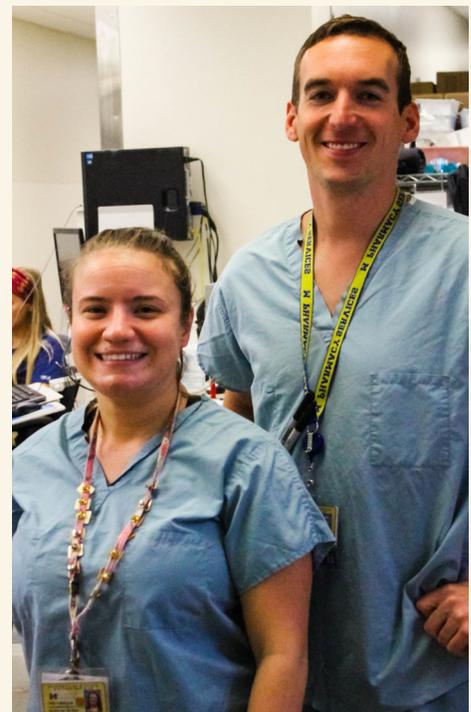
Location	# Treatment Chairs/ Beds	FY19 Average Pa- tient Visits Per Month	FY19 YTD Average # Orders Verified By Pharmacist	FY19 YTD Average # Doses Dispensed By Technicians
Brighton*	16	505	2928	669
Cancer Center	59	2754	22879	3728
Canton	9	422	1865	460
Clark Road**	6	68	151	--
CW7 Infusion (adult and pediatric)	57	548	4389	688
East Ann Arbor	10	457	1543	430
Northville	12	604	2594	571
Taubman	16	557	1772	424
West Ann Arbor	12	353	1844	380

*Brighton opened in September 2018

**Doses prepared incorporated into Canton data



Sharon Baik, Tom Jarvi, Rania Bazzi



Natalie Harmon, Josh Johnson



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Infusion Pharmacy (continued)

Highlights/Achievements

- ◆ Brighton Center for Specialty Care opened in September 2018 with the Joint Commission Sterile Compounding Certification achieved
- ◆ Renovation from segregated compounding area to cleanroom was completed at Northville Health in April 2019
- ◆ Current renovation from segregated compounding area to cleanroom at Cancer Center
- ◆ Cancer Center moved to a paperless workflow with more pharmacist integration in clinic areas/space
- ◆ Improved medication turn-around time
- ◆ First year with two pharmacy interns
- ◆ Team expansion from 35 employees in 2016 to 58 employees currently within infusion
- ◆ Newly revised expiration compounding chart for extended dating and revisions, which was also standardized across CW and other infusion sites



Pattie Kim

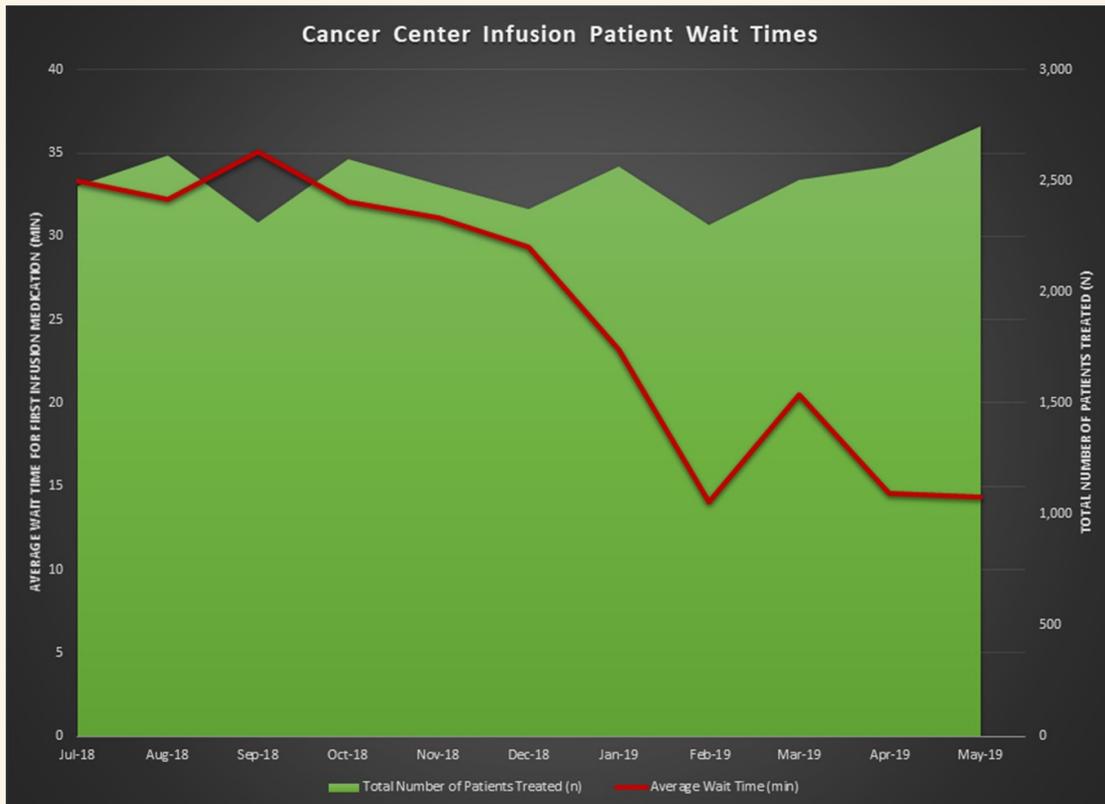


Liz Jennings

Infusion Pharmacy (continued)

Infusion Pharmacy Metrics	May 2018	May 2019
Total Number of Patient Visits/Encounters at Cancer Center	2815	2748
Total Number of Products Dispensed from CC Infusion Rx	3934	4604
Percentage of Patients Receiving 1 st Med in ≤ 30 min from RTT	44.90%	85.23%
Percentage of Patients Receiving 1 st Med in ≤ 60 min from RTT	77.37%	95.56%
Percentage of Patients Receiving 1 st Med in ≥120 min from RTT	1.10%	0.62%
Average Wait Time (minutes) from RTT to 1 st Med Dispensed	38.32	14.37

Highlights/Accomplishments (continued)



Oncology Clinical Services

The oncology clinical services team had a busy and productive year. Team members were engaged with more than 50 committees and tumor boards, had over 26 publications, delivered over 25 presentations, provided didactic lectures at numerous schools and colleges, and provided over 110 experiential rotation experiences. Team members were also honored with multiple Making a Difference Awards, two Michigan Pharmacists Association Hall of Honor recipients, and multiple nominations for the College of Pharmacy's Preceptor of the Year, and Oncology Residency Preceptor of the Year.

Inpatient Oncology Pharmacists

The inpatient oncology clinical specialist team is comprised of 6 pharmacists, providing care to 9 inpatient oncology services in University Hospital and C.S. Mott Children's Hospital. The team provides care to up to 100 complex adult and pediatric, bone marrow transplant, cellular therapy, medical oncology and hematology patients per day. 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 practice began in 2014. This team has grown to 9 pharmacists, providing care in the Rogel Cancer Center, C.S. Mott Clinics, and the Brighton Center for Specialty Care. These pharmacists provide comprehensive oncology care as an independent, yet collaborative care provider within the constructs of the medical team. The team provided pharmacist services for over 3,400 patient encounters this year. This spring, pharmacists led the approval of a collaborative drug therapy management agreement enabling a provider to refer a patient to the pharmacist for management of GI toxicities of cancer, including prescribing new medications within the scope of the agreement. The pharmacist team is also leading a number of other initiatives including improvements for patients transitioning between inpatient and outpatient care, creating processes for patients to safely receive chemotherapy at home, and reviewing patient-reported outcomes submitted by text message in real-time. This team also includes generalist pharmacists working in the anemia clinic, symptom management, and some solid tumor areas.

Oral Medications for Cancer Therapy Program

The Oral Medications for Cancer Therapy Program was initiated in 2012 and follows all patients receiving oral anticancer medications. The focus of this program is on streamlining and providing support for medication access, providing medication reconciliation, patient medication education, patient compliance/adherence information, drug-drug interaction review and medical record documentation. This team also works on creating and providing the health system with oral medication education, to empower patients in self-care management of adverse effects yet know when to contact their clinic providers. Clinical and quality outcomes are continuously assessed and we evaluate and care for more than 3000 patients/year. This year the program has contributed to high performance on many of the ASCO QOPI quality metrics and URAC accreditation preparation in our specialty pharmacy partnership.



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Oncology Clinical Services (continued)

Clinical Orders Team

The University of Michigan continues to optimize workflows with the EPIC Beacon product for chemotherapy CPOE, and integration with our pathways product, ViaOncology. This work is supported by a clinical orders team, which provides evidence-based reviews for treatment protocol requests and leads a standardized approach to the build for orders templates. The team of 2 pharmacist FTEs maintains over 1150 commercial treatment or therapy plans and collaborates to manage over 660 research plans.

Medication Reconciliation Programs

The pharmacist-run medication reconciliation program for Cancer Center patients is an integral component of improving patient care and clinic efficiency. It is supported by Introductory Pharmacy Practice Experience (IPPE) students through partnership with the University of Michigan College of Pharmacy, and pharmacist interns and infusion clinical pharmacist preceptorship. The program provides complete medication reconciliation prior to the first Cancer Center visit. In addition, pharmacist team members provide Medication Management Services by request where the pharmacist reviews medications, including herbal and dietary supplements, and assesses for drug- or disease-interactions.





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Emergency Pharmacy Services

The emergency department (ED) team consists of 10 core pharmacists who provide 24/7 pharmacy services for two emergency departments – Adult Emergency Services (AES) and Children’s Emergency Services (CES). The ED pharmacist responds to all codes, traumas, and medical emergencies, assists with optimal drug and dose recommendations, compounds life-saving drips at the bedside, and recommends proper dose titrations to achieve desired patient outcomes.

The ED pharmacists provide pharmacokinetic dosing services for vancomycin and aminoglycosides, and work closely with providers to ensure antibiotic selection is appropriate and dosed correctly for each unique patient case. Additional services provided by 24/7 pharmacist presence in AES and CES include participation in critical airway management, responding to drug information questions and toxicology consults, order verification, patient counseling, focused medication history reviews, and medication dispensing (some of which includes post-exposure prophylactic meds for occupational exposure, rabies vaccine and immune globulin, and investigational drugs). In addition, the AES pharmacist also attends daily rounds for critical patients located in the Emergency Critical Care Center (EC3) within AES.



*Pictured, from Left to Right: Dave Blackford, Liz VanWert, Emily Supenia, Nada Saad, Liz Macon, Mary Dimo, and Lindsey Clark.
Not Pictured: Adrienne Bell, Christine Egenti, Nancy Jamieson, Aaron Jeffery, and Matt Kalisieski.*

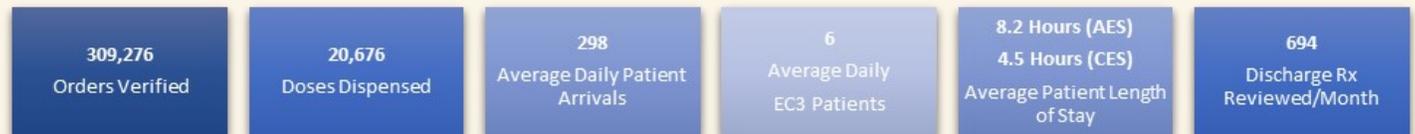
Highlights/Accomplishments

- ◆ Obtained approval to begin our PGY2 Emergency Medicine Pharmacy Residency Program, received ASHP-Pre-Accreditation Status, and successfully matched with our first resident, who started with us on July 1st, 2019.
- ◆ Recruited and on-boarded our first dedicated ED Pharmacy Technician position.
- ◆ Obtained approval for 2.0 additional FTE ED Pharmacy Technician to provide for increased pharmacy technician coverage on the day and evening shifts.
- ◆ Continued naloxone nasal spray dispensing and counseling program, through which we provided naloxone nasal spray to over 50 patients at discharge from the ED.
- ◆ Continued implementation of the AES/CES Pharmacy Weekly STATus Updates for improved communication and transparency.
- ◆ Held team discussions of our mission, vision, goals, and priorities for the upcoming year.

Emergency Pharmacy Services (continued)

Highlights/Accomplishments

- ◆ Optimized the ED Track Board to integrate PK scoring tools and sepsis screen for ED pharmacists.
- ◆ Participated in several mass casualty drills, including the Burn Drill on 10/30/18, SNS Region 2 South Tabletop Exercise on 6/14/19, and other drills through the Emergency Management Executive Committee (EMEC).
- ◆ Implemented cost savings initiatives, including the Rabies Immune Globulin Dose Rounding Policy and addition of 100 mg tPA vials to formulary, to be used in place of 2 x 50 mg vials for patients requiring > 50 mg of tPA per weight-based dosing.
- ◆ Prepared to provide post-exposure prophylaxis for patients presenting to AES/CES during the Measles outbreak.
- ◆ Precepted 22 learners on rotation in the department throughout the year, including IPPE students, APPE student, PGY1 residents and PGY2 residents.
- ◆ Implemented several improvements to the AES learner rotation.
- ◆ Cross trained several new pharmacists in AES and CES.



Transitions of Care (TOC)

The transitions of care (TOC) pharmacy technician team strives to facilitate timely patient access to medications. TOC pharmacy team services include conducting copay checks to assess insurance coverage, facilitating prior authorizations, completing appeal letters, providing insurance formulary options, and coordinating the filling and bedside delivery of discharge medications.

Clinic Team

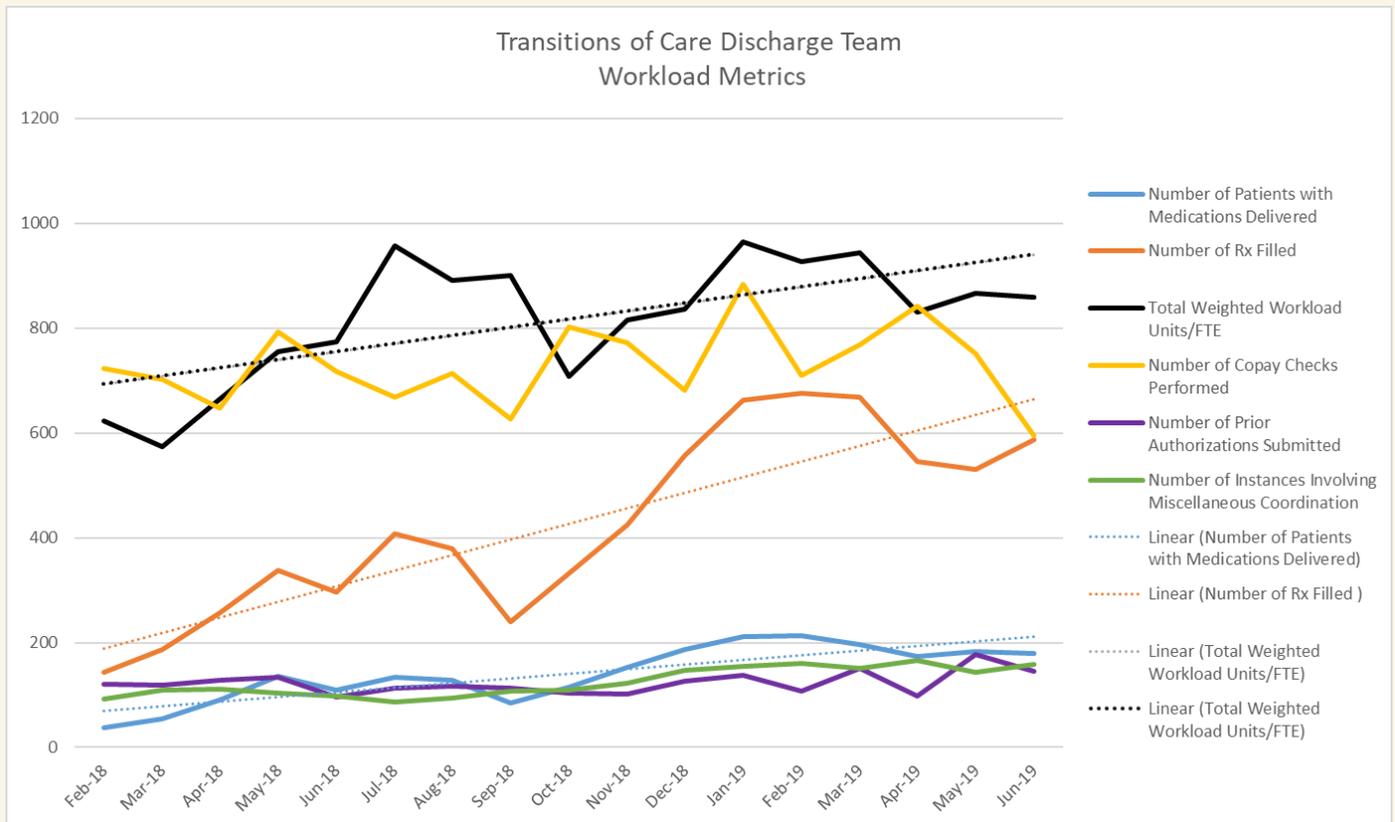
The TOC clinic team consists of eight pharmacy technicians who offer medication access assistance in the Dermatology, Hepatology, Gastroenterology/Infectious Disease, Pulmonary/Nephrology, and Rheumatology Taubman Outpatient Clinics and the Metabolism, Endocrinology, and Diabetes Clinic at Domino's Farms. At these locations, TOC pharmacy technicians are integral and highly valued members of the interdisciplinary health care team. They are frequently consulted by clinic nurses and providers for their services. There has been great interest in continuing to expand our medication access services throughout the health system, and work in this area is on-going! Sept 2018-June 2019 Workload below:



Transitions of Care (TOC) (continued)

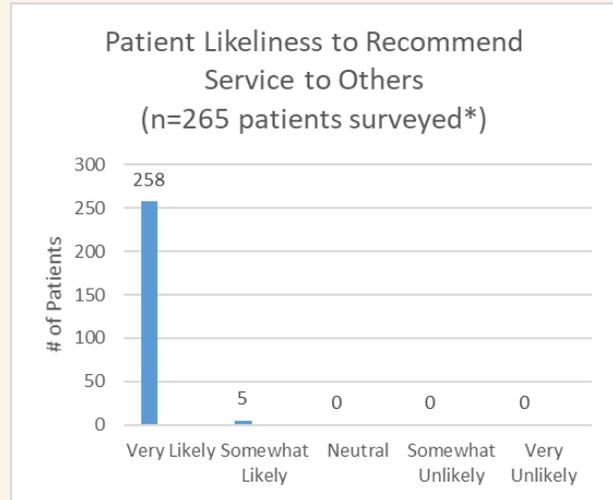
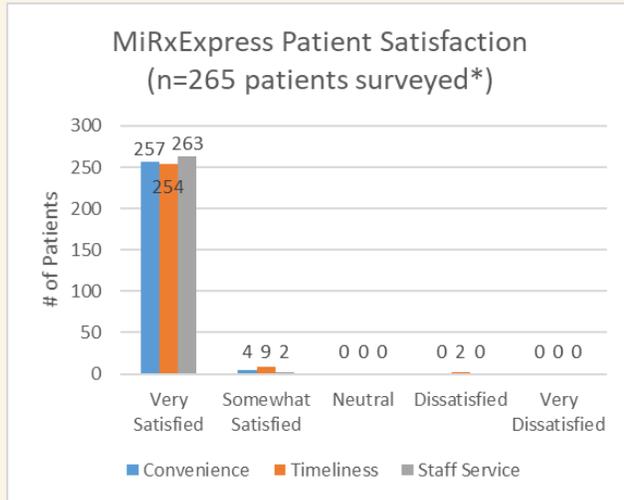
Discharge Team

The TOC discharge team consists of six pharmacy technicians and one pharmacy intern involved in the process of adult inpatient discharge to home and the discharge medication bedside delivery service, MiRxExpress. Pharmacy technicians currently assist patients discharging from University Hospital, Cardiovascular Center, Von Voigtlander Women’s Hospital Service, Adult Hematology/Oncology Service, and the Adult Emergency Services (AES) department. The team also participates in Medicine Faculty Hospitalist rounds, serves on hospital committees related to the discharge process, and provides discharge summaries for Blue Care Network patients. MiRxExpress pharmacy technicians currently provide daily discharge bedside delivery to 9 units (4C, 5A, 5B, 5C, 7A, 8A, 8B, 8C, and 8D), including patients involved in the Michigan Patient Arrival and Rapid Throughput (MiPART) priority discharge program (PDP). MiRxExpress expansion to additional units is on-going, with a long-term goal to offer bedside delivery to all patients who would like to receive this service across the institution.

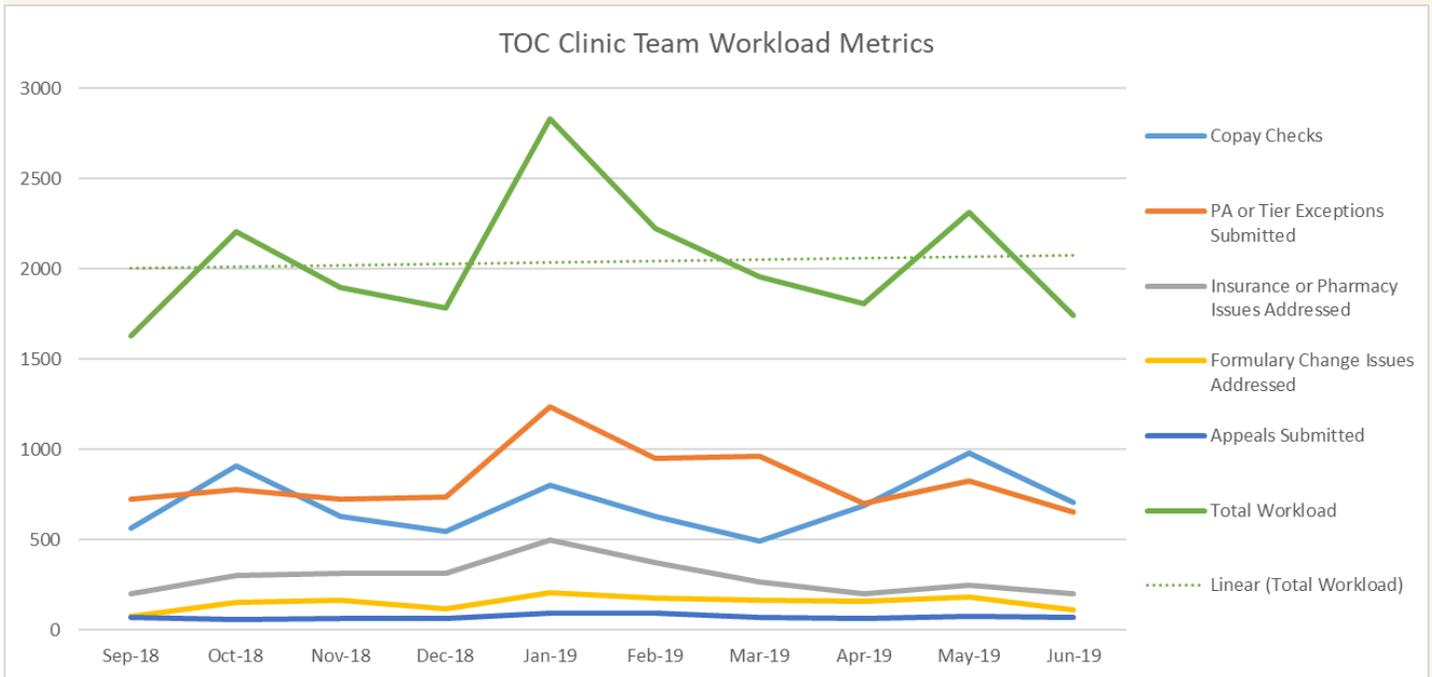


Transitions of Care (continued)

Patient Satisfaction Results



*265 patients were surveyed; not all 265 surveys were answered in completion.
Total number of responses may not equal 265.





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Transitions of Care (continued)

Pictured, Top from Left to Right: Julie Habitz, Staci Joseph, Sara Fox, Denise Richard, Lindsey Clark, Sue Lott, Brittany Weber, Maria Lara.

Pictured, Bottom from Left to Right: Red-cloud George, Felicia Tilley, Nichole Culter, Christabel Lo.

Not Pictured: Aliaa Chehadeh, Megan Hart, and Kaitlyn Henry.



Highlights/Accomplishments

- ◆ Implementation of 2 new Pharmacy Technician Supervisor positions- one position for the discharge team (Staci Joseph) and the other position for the clinic team (Sara Fox).
- ◆ Promotion of several team members to the next level using the Pharmacy Technician Career Ladder.

Discharge Team

- ◆ Expansion of the MiRxExpress bedside delivery program to additional units, including UH 5B, 7A, and 8D.
- ◆ Demonstrated outstanding patient satisfaction with our MiRxExpress services. On a scale of 1-5, with 1 being very dissatisfied and 5 being very very satisfied, our convenience average score is 4.9 (median of 5), timeliness average score is 4.94 (median of 5), and our staff service average score is 4.99 (median of 5), with a patient likeliness to recommend average score of 4.94, with a median of 5 (scale of 1 (very unlikely) to 5 (very likely)). This survey included 265 patients that received the MiRxExpress bedside delivery service.
- ◆ Conducted a lean process improvement study of our MiRxExpress bedside delivery process and implemented a workflow redesign to improve the efficiency of our processes.
- ◆ Hiring and on-boarding of 3 new Transitions of Care Pharmacy Technicians and 2 Pharmacy Interns to the Discharge Team.
- ◆ Improvement of the TOC Discharge Team Workload Dashboard.

Clinic Team

- ◆ Expansion of the TOC Clinic Team services to include additional patient populations, including the Taubman Hepatology Clinic and expanded coverage of the Taubman Rheumatology Clinic and service line.
- ◆ Hiring and on-boarding of 2 new Transitions of Care Pharmacy Technicians to the Clinic Team.
- ◆ Implementation of TOC Clinic Team Workload Dashboard.
- ◆ Currently, work is on-going to expand the role of the pharmacy technician in the clinics across the health system to facilitate greater medication access for our patients.

Pharmacy Analytics, Quality, Regulatory, & Safety

Pharmacy Analytics, Quality, Regulatory & Safety (PQRS) represents four pillar concepts used by the distinct teams in this section of the department to support Michigan Medicine and pharmacy operations. The distinct teams work within the PQRS pillars listed below and are described in the pages that follow:

- ◆ Pharmacy Analytics
- ◆ Medication Quality & Safety
- ◆ Diversion Prevention
- ◆ Medication Use Policy
- ◆ Compounding Compliance

Pharmacy analytics is inclusive of the data, tools, and methods used to help us to better understand our work and its impact on patients. Primary tools include project management, business intelligence software and data visualizations. Major analytics domains for the work include: workload and productivity assessment, drug costs and utilization tracking, clinical outcomes, diversion detection, and safety monitoring.

Quality improvement efforts help us continually improve the care we provide our patients and the services we provide to our customers. This is achieved via a number of quality projects, continual performance improvement monitoring, and medication use evaluations.

Regulatory compliance is an integral part of quality. PQRS teams continually provide guidance to the department and organization regarding regulatory standards, educate staff about how to best to meet these standards, help devise detailed policies and standard operating procedures, and perform audits to continually assess our performance relative to regulatory standards and best practices to ensure a state of continual readiness and compliance. Over the course of the past year, we have successfully hosted compounding visits from both the FDA and Joint Commission (TJC) and passed our triennial TJC survey.

Safety is achieved by working in an interdisciplinary manner to optimize the safe and effective use of medications in the health-system, spearheaded by work done in our Medication Safety, Pediatric Medication Safety, and P&T Committees.



Pharmacy Analytics

Team Members

- ◆ Karl Renius (*left*)
Clinical Pharmacist, Analytics
- ◆ Seema Jetli (*front center*)
Senior Project Manager for Data Visualization
- ◆ Todd Benner (*back center*)
HITS Database Support, Senior Applications Analyst/
Programmer
- ◆ Bruce Chaffee (*right*)
Assistant Director, Pharmacy Analytics, Quality, Regulatory & Safety

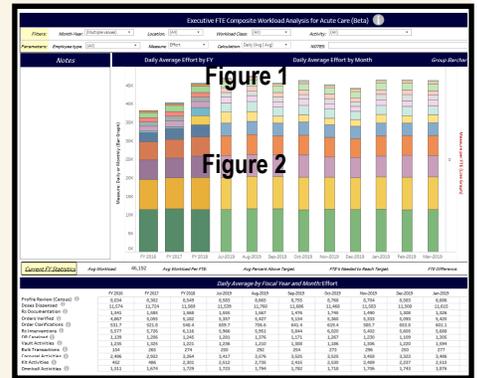




Pharmacy Analytics

Highlights/Accomplishments

- Created and delivered over 50+ visualizations and dashboards including but not limited to:
 - The Acute Care Executive Drug Cost Dashboard, which provides executives with a high level view of the drivers of inpatient and ED drug costs and additional patient details by hospital facility, MPLAN facility, Medical Service or Pharmacy Team. The core dashboard is designed to detail the total cost, but it can be filtered to display data according to the drug cost per patient day, average monthly cost, and other variables.
 - A Drug Cost Dashboard based on FLEGS and Cost Centers, which provides medication costs trending details for Finance and the Infusion Centers over user-selectable time periods and assists in variance reporting.
 - The Acute Care Executive and Manager FTE Composite Workload Dashboards, which provides Pharmacy Management with a detailed view of workload/effort and productivity measure per FTE for Pharmacists and Technicians in Acute Care Inpatient settings including UH-CVC and CW Inpatient Areas, ORs, B2 and Clean Room.
 - A Utilization Dashboard for Antimicrobial Stewardship team to display metrics pertaining to antimicrobial Days of therapy
 - A Product Error Dispense Report Dashboard, which provides a quick and easy way for pharmacist to document errors found during the dispense process using Qualtrics and later analyzed and monitored by the Medication Safety team through Tableau.
- Outreach and alliances – Partnership with CANDI (Cost Analytics and Decision Intelligence) team to integrate our composite workload metrics to support and implement an advanced decision support platform to enable Michigan Medicine to derive the value of care provided to patients through the provision of robust analytics and reporting that integrates cost, outcomes, and revenue to inform quality improvement and change management at Michigan Medicine.





Regulatory Compliance: Compounding Compliance Team (CCT)

Sterile Compounding Program Scope

- ◆ 25 Compounding Locations (Figure 1)
- ◆ 368 Compounders (Figure 2)

Site Visits and Inspections Managed in FY'19

- ◆ LARA Inspection of BCSC– Aug'18
- ◆ NABP Inspection of Canton Infusion- Nov'18
- ◆ TJC Inspection of BCSC- Nov18
- ◆ FDA return inspection of main medical campus clean rooms- Dec'18
- ◆ TJC Compounding Certification renewal of all sterile compounding locations- Mar'19

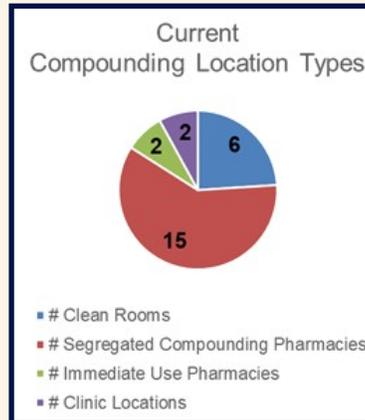


Figure 1

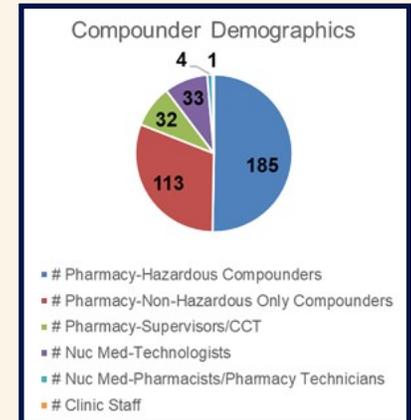


Figure 2

Corporate Responsibilities Expansion

- ◆ Oversight expanded from sterile compounding focus (USP <797>) to include all compounding compliance including non-sterile compounding (USP <795>) and hazardous drug handling (USP <800>)
- ◆ New Positions will support CCT Service Expansion
 - ◆ 3 Technicians (started March, April '19)
 - ◆ 2 Pharmacist Specialists (started March, May '19)

Service Expansions Planned in FY'20

- ◆ Enhanced education/competency assessments for hazardous drug handling and non-sterile compounding
- ◆ Compliance auditing of compounding areas
- ◆ Increased environmental monitoring of segregated compounding areas (USP <797> change)
- ◆ USP <800> program oversight

Highlights/Accomplishments

- ◆ Implemented a twice annual media fill program, completing over 700 challenges in FY'19 (Figure 3)
- ◆ Revised/Implemented a comprehensive portfolio of sterile compounding policies and work procedures (June-October'18)
- ◆ Redesigned New Employee Training Program from 2-day to 3-day program conducted by CCT- November'18
- ◆ Participated in the construction planning and post-construction activation activities for the following compounding locations: Brighton Center for Specialty Care (Infusion, OR), B2 Clean Room, Northville Infusion
- ◆ Launched Compounding 360 compounding task management application and rolled out to all clean room locations

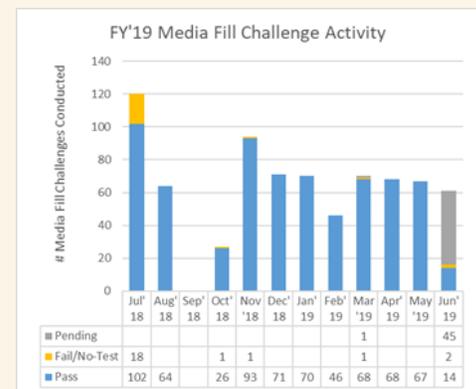


Figure 3



Top: Kristina Mulzer, Craig Rurka, Jamie Tharp, Carrie Penzien Bottom: Cheyanne Ward, Shanna Kaczynski, David Melton, Corissa West, Emily Ingalls, Jamie Tharp, Scott Blackburn



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Medication Safety and Medication Management

- ◆ Prepare for and respond to regulatory visits by The Joint Commission (TJC) and Centers for Medicare and Medicaid Services (CMS)
- ◆ Represent pharmacy on related committees such as Accreditation and Regulatory Readiness Committee (ARRC)
- ◆ Oversee and assist with auditing of 279 clinical sites (both inpatient and outpatient) by pharmacy personnel at least twice annually
- ◆ Review results of self-surveys done by local leadership in each clinical site
- ◆ Educate internal and external UMHS staff on medication management standards
- ◆ Identify areas of risk and help develop practice standards to improve compliance
- ◆ Ensure departmental policies are standardized and up-to-date
- ◆ Oversight (review, classification, investigation, follow-up of medication related events reported via RL Solutions)
- ◆ Education and promotion of medication best practices
- ◆ Medication-related event report generation for ongoing monitoring, transparency, trending, and analysis
- ◆ Monitor medication related quality improvement actions
- ◆ Smart pump library maintenance and pump quality improvement adjustments and metrics

Improving Medication Safety at Michigan Medicine: Assessing Risk and Opportunities for Change

Highlights/Accomplishments

- ◆ Audited 150+ ambulatory clinics
- ◆ Combined efforts with Diversion Prevention Team (DPT) to increase efficiency of pharmacy audits done in ambulatory care
- ◆ Adopted new auditing software used by DPT to help provide standardized feedback for ambulatory care
- ◆ Identified and assisted with 69 departmental policy reviews that were required to ensure TJC compliance
- ◆ Influencing P&T medication safety on medication P&T sub-committees
- ◆ Reviewed and analyzed 5,500 voluntary reported medication-related safety events
- ◆ Christina completed the ISMP/ASHP Medication Safety certificate program
- ◆ Audits of High-alert and look-alike medications, and smart pump compliance
- ◆ Standardization of several pediatric infusion concentrations & differentiation of concentrations (e.g. – syringe sizes)
- ◆ Implemented the Product Error form tracking for CSP and non-CSP medications that are identified in pharmacy
- ◆ Implementation of Dispense Prep in UH/CVC satellites
- ◆ Successful Joint Commission survey on medication standards



Right-to-left: Scott Ciarkowski, Matt Zedro, Christina Seeley, Karrie Sokolowski



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Diversion Prevention

Prevention

- Performed over 40 audits of non-pharmacy areas that store controlled substances (CS)
- In-serviced all new pharmacy staff, students and residents on drug diversion awareness and CS accountability
- Held over 100 in-services, presentations and education sessions for students, staff and external stakeholders
- Created a Drug Free Workplace MLearning for all Michigan Medicine faculty and staff
- Helped to facilitate an improvement in medication safety, requiring propofol to be treated as controlled substance
- Promoted program awareness via screen savers, digital signage and Michigan Medicine Headlines

Detection & Response

- Performed over 300 in-depth reviews of anomalous clinical practice
- Identified several diversion cases
- Improved algorithm for diversion detection analytics
- Engaged in root cause analysis to identify opportunities for data and system related improvements
- Responded to and led investigations of all cases of actual and suspected diversion
- Performed regulatory reporting requirements for all cases of diversion and significant loss of CS
- Promoted early intervention and access to treatment for staff with substance use disorders, when applicable

Highlights/Accomplishments

The Diversion Prevention Program was featured in the Advisory Board's 2018 Research Report: *Drug Diversion: Health Care's Hidden Substance Use Problem*. Multiple best practices were highlighted, including multidisciplinary collaboration, use of data analytics and investigatory interviewing.



From left: Steven Harvey, Denise Beson, Carol Purcell, Sarah Moore-Ar-Rasheed, Andrew Bradley



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Medication Use Policy

The Medication Use Policy (MUP) team is located at Michigan House at 2301 Commonwealth Blvd in Ann Arbor. The primary focus of the MUP team is to promote safe and effective use of medications within the health system. The MUP team's main responsibilities include providing drug information services and supporting the Pharmacy and Therapeutics (P&T) Committee and related P&T Subcommittees. Services include oversight of formulary management, medication use evaluations, and development and revision of drug use policies and guidelines. The MUP team also serves as a primary experiential training site for P4 pharmacy students and PGY-1 pharmacy residents.



*MUP Team Members (from left to right): Kirsten Smith, Julie Berman, Karin Durant, Janice Stumpf, Gundy Sweet
(Not Pictured: Paul Walker)*

Volume of Work Completed

- ◆ Facilitated 12 P&T Committee meetings
- ◆ Published 12 editions of the Pharmacy ForUM newsletter
- ◆ Assisted with 25 new or significantly revised policies/guidelines/protocols
- ◆ Assisted with 46 routine policy/guideline/protocol revisions
- ◆ Oversight of 69 formulary additions/deletions/criteria revisions
- ◆ Completed 3 drug class reviews
- ◆ Evaluated 13 new external outsourcing pharmacies and completed annual evaluations of 9 external outsourcing pharmacies
- ◆ Precepted 18 Pharm.D. Candidates on APPE rotations and 14 PGY-1 pharmacy residents

Highlights/Accomplishments

- ◆ \$3.7 million in estimated cost savings and cost avoidance through product vendor selection, formulation changes, and therapeutic substitutions
- ◆ Facilitated significant revisions to the Hypersensitivity/Infusion Reaction/Anaphylaxis protocols for both adults and pediatrics
- ◆ Assisted the clinical decision support team with reviewing duplicate drug alerts in the ambulatory setting
- ◆ Assisted with revisions to ambulatory pharmacy collaborative practice agreements

Research Pharmacy

Vision:

Our vision is to become the national leader in Research Pharmacy Practice and to advance research pharmacy standards on a global scale.

Mission:

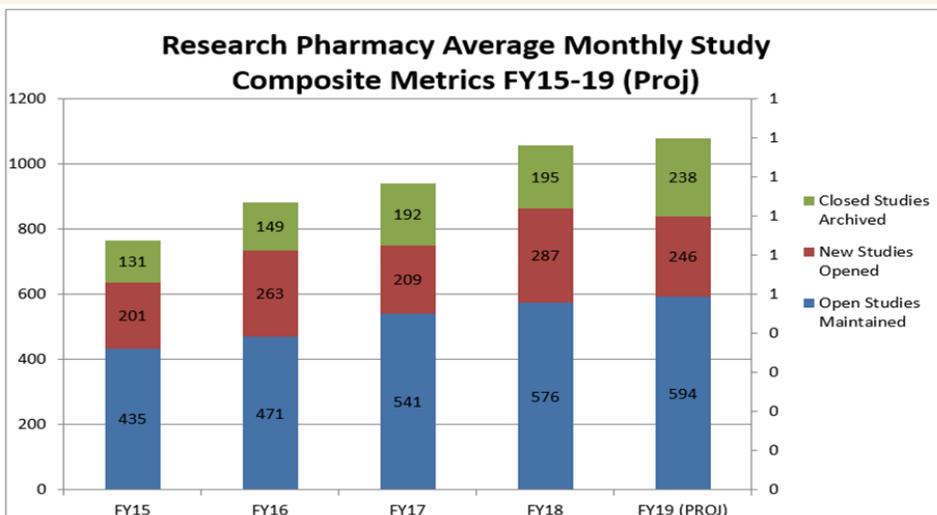
- Education:** Educate current and future healthcare professionals about medication-related research
- Patient Care:** Advance medication therapy by operationalizing research protocols in a safe and compliant manner
- Research:** Collaborate with research and healthcare partners to safely and efficiently conduct quality medication-related research, as well as to progress the practice of research pharmacy



Tiffany Jao (Intern) documenting patient returns

The Research Pharmacy (RP) ensures that clinical trials involving medications at Michigan Medicine are conducted safely, efficiently, and appropriately. In doing so, the RP participates on the Medical School Institutional Review Board (IRB) by reviewing protocols for approval and continuing review. The RP will only handle protocols that have been IRB-approved. Additionally, the RP adheres to federal law, study sponsor protocols, the Joint Commission regulations, and Michigan Medicine institutional and Department of Pharmacy policies in conducting its work.

The RP is responsible for all pharmacy aspects of each protocol that it oversees, including – but not limited to – procurement, storage, handling, labeling, dispensing, and disposal of investigational medications. In addition, RP pharmacists develop protocol-specific dispensing guidelines that outline these procedures to ensure that all RP and satellite pharmacy staff are trained in proper per-protocol dispensing and handling of each investigational medication. The RP is responsible for proper documentation, inventory accountability, and oversight of all protocols it manages.



Melissa Goetting (CPhT) and Seth Rice (Intern) discussing a study protocol



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Research Pharmacy (continued)

Highlights/Accomplishments

- ◆ Managed investigational drug supply and assured patient safety and regulatory compliance for ~600 clinical trials
- ◆ Dispensed or supported dispensing of 10,000+ investigational drug doses
- ◆ Provided pharmacy reviews of nearly 300 new clinical trials and nearly 1600 amendments for Michigan Medicine Institutional Review Board (IRB)
- ◆ Participated in department planning for USP <800> compliance and remodeling
- ◆ Demonstrated regulatory compliance via internal and external audits and sponsor monitoring visits
- ◆ Supported provision of investigational drugs via expanded access pathways for 20+ patients



A portion of the Research Pharmacy Team: Denise Propes (CPhT), Roxana Dumitrache (Intern), Tiffany Jao (Intern), Elani Sanders (Intern), Cathy Francis (RPh), Seth Rice (Intern), Jeffrey Hurren (RPh), Kim Redic (RPh, Manager), Melissa Goetting (CPhT), Kirk Haddas (RPh), Frank Zaran (RPh), Rebecca Babcock (CPhT), Yihan Sun (RPh)



Yihan Sun (RPh) checking an investigational product that will be dispensed



- ◆ Planned and opened first Schedule I controlled substance used in clinical trial at Michigan Medicine
- ◆ Created new model for study management with priorities of improving training and mentoring for new team members, improving study management distribution and workload, improving service transparency in study status to external customers, and standardizing processes and documents
 - ◆ Recruited and matched PGY1/PGY2 candidate for incoming residency class
 - ◆ Expanded the Research Pharmacy team to include 11 Clinical Pharmacist Specialists (including 3 team leads), 8 Certified Pharmacy Technicians, 4 Pharmacy Interns, 1 Technician Supervisor, 1 Research Pharmacy PGY1/2 Resident, and 1 Manager
- ◆ Maintained Research Pharmacy representation on numerous enterprise-wide research committees and workgroups
 - ◆ Provided training sites for College of Pharmacy fourth-year advanced practice students and pharmacy residents
 - ◆ Contributed to the advancement of Research Pharmacy practice through prominent participation and contributions to national pharmacy organizations

Antimicrobial Stewardship

- ◆ In 2018, the antimicrobial stewardship program (ASP) at Michigan Medicine continued its efforts to promote judicious antimicrobial utilization and improve the care of patients with infectious diseases. Initiatives that promote compliance with national quality performance measures and improve patient outcomes are an important component of ASP efforts. In 2017, the ASP at Michigan Medicine was among the first in the nation to receive the Antimicrobial Stewardship Centers of Excellence designation from the Infectious Diseases Society of America (IDSA). This designation recognizes institutions that promote standards established by the Centers for Disease Control and Prevention (CDC). This report summarizes initiatives and accomplishments for the 2018 calendar year. Additionally, there is a summary of resistance trends, antimicrobial utilization and expenditure, and goals for the upcoming year

Highlights/Accomplishments

- ◆ A Pneumonia stewardship initiative is being developed to evaluate the impact of bundled ASP interventions, including enforcing guidelines, correct interpretation of procalcitonin, and surveillance cultures, on broad-spectrum antimicrobial use in patients with suspected pneumonia.
- ◆ The stewardship team implemented an automated real-time alerting system for 15 different multi-drug resistant organisms. The stewardship team then reviews the patient's current therapy and profile, and recommends modifications to antibiotic therapy as needed.
- ◆ A Penicillin Skin Testing (PST) initiative was performed to develop a multidisciplinary protocol for hospitalized patients with a documented penicillin allergy and perform PST when appropriate. In total, 52 patients were tested, with 51 patients testing negative and thus able to have their allergy removed. Educated by this pilot experience, discussions are underway with a goal to implement PST across the institution by 2020.
- ◆ The stewardship team collaborated with several IT groups at UMHS to implement monthly tracking and benchmarking of antibiotic utilization data via the CDC/NSHN AU program.
- ◆ The pediatric AST pharmacists assumed the responsibility of reviewing, documenting, and intervening pediatric tier II restricted antimicrobials in 2018 to alleviate workload from the clinical pharmacy specialists during a time of severe shortage, and to more consistently provided education and feedback to prescribers regarding the restriction criteria for tier II antimicrobials.
- ◆ The stewardship team implemented the following changes to improve urine culture ordering, 1) requiring an indication for inpatient ordering of a urine culture, 2) ongoing education at department conferences, 3) collaborating with the ED to remove pre-checked urine culture orders from certain order sets, and 4) continued tier II restriction of fluoroquinolones.
- ◆ In an effort to expand the reach of the ASP to a larger audience and maintain up-to-date material, ASP has begun to transition to a public facing Antimicrobial Stewardship Webpage which will be accessible on mobile and desktop devices allowing the access of materials in any setting, including inpatient, outpatient, and other offsite environments.
- ◆ Developed a triage and rationing plan during national drug shortages for the following agents: aztreonam, doxycycline (IV only), cefazolin, cefuroxime (IV and PO suspension), metronidazole (IV only), ampicillin-sulbactam, bicillin LA, cefpodoxime, vancomycin (IV only), nystatin, cidofovir, cefotaxime, moxifloxacin (IV only), nitrofurantoin (PO suspension), and ethanol locks.



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HomeMed Pharmacy and Specialty Infusion



HomeMed is a licensed pharmacy and home infusion provider. Our unit is uniquely positioned within Michigan Medicine to effectively contribute to a complete and coordinated continuum of care as patients and their families transition from the inpatient and outpatient settings to the home environment. Our team provides comprehensive and individualized in-home pharmacy infusion products, specialty infusions, clinical care services, training, and delivery throughout Michigan, Northern Ohio, Northern Indiana, and Florida.

Clinical pharmacist specialists, nurses, and dietitians comprise our clinical compendium of health care professionals. Pharmacy and home care technicians, patient services associates, reimbursement specialists, and office staff assist in operating a business model that is adaptable to meeting the ever-changing challenges in health care. Our highly trained and infusion certified in-home nursing staff supports patient education and practice habits necessary for a sustainable home infusion environment. Together, all of these individuals strive to educate patients and their families to adhere to their individualized plan of care to promote quality outcomes in an alternate location at lower costs.

Highlights/Accomplishments

- ◆ Patient Satisfaction > Benchmark at 94.1%
- ◆ Timely Delivery > Benchmark at 97.7%
- ◆ YOY Net Margin Improvement
- ◆ Launch of formal structure for Change Management to efficiently implement practice improvements
- ◆ TJC Recognized Best Practice for Hand Hygiene Program
- ◆ Completion of FMEA for trending operational issues to realize improved quality
- ◆ Implementation of Automated Call Documentation for home patient telephone encounters
- ◆ Completed Employee Engagement Plan with 94.4% participation in the March 2019 survey
- ◆ Completed all identified Cost Reduction Initiatives
- ◆ Expanded service provision in collaboration with Care Management
- ◆ Transitioned to UMHS Standardized Informed Consent
- ◆ All Staff education in Unconscious Bias Awareness
- ◆ Advocacy and engagement in multiple Diversity, Equity, and Inclusion initiatives
- ◆ Launch of focused outreach activities to expand UMHS awareness of service offerings

Fiscal Year 2019 Metric Assessment	
(extrapolated 10 months)	
Gross Revenue / Charges	\$129,897,500
Bad Debt (% of Gross Rev.)	1.56%
Pharmaceutical Spend	\$26.6 Million ^a
Infusion Days	1,062,809
Average Patient Census	2,760
Prescription Fills	70,296
Doses Prepared	708,055
Orders Processed	44,767
Patient Deliveries	49,580
Home Nursing Visits	5,654
Staff FTEs	125.2

^anet 340B savings

Medication Use Informatics and Technology

Michigan Medicine's Medication Use Informatics & Technology teams are Health Information Technology & Services groups responsible for supporting enterprise informatics and health information technology, with the aim of facilitating the provision of safe, effective and efficient medication-use.

In addition to implementation and support activities, the Medication-Use teams are actively involved in the education of pharmacy informatics professionals through the PGY-2 Pharmacy Informatics program and precepting of an Informatics intern, pharmacy residents, and students on rotation from the College of Pharmacy. The medication use informatics and technology teams are located at Domino Farms.

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 team is a group within HITS assigned to support technology and systems in the department of Pharmacy. This includes technical support of the MiChart Willow and Beacon systems as well as other non-MiChart pharmacy systems. The team supports automated dispensing systems, provides ad hoc report production, and provides other technical assistance such as device support. Critical non-MiChart systems supported include the Pharmacy DataWarehouse, Sharepoint, Omnicell, DoseEdge, CSM (Vault), WorkFlowRx central inventory system, ScriptPro dispensing system, LabelSafe, ClinicReq, and the QS/1 outpatient pharmacy system. The group provides Pharmacy systems support 24 hours per day, 7 days per week, 365 days per year.

Leadership	
◆	Carleen Penozza, MHSA, BSN, RN <i>Director, Inpatient Applications, Medical Center Information Technology</i>
◆	Heather Somand, PharmD, BCPS <i>Medication-Use-Informatics and Technology Manager</i>
◆	Christopher Zimmerman, PharmD, BCPS <i>Coordinator, Electronic Health Record (EHR) Decision Support; PGY-2 Pharmacy Informatics Residency Program Director</i>
◆	Matt Enell, PharmD <i>Medication-Use-Informatics Team Lead</i>
◆	Russ Burnham <i>Medication-Use-Technology Team Lead</i>
◆	Jason Matuszkiewicz <i>Medication-Use-Technology Team Lead</i>

Medication Use Informatics

The Medication-Use-Informatics (MUI) team is a group of pharmacists and nurses within HITS which supports clinical informatics for the MiChart Willow (Pharmacy) and Beacon (Oncology) 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.



Medication Use Informatics and Technology

Highlights/Accomplishments

- ◆ October and April MiChart Upgrades
- ◆ Assisted Infusion Charging
- ◆ Switch to Lexicomp as sole medication reference vendor
- ◆ Insulin calculator pilot in CVICU
- ◆ Rolled out Epic's Medication Adherence functionality
- ◆ Updated Cyclic TPN Orders
- ◆ Updated all order sets to comply with Joint Commission standards
- ◆ Updated medications to reflect current ISMP Do Not Crush list
- ◆ Implemented Clinic Administered Medication lists
- ◆ Penicillin Skin Testing
- ◆ Resolved over 3,100 incidents/requests
- ◆ Brighton Health Care Center
- ◆ DoseEdge Expansions
- ◆ QS1 Perpetual Inventory
- ◆ Automated Pseudoephedrine Sales Reporting to Appriss at Point of Sale in QS1
- ◆ Outpatient Medication Therapy Management Module implementation in QS1
- ◆ EMPI Upgrade to Phynd
- ◆ Asembia 1
- ◆ Deployed Omnicell Patient Medication Accounts functionality
- ◆ Pharmacy Analytics Workload Tableau Visualization project
- ◆ Dispense Prep in UH/CVC
- ◆ Home Med Infusion build
- ◆ Inventoried existing Omnicell resources that now consist of 248 live Omnicell cabinets and 7 carousels
- ◆ RFP planning and deployments for new Medication Systems vendor (Pyxis)





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Education

Education is one pillar of the Missions of Michigan Medicine and the University of Michigan, and the Department of Pharmacy Services has a strong commitment to education. Three key areas where we support the education Mission include our Pharmacy Residency Programs, Pharmacy Student Experiential Education, and our Pharmacy Internship Program.

Pharmacy Residency Program



The Department of Pharmacy Services has strong [Pharmacy Residency Programs](#) and postgraduate pharmacy training is a deep part of our Department's history, in collaboration with the UM College of Pharmacy. The University of Michigan Department of Pharmacy Services established the first pharmacy residency program in 1927 (at that time called a post-graduate internship) under the leadership of Harvey A.K. Whitney. Our residency program was also one of the first accredited pharmacy residency training programs in the nation. In addition, our PGY-1 residency program was recognized with the ASHP Foundation Pharmacy Residency Excellence Award in 2010.

We continue this legacy by supporting residency programs which strive to provide each resident the opportunity to develop practice skills, expand their knowledge, and gain experience in an environment that promotes excellence, innovation, and leadership in the profession. Michigan Medicine preceptors are leaders in their clinical areas and play a critical role in training the residents in complex clinical problem solving through instruction, modeling, coaching and facilitating.

In addition to developing clinical, operational, and patient-care skills and knowledge, pharmacy residents at Michigan Medicine have a variety of extraordinary opportunities: research project, writing project, CE presentation, assisting in teaching and precepting of pharmacy students in the classroom and during experiential rotations, optional teaching certificate, and a formal mentorship program. In alignment with our leadership tradition and values, the program aims to develop residents' leadership skills through professional involvement and community service/outreach.



Education (continued)

The 2018-2019 pharmacy residency class consisted of 28 residents in 14 different programs. The class was supported by two Chief Residents: Joseph (Joe) Cusimano (PGY1 Pharmacy Practice) serving as PGY1 Chief Resident and Alexandra (Alex) Bixby (PGY2 Solid Organ Transplant) serving as PGY2 Chief Resident. Oversight of the programs is provided by the Executive Residency Advisory Committee (RAC-E), and the Chair of that committee is our Residency Coordinator. Pam Walker, PharmD previously served in this role as our first Residency Coordinator, but she accepted a new opportunity at another institution. We are actively recruiting to fill this position.

This coming year, we are again expanding our residency program by adding 2 new programs (each with 1 resident): PGY2 Residency in Emergency Medicine, and PGY2 Residency in Pain and Palliative Care. This year we will also be graduating our first resident from the combined PGY-1/PGY-2 residency in Investigational Drugs and Research, the 2nd program of its kind in the country. All of these programs will undergo their initial ASHP Accreditation Visits in the Spring of 2020. We will now have a total of 33 Pharmacy Residents across 17 Residency Programs:

- ◆ PGY1 Pharmacy Residency (10 residents)
- ◆ PGY1 Community Pharmacy
- ◆ PGY1 Managed Care Residency (UM Prescription Drug Plan)
- ◆ PGY1 Managed Care Residency (Blue Cross Blue Shield of Michigan)
- ◆ PGY1/PGY2 Health System Pharmacy Administration and Leadership (4 residents)
- ◆ PGY1/PGY2 Investigational Drug Service and Research Pharmacy (2 residents)
- ◆ PGY2 Ambulatory Care (2 residents)
- ◆ PGY2 Ambulatory Care/Fellowship Track
- ◆ PGY2 Cardiology Pharmacy
- ◆ PGY2 Critical Care Pharmacy
- ◆ PGY2 Emergency Medicine Pharmacy
- ◆ PGY2 Infectious Diseases Pharmacy
- ◆ PGY2 Oncology Pharmacy (2 residents)
- ◆ PGY2 Pain Management and Palliative Care Pharmacy
- ◆ PGY2 Pediatric Pharmacy
- ◆ PGY2 Pharmacy Informatics
- ◆ PGY2 Psychiatric Pharmacy
- ◆ PGY2 Solid Organ Transplant Pharmacy





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Education (continued)

Pharmacy residents also have several opportunities to expand their professional networks and learn from other residency programs and health-system practices. In addition to representing the University of Michigan at the ASHP Midyear Clinical Meeting, they represented us at the Great Lakes Pharmacy Residency Conference in April where they presented their research projects and attended other resident presentations. The residents also bonded during the annual Residency Exchange Trip (Resi-trip), deepening friendships and forming connections with colleagues across the country. This year they traveled to Baltimore, MD and Washington, DC to meet with pharmacists at the National Institutes of Health, the American Society of Health-System Pharmacists (ASHP), and Johns Hopkins.

Despite the rigorous demands of our program, the residents also find time to bond and enjoy social activities as a group, further strengthening their camaraderie and teamwork! Even more importantly, they also find time to give back to the local community. Our residents have volunteered for countless hours through precepting and providing pharmaceutical care at charitable events and free clinics.



Education (continued)

Pharmacy Student Experiential Education

Experiential education is an essential part of pharmacy education, 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 UM College of Pharmacy. Our APPE and IPPE rotations include learning opportunities in the following categories/practice settings:

Advanced Pharmacy Practice Experiences (APPEs)

- ◆ 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.)

Introductory Pharmacy Practice Experiences (IPPEs)

- ◆ Health-System Pharmacy Practice (P-3 students), Direct Patient Care (P-3 students), and Community Pharmacy Practice (P-2 students)

This past year, we provided a significant number of experiential rotations for pharmacy students across the entire health-system, including inpatient and ambulatory care practice sites:

- ◆ APPE Rotations = 344 individual rotations led by 111 preceptors
- ◆ P-3 IPPE Rotations = 85 individual rotations led by 32 preceptors
- ◆ P-2 IPPE Rotations = 95 individual rotations led by 23 preceptors

This contribution of APPE rotations represents approximately half of all of the APPE rotation spots for P-4 students at the UM College of Pharmacy. Our pharmacist preceptors have a significant contribution to pharmacy student education and a profound impact on their future careers through formal and informal mentorship as well.

Pharmacy Internship Program

The [Michigan Medicine Pharmacy Internship Program](#) has existed in many forms since at least the 1970's and has trained many prominent figures both within the 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 with the hiring of three student interns. Initially working as pharmacy technicians in the adult inpatient setting, the Pharmacy Internship Program slowly expanded into a 2-year program and began to encompass other areas of pharmacy practice, with partial support from the UM College of Pharmacy. As of the 2018-2019 year, the Pharmacy Internship has expanded to encompass 24 intern positions, providing opportunities in a variety of pharmacy practice areas. Pharmacy interns work throughout the Michigan Medicine health system in areas that include inpatient adult and pediatric care, central pharmacy operations and medication use systems, ambulatory care, oral oncology, infusion pharmacy, research pharmacy (investigational drug service), transitions of care, and specialty pharmacy. Additionally, interns serving within the inpatient setting provide medication histories within the emergency department, outside their core area of staffing.



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Education (continued)

The Pharmacy Internship also elects 2 Chief Pharmacy Interns, one from each class, who have additional leadership opportunities and represent their respective classes of interns. This past year our Senior Chief Intern was Lauren Williams, and our Junior Chief Intern was Meghan Hoffman. This upcoming year, Meghan Hoffman will move into the Senior Chief Intern position, and Kirsten Smith will serve as the Junior Chief Intern.



Not only are interns given the opportunity to cultivate their skills within their area of practice, the internship has a series of professional development meetings throughout the summer, including speakers and facilitators that discuss leadership, professional development, and other topics to foster success for the interns throughout their careers. During the school year, interns had the opportunity to experience a longitudinal relationship with the Chief Pharmacy Officer through monthly meetings that covered a variety of topics to further prepare interns for the workforce. Furthermore, interns can participate in a formal Intern Mentoring Program as well as on-the-job shadowing opportunities.

During the 2nd summer of the internship, senior interns complete a pharmacy related project in their core area of practice. Topics of projects from the last cohort of senior interns include:

- ◆ Drug use evaluation of dornase alfa
- ◆ Assessment of cold-chain distribution processes in a health-system pharmacy
- ◆ Lean process improvements for MiRxExpress
- ◆ Implementation of baseline medication assessments for specialty pharmacy patients
- ◆ Immunosuppressant laboratory monitoring in rheumatology

Senior interns were given the opportunity to present their research at ASHP Midyear Clinical Meeting. This past year, 10 senior interns had their conference attendance funded. Additionally, 5 junior interns were able to attend the local conference held by the Michigan Pharmacist Association and prepare a report distributed to the rest of the pharmacy department. Through the program, 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.



In 2018, we collaborated with pharmacy interns and colleagues from Ohio State University to establish an annual UM-OSU Pharmacy Internship Exchange. OSU hosted in 2018, and we had the pleasure of hosting interns and colleagues from OSU this past May. Our intent is to continue to revise and continue this collaboration.



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Administration

The Pharmacy Administration team is responsible for supporting the operations of the Pharmacy Department. Our team specifically runs the day to day operations of the 340b program, financial oversight & reporting of the department, manages third party payor audits of pharmacy, human resources transactions and reporting, and administrative functions for the department. FY19 was a year of optimization for our team as we settled in with new leadership and new teammates. To name a few things our team worked on: expanded our 340b team and network, created a third party payor audit database and report out mechanism, created automated financial reports to be sent to management, increased inventory oversight, took on more administrative tasks, and became more involved/streamlined in our HR reporting and turn around time. There are many other contributions our team made and we are very proud of the change endured by the team and everyone's willingness to step up. During FY20 we look forward to becoming more streamlined, compliance oriented, and finding more ways to support the department.

Highlights/Accomplishments

- ◆ Retail audits: annualized 60
- ◆ PARs: annualized approximation 860
- ◆ Vouchers: annualized approximation 65,500 for \$466.8 million
- ◆ Contract pharmacies: 340



Administrative Team: Jennifer Holtzhouse-Maynard, Mark Thorn, Cari Marshall and Judy Boldt

Billing/340b Team: Neil Matte, Clayton Every, Sarah Ismail, Abby Feyssa, David Valentine and Tom Mobley



Publications

2018

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