Michigan Medicine
Department of Pharmacy

Patient Care · Education · Research · Community

2017-2018 Annual Report
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This past year – July 2017-June 2018 – has certainly been eventful. From reaching new levels of performance in sterile compounding, to having 12 of our residency programs accredited, every pharmacist, technician and support staff has been instrumental in our successes. Last year I established a system for setting department goals and we now have a year of experience under our belts with this system. Thanks to all of you who contributed ideas for improving our department – it certainly helps me set priorities. On the following pages I’ve highlighted some of our achievements. You’ll note that many of them were part of the original goals that were set, but many were accomplishments based on reacting to challenges that arose throughout the year. This points to the importance of us being flexible, open and responsive to needs and opportunities. But we can’t always simply be fixing problems and reacting to the environment. To optimize our effectiveness, and be leaders and best, we have to be strategic and proactive. Towards that end in January 2019 I will hold a strategic planning meeting with several department members, but also many leaders outside of our department. Involving others in our planning is important so that they are aware of our challenges and needs and can be supportive when needed. It is also important for our department to set goals and strategies that support the goals and mission of UMHS.
This will maximize our potential to get resources needed to achieve our goals. Otherwise our strategic plans are just strategic dreams.

We still have a lot of work to do before we get to the point where we are providing all of the services that we should in a consistent and effective way. This requires having the right number of people, but also making sure we have the right systems and processes and we are adherent and accountable. We also need to assure our staff feels empowered and good about coming to work every day. Teamwork and supporting one another is critical. In the end we will have a high-performing system of pharmacy services and engaged employees who help us to continually improve.

I want to personally thank all of our staff for your continued dedication, flexibility, cooperation, teamwork and efforts. A leader is only as successful as the people under their charge. I am honored and privileged to have working for me the best pharmacy staff anyone could hope for.

Go Blue!

Stan Kent, RPh, MS, FASHP
Chief Pharmacy Officer—Michigan Medicine
Associate Dean for Clinical Affairs—University of Michigan College of 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 (Omnicell 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.
Accomplishments

- Completed renovations of B2 Clean room space to comply with USP 797 standards
- Revamped sterile compounding practices and training to increase compliance with USP 797
- Planned and implemented construction on multiple B2 spaces to be compliant with USP 800 standards
- Managed and mitigated multiple extensive shortages with limited impact on end users (e.g. fluid shortage, opioid shortage)
- Planned for complete Pharmacy Technology renovations for FY2019 & FY2020
- Planned and implemented a new Vault interface to allow automatic ordering from Vault software (CSM) to wholesaler (ABC) creating electronic ordering and receipt of controlled substances
The University Hospital (UH) and Cardiovascular Center (CVC) pharmacy teams include medicine, surgery, cardiology, emergency, oncology and operating room pharmacy 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 and 8th floor satellite pharmacies as well as the CVC and Operating Room pharmacy work in collaboration with these 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 the pharmacists and technicians working on the 6th and 8th floors and in the CVC pharmacy include medication order review and verification, medication preparation and delivery, drug information, code response, and other services as needed. The 8th floor satellite pharmacy has a focus on chemotherapy and investigational drugs, and the CVC pharmacy services cardiovascular patients.

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

Highlights 2017-2018

- Expanded inpatient LACE interventions, including medication reconciliation and discharge education, to seven days per week
- Expanded transplant pharmacy services in kidney transplant clinics
- 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
- Initiated Pharmacist Acute Pain Service
- Implemented penicillin skin testing for allergy confirmation
- Expanded antimicrobial stewardship activities on weekends and holidays
- Published 7th edition of “Guidelines for Antimicrobial Use in Adult Patients”
- Enhanced security and handling of propofol as a controlled substance
- Standardization of pre-op antimicrobial prescribing process
- Standardized OR infusions
Metrics

Doses Dispensed by Pharmacy

Orders Verified by Pharmacy

UH OR Team Members from left to right: Sharon Zynda, Carrie Hammond, Martha Brooks, Courtney Kilbourn and Carrie Caillouette.
C.S. Mott Children’s and Von Voigtlander 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. Mott offers a wide variety of diverse pediatric services including Level-1 Pediatric Trauma, numerous nationally ranked pediatric subspecialties including pediatric cardiovascular surgery, transplant, oncology, child and adolescent psychiatry, and neonatology, and is the first Verified Children’s Surgery Center in the State of Michigan. Recognized nationally in 2017 by U.S. News and World Report as one of the top pediatric facilities in the nation, Mott was among just 23 hospitals nationwide to be ranked in each of ten specialty areas including cardiology, nephrology, orthopedics, neurology/neurosurgery, hematology/oncology, gastroenterology, pulmonology, urology, and diabetes.

Responsibilities of pharmacists for the CW team include pharmacokinetic dosing, cardiac arrest team participation, nutrition support, medication dosing, patient and parent education, anticoagulation management, sepsis team support, and the verification and dispensing of 1 million and 800,000 medication orders, respectively. The pediatric pharmacy team includes clinical pharmacist generalists, pharmacy technicians, and clinical pharmacist specialists who work together to support pharmacy expertise in pediatric critical care, cardiology, surgery, neonatal critical care, antimicrobial stewardship, general pediatrics, bone marrow transplant, and hematology/oncology. The CW Pharmacy Team services four different pharmacy satellites providing inpatient, outpatient, operating room, and emergency room services. The Mott pharmacist team prides itself in the high level of service excellence provided to patients and families, with the key objective of working every day to put patients and families first.
Accomplishments

♦ Successful completion of construction projects to improve air quality in all CW sterile compounding areas

♦ Addition, recruiting, and hiring of new positions on midnight shift for clinical pharmacist generalists and pharmacy technicians to improve services and support sterile compounding activities

♦ Expansion of clinical pharmacist specialist services for PICU, NICU, PCTU, and General Pediatrics via addition of four incremental positions

♦ Recruiting, interviewing, and hiring over 30 pharmacy technicians and clinical pharmacists at the specialist, generalist, and management level in FY18

♦ Expansion of CW outpatient infusion to accommodate overflow patients from the Cancer Center

♦ Reorganization of CW leadership team to improve processes and provide better support to the front line

♦ Planned and implemented a team-based reporting structure with teams supporting General Pediatrics, Critical Care Pediatrics, and Oncology

♦ Trained two new pharmacy technician supervisors and supported ongoing leadership development for the CW Leadership Team

♦ Established biweekly team huddles and a weekly informational bulletin for information sharing
Our team members provide high-quality, patient-centered services across the outpatient 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, initiatives to improve cost and quality, and collaborate with teams of healthcare providers to provide the best care to all. Ambulatory Pharmacy Services encompass five outpatient pharmacies, five infusion pharmacies, specialty pharmacy services, outpatient oncology services, and transitions of care services.

Ambulatory Pharmacy

University of Michigan Community Pharmacies

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.

Outpatient Pharmacy Locations

- Main Campus Pharmacies—Taubman Center, Cancer Center
- Offsite Pharmacies—East Ann Arbor, Kellogg Eye Center, Brighton Center for Specialty Care

Pharmacist-Run Anemia Management Clinic

This is an ongoing program which functions under a collaborative practice agreement to provide laboratory monitoring, medication dosing and ordering. TheraDoc is utilized for patient tracking to ensure compliance with FDA REMS program for ESAs. Pharmacist team members provide Medication Management Services where the pharmacist reviews medications, including herbal and dietary supplements, and assesses for drug- or disease-interactions. Recommendations are communicated with the patient’s primary oncologist.
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.

Ambulatory Highlights

- Filled 240,000 prescriptions from July to June across 4 pharmacies for a total of $214,617,390 in sales.
- Continued growth of the medication therapy management (MTM) program to include medication synchronization for patients with complex care needs.
- 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 8 units with plans to continue expanding.
- Provide comprehensive medication reconciliation and education to patients discharging from the hospital.
- 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.

From left to right:

Trudy Mosley, Johnny Bansfield, Kim Parker, Amelia Reese, Frank Pawlcki, Steve Davies, Leslie Pierce, Doug Wojciechowski, Danielle Devlin, Erin Hennessey, Lindsay Dudek, Zachary Morgan, Jonathan Coan, Shawn Race, Sarah Lakehal-Ayat, Gayle Miller

Douglas Wojciechowski
Kimberly Parker
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 1000 patients/year. This year the program has contributed to high performance on many of the ASCO QOPI quality metrics.

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.
**Embedded Clinic Pharmacists**

Oncology pharmacists began piloting an embedded clinic pharmacist model in 2014. This pilot program provided improvements in clinical, quality, efficiency and satisfaction outcomes and was expanded to include additional clinics in June 2015. The expansion of the pilot continued to provide compelling positive outcomes. This program will continue to grow in FY2019 with additional clinicians working as integral members of the medical oncology and hematology teams in this area. These pharmacists provide comprehensive oncology care as an independent, yet collaborative care provider within the constructs of the medical team.

**Medication Reconciliation Programs**

The pharmacist-run medication reconciliation program for Cancer Center patients continues to be 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, as well as a pharmacist intern position. In the pilot, over 90% of patients received complete medication reconciliation prior to the first Cancer Center visit.
Specialty Pharmacy Services provides high-touch services to patients with specialty medication needs including medication fulfillment, financial coordination, and clinical programs. 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.

The Specialty Pharmacy program continues to grow as new specialty drugs become available, increasing the number of patients we are privileged to serve and the volume of prescriptions we manage.

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**Highlights**

- We developed a Specialty Pharmacy Mission statement to guide our patient care services: *We are dedicated to providing inclusive access to specialty medications and innovative clinical care from diagnosis to delivery and throughout the treatment process.*
- We hired an additional Clinical Pharmacist Generalist, Pharmacy Technician, and gained a new student intern to support our program services.
- In March, we opened the doors to ~300 square feet of new space in the lower level of East Ann Arbor Health Center for specialty medications. It was long awaited good news, and will support the safety and growth of our services. Transplant and outpatient surgery center patients are still served by our staff in the primary pharmacy upstairs.
- We developed partnerships with several new specialty clinics to expand and coordinate our services for patients seen by Pulmonary Hypertension, Cystic Fibrosis, and Orthopedic providers.
- We maintained ongoing collaboration with our transplant, MS, rheumatology, GI, oral chemo and transitions of care colleagues to expand and refine our services. Through such collaboration, we gained new access to three cystic fibrosis medications.
- Selected outcome measures from our pharmacist-provided clinical services include:
  - Hepatitis C patients: SVR rates were greater than 98% for patients completing treatment. Overall patient satisfaction survey of the pharmacist consultation was rated 4.9 out of 5.
  - Transplant patients: 133 patients reached for 6- and 12-month follow-up with an average of 2.14 medication discrepancies per patient identified; 63% of pharmacist recommendations were accepted by providers.

Steve Zawisza, lead pharmacist
Newly reported patient adherence rates for Enbrel and Humira: PDC of 0.88 and 0.93, respectively.

With the collaboration of our pharmacist and financial coordinators we achieved an 83% approval and fill rate for PCSK9 inhibitors (national approval average is 47% [Hess et al. Circulation 2017]).

In partnership with the U-M Prescription Drug Plan, we continued to provide value and excellent service to our university employee and retiree patient population as their dedicated specialty pharmacy provider. This included ~12,000 specialty medications for nearly 1,000 patients, most of which required prior authorizations. Additionally, ~$143k in copay assistance was resourced.

We hired an accreditation consultant, and have diligently been working on all the documentation and new workflows necessary to apply for specialty pharmacy URAC accreditation. Additionally, we started a specialty pharmacy Quality Management Committee to track key metrics of our quality, safety and service standards.

We received specialty credentialing from ExpressScripts as a specialty pharmacy network provider.

Established a client participation agreement with Acentrus, a collaborative of health system specialty pharmacies across the country, and serve on their benchmarking, payer, and clinical workgroups.

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**Metrics: Summary**

<table>
<thead>
<tr>
<th>FY18</th>
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<tbody>
<tr>
<td><strong>Patients</strong></td>
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<tr>
<td><strong>Rx Volume</strong></td>
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<tr>
<td><strong>Packages Shipped</strong></td>
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<tr>
<td><strong>Call Center</strong></td>
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<tr>
<td><strong>Prior Authorizations</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Copay/patient assistance</strong></td>
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</tbody>
</table>

*ASA, % calls picked up within 30 seconds

Specialty team at Taubman: Jerry St. James, Scott Jones, Sherrie Luttman, Shawn Race, Kaleigh Fisher

NIB Staff: Melanie Wood, Elizabeth Smith, Michael Anderson, Krystie Sedlmayer, Marie Sager, Amanda Haynes, Nick Weller, Carol Auman, Sandy Goel, Dawn Reid, Jessica Wilson, Clayton Every, Rachel Kuo, Elizabeth Balogh
Accomplishments

- West Ann Arbor is the first infusion pharmacy with a clean room
- Cancer Center team has begun the process to transition the order verification and compounding of continuous infusion pumps for chemotherapy cycles
- CW Sunday infusion services were expanded from 4 hour days to 8 hour days
- The infusion tech supervisors worked on improving and revising the technician training for new technicians on the infusion team
- The infusion team went from 1 first year intern to now having 2 first year interns
- The infusion supervisors have been working to update old work procedures
- The infusion team has adopted new sterile compounding work procedures and policies
- Dose Rounding of high cost infusion agents was implemented, and work continues to happen in this arena
- Infusion technician staff members revised the break and lunch schedule to optimize workflows

The infusion team is located in the Ann Arbor and surrounding suburbs
- Composed of about 54 team members (pharmacists and pharmacy technicians)
- There are 3 infusion centers with a dedicated pharmacy on the main medical campus
  - CW on 7th Floor
  - Taubman
  - Cancer Center
- The infusion centers that are in the Ann Arbor suburbs with a dedicated pharmacy include
  - East Ann Arbor Health Center
  - Canton Health Center
  - Northville Health Center
  - West Ann Arbor Health Center—newly opened May 2018
  - Brighton Center for Specialty Care—slated to be open Sep 2018
- 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
  - West Shore Urology—supported by Canton Health Center
  - Livonia Surgery Center—supported by Northville Health Center

<table>
<thead>
<tr>
<th>Location:</th>
<th>#Treatment Chairs/Beds</th>
<th>FY18 Average Patient Visits per month</th>
<th>FY18 YTD Average # Orders Verified by Pharmacists</th>
<th>FY18 YTD Average # of doses compounded by technicians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer Center</td>
<td>59</td>
<td>2950</td>
<td>22825</td>
<td>4201</td>
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<tr>
<td>Canton</td>
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<td>CW Infusion*</td>
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<td>Clark Road</td>
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<tr>
<td>West Ann Arbor***</td>
<td>12</td>
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<td>214</td>
<td>157</td>
</tr>
</tbody>
</table>

*CW infusion includes both adult and peds patients
**Doses prepared incorporated into Canton data
***West Ann Arbor opened May 2018
Cancer Center Infusion Pharmacy

♦ Supports 65 patient chairs/beds, providing service to 150-200 patients per day
♦ Provides approximately 46,000 infusion procedures annually to both oncology and non-oncology patients
♦ Provides dispensing and infusion support to the Research Pharmacy team
♦ Utilizes closed system device technology to safeguard employees and patients from hazardous medication exposure
♦ Performs quality and safety checks at each step of the dispensing process. Monitors patient laboratory results and recommends dose adjustments when appropriate
♦ Provides nursing education for new medications
♦ Provides training/educational support to our College of Pharmacy students

Canton Infusion Pharmacy

♦ Supports 9 chairs providing service to 25-35 patients per day.

E. Ann Arbor Infusion Pharmacy

♦ Supports 10 chairs, providing service to 20-25 patients per day.

Northville Infusion Pharmacy

♦ Supports 12 chairs, providing service to 30-45 patients per day.

Taubman Infusion Pharmacy

♦ Supports 9 chairs providing service to 25-35 patients per day.
♦ Assists with needs for patients treated in Transplant Procedural area.
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

**Service Description:**

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.
Highlights of Research Pharmacy

- Managed investigational drug supply and assured patient safety and regulatory compliance for ~575 clinical trials
- Dispensed or supported dispensing of nearly 9000 investigational drug doses
- Provided pharmacy reviews of 400+ new clinical trials and 1800+ amendments for Michigan Medicine Institutional Review Board (IRB)
- Demonstrated regulatory compliance via internal and external audits and sponsor monitoring visits
- Supported provision of investigational drugs via expanded access pathways for 20+ patients
- Expanded the Research Pharmacy team to include 9 Clinical Pharmacist Specialists, 7 Certified Pharmacy Technicians, 4 Pharmacy Interns, 1 Technician Supervisor, 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
- Recruited and matched to new PGY1-PGY2 Investigational Drug and Research Pharmacy residency
- Contributed to the advancement of Research Pharmacy practice through prominent participation and contributions to national pharmacy organizations

Katherine Reeves (RPh) checking capsules prepared by one of the pharmacy technicians and Jeffrey Hurren (RPh) preparing to compound an oral solution.

Elani Sanders (Student Intern) checking in new inventory

A portion of the Research Pharmacy Team: Jeff Hurren, Robert Finney, Crystal Lee, Rachael Sitarek, Lauren Mackenzie, Bekkie Wang, Nichole McLaughlin, Jae Yun (Sam) Baek, Anna Christich, Roxana Dumitrache, Elani Sanders, Denise Propes
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 that work hard within the PQRS pillars are listed below and described in the pages that follow:

♦ Pharmacy Analytics
♦ Compounding Compliance & Medication Management
♦ Diversion Prevention
♦ Medication Safety
♦ Medication Use Policy

Pharmacy analytics help us to better understand our work and its impact on patients through the use of business intelligence tools and data visualizations in a variety of domains, including workload, drug costs, clinical outcomes, diversion detection, and safety monitoring.

Quality efforts are structured to 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.

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

- Seema Jetli
  Senior Project Manager for Data Visualization
- Cory Smith
  Clinical Pharmacist, Informatics
- Bruce Chaffee
  Assistant Director, Pharmacy Analytics, Quality, Regulatory & Safety

Major Accomplishments

- Created and delivered over 50+ visualizations and dashboards:
  - Pharmacy workload characterized by doses dispensed, orders verified, pharmacist documentation and education (including LACE and pharmacist interventions in inpatient areas and infusion centers).
  - Executive composite workload dashboards for pharmacist and technician work efforts.
  - Drug cost analysis dashboard to compute variance by fiscal year costs, identify major cost contributors, and explain trends.
  - Monthly pharmacy dashboard tracking reports for the pharmacy executive team.
  - Pharmacokinetics (PK) dashboard providing a high level overview of patient outcomes related to renal function and rates of sub- and supra-therapeutic drug levels in patients treated with vancomycin and/or aminoglycoside antimicrobials.
  - Opioid/IV acetaminophen usage trends in response to changing opioid policies.

- With the support of Todd Benner from the Medication Use Technology team, established the pharmacy data warehouse (PharmDW) as the primary data source for all visualizations and other operational reports requested by management and pharmacists.

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The goal is to turn data into information, and information into insight.

— Carly Fiorina
Compounding Compliance Team

- Established new team:
  - 1 Manager (started January ‘18)
  - 2 Technicians (started March, April ‘18)
  - 1 Pharmacist Specialist (started June ‘18)
  - All achieved an advanced Qualified Person (QP503A) certification through Critical Point

- Initiated oversight of compounding pharmacy location certification coordination and completion of environmental monitoring sample collection/results management in January ‘18

- Contracted with Critical Point for:
  - On-site training of technicians and supervisors
  - eLearning modules for comprehensive sterile compounding education of staff
  - A portfolio of standard operating procedures that will become 7 Policies and 35+ work procedures

- Worked to standardize new compounding related supplies

- Provided post construction evaluations and environmental monitoring support to achieve clean room status: B2 Rx, CW10 Rx, West Ann Arbor, CW7 Infusion

Medication Management “Team”

- Established new role: Medication Management Compliance Pharmacist

- Identified 150+ ambulatory clinics that will need to be visited twice yearly by pharmacy staff, and started visiting these clinics in May 2018

- Implemented a new survey tool to replace previous inpatient unit inspection surveys, as well as expanded the areas and items being inspected
Diversion Prevention Program

Prevention
- Performed more than 40 audits of non-pharmacy areas that store controlled substances (CS)
- Performed monthly medication safety rounds on nursing units
- In serviced all new pharmacy staff and residents on drug diversion and CS accountability
- Shared best practices via local and national presentations
- Created new visuals to increase awareness via health system headlines and digital signage
- Created a Drug Free Workplace MLearning for all faculty and staff
- Performed a variety of multi-disciplinary education sessions for leadership and staff
- Enhanced internal reports to aid in CS reconciliation
- Created data dashboards and tracking metrics for the CS executive oversight committee
- Formed a new, multi-disciplinary committee to address CS operational issues
- Developed written guidelines for secure sharps containers
- Improved camera surveillance in pharmacy areas

Detection
- Enhanced data analytics to improve diversion detection
- Identified several diversion cases via the use of data analytics
- Collaborated on a variety of diversion cases and used root cause analysis to find opportunities for data and system related improvements

Response
- Program leadership responded to 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 disorder, when applicable
Medication Safety

- 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
- Track and follow-up of medication related quality improvement actions
- Track pharmacy-related medication events by Contributing factor: dispensing delay, dispensing error, incorrect preparation, delivery issue, ADC miss-stock, and label issue
- Smart pump library maintenance and pump quality improvement adjustments and metrics
- Partner with Patient Safety Event team and the Patient Relations & Clinical Risk office
- UH/CVC Serious Event Triage Team & Serious Event Scoring member
- Chair Medication Safety Committee

Accomplishments

- Continued influence and active member on medication related P&T sub-committees
  * Anticoagulation
  * Glycemic Management
  * Pain
  * Pediatric Medication Safety
- Reviewed and analyzed 4,900 voluntary reported medication-related safety events
- Completed the ISMP High-Alert Medication self-assessment
- Policy/procedure review and revision
- Advocating senior leadership for funding of infusion pump interoperability project

Medication Safety Team
Scott Ciarkowski (Medication Safety Officer)
Christina Seeley (Medication Safety Technician)
Medication Use Policy

Volume of Work Completed

♦ Facilitated 11 P&T Committee meetings
♦ Facilitated 34 new or significantly revised policies/guidelines and 31 routine policy/guideline revisions
♦ Completed 7 drug class reviews
♦ Oversight of 81 formulary additions/deletions/criteria revisions
♦ Evaluated 15 external outsourcing pharmacies
♦ Published 11 editions of the Pharmacy For UM newsletter
♦ Precepted 20 Pharm.D. Candidates (APPE rotations) and 13 PGY-1 residents

Highlights/Accomplishments

♦ $3.3 million in estimated cost savings and cost avoidance through product vendor selection/formulation changes and/or therapeutic substitution
♦ Implemented new policy providing standardization and safety measures for use of home pumps/devices
♦ Facilitated and coordinated multidisciplinary work flow processes for new technologies (e.g., CAR T-cell therapy, gene replacement)
♦ Assisted clinical decision support team evaluating clinical relevance of drug therapy alerts to minimize alert fatigue

The Medication Use Policy (MUP) Division within the Michigan Medicine Department of Pharmacy is located at 2301 Commonwealth Blvd in Ann Arbor. The focus of MUP is to promote rational, safe and effective medication use within the health system. MUP coordinates the activities of the Pharmacy & Therapeutics (P&T) Committee and serves as the primary drug use policy body for the system. Responsibilities include oversight and coordination of the P&T and related medication use subcommittees, formulary management, development/revision/implementation of medication use guidelines and policies. MUP serves as a primary experiential training site for P-4 pharmacy students and PGY-1 practice residents.
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.

Fiscal Year Metric Assessment

<table>
<thead>
<tr>
<th>Fiscal Year 2018 Metric Assessment</th>
<th>△ FY'17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Revenue / Charges</td>
<td>$125,602,479 ▲</td>
</tr>
<tr>
<td>Bad Debt (% of Gross Rev.)</td>
<td>2% ▲</td>
</tr>
<tr>
<td>Pharmaceutical Spend</td>
<td>$27.6 Million ▲</td>
</tr>
<tr>
<td>Infusion Days</td>
<td>1,019,520 ▲</td>
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<tr>
<td>Average Patient Census</td>
<td>2,616 ▲</td>
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<tr>
<td>Prescription Fills</td>
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<tr>
<td>Doses Prepared</td>
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<tr>
<td>Orders Processed</td>
<td>46,280 ▲</td>
</tr>
<tr>
<td>Patient Deliveries</td>
<td>49,014 ▲</td>
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<tr>
<td>Home Nursing Visits</td>
<td>6,287 ▲</td>
</tr>
<tr>
<td>Staff FTEs</td>
<td>129.2 ▲</td>
</tr>
</tbody>
</table>

*net 340b savings
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.

Volume of Workload Completed- AES and CES Combined:

- 267,211 Orders Verified
- 16,327 Doses Dispensed
- 292 Average Daily Patient Arrivals
- 16 Average Daily Resus Patients
- 7.31 Hours Average Patient Length of Stay
- 589 Discharge Rx Reviewed/Month

Pictured, from Left to Right: Elizabeth Macon, Adrienne Bell, Mary Dimo, Emily Supenia, Mary Shue, and Elizabeth VanWert

Not Pictured: Christine Egenti, Nancy Jamieson, Aaron Jeffery, Matt Kalisieski, and Nada Saad

Highlights/Accomplishments

- Two exciting public health initiatives were implemented in AES and CES during FY 2018. These included the hepatitis A screening and vaccination program for high risk individuals, and the naloxone dispensing program for outpatient use. For the naloxone dispensing program, at the request of a provider, patients are provided with intranasal naloxone at discharge for emergent home use. Pharmacists can provide detailed patient counseling, and the program helps to ensure naloxone is available for patients at risk of opioid overdose.

- Training and on-boarding of a new ED core team pharmacist and cross-training of several inpatient pharmacists in AES

- The ED medication history note template and process were updated and improved

- In CES, pharmacists implemented a process for discharge prescription review to screen for potential drug errors prior to patient discharge

- In AES, pharmacists were educated and trained for participation with the EROCA study, which seeks to investigate the benefits of extracorporeal cardiopulmonary resuscitation (ECPR) for refractory out-of-hospital arrest

- In AES, a pharmacy intern admission medication history service was implemented and an outcomes assessment was performed

- Both AES and CES continued to provide pharmacy student and resident learning opportunities throughout FY 2018. The pharmacists took numerous IPPE & APPE students and PGY1 and PGY2 residents on rotation, in addition to providing shadowing opportunities for medical and dental students

- AES is also currently trialing technician assistance within the pharmacy and have been extremely pleased with the positive patient impact - the ultimate goal is full time technician staffing in AES.
Transitions of Care Pharmacy Team

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.

**Discharge Team:** The TOC discharge team consists of five 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 Voightlander 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 7 units (4C, 5A, 5C, 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 expected in the future with a long-term goal to offer bedside delivery to all patients who would like to receive this service across the institution.

**Clinic Team:** The TOC clinic team consists of six pharmacy technicians who offer medication access assistance in the Dermatology, Gastroenterology/Infectious Disease Clinic, Taubman Dermatology Clinic, and the hiring, training, and on-boarding of an additional part-time technician for our Taubman Rheumatology Clinic.

**Highlights of the Past Year**

- Expansion of the MiRxExpress bedside delivery program to additional units, including UH 4C, 8A, 5A, 5C, and 8D
- Expansion of the Transitions of Care Pharmacy Technician Clinic Team to the Domino Farm MEND Clinic, Taubman Gastroenterology/Infections Disease Clinic, Taubman Dermatology Clinic, and the hiring, training, and on-boarding of an additional part-time technician for our Taubman Rheumatology Clinic
- Establishment of a monthly workload metrics dashboard for the discharge team
- Completion of an assessment of our Turn Around Time and patient, provider, and nursing satisfaction with our services
- Hired, trained, and on-boarded 2 new team members for the Discharge Team and 3 new team members for the Clinic Team
- TOC Discharge and Clinic Team Retreats held to discuss mission and vision of the team, guiding principles, future directions, and build relationships among team members

**Volume of Work Completed—Discharge Team**

- 7,558 Copay Checks Performed
- 1,483 Prior Authorizations Completed
- 749 Patients Receiving Bedside Delivery
- 2,269 Rx Delivered via MiRxExpress
- 5,900 + Total Patients Assisted

From Left to Right: Richard Fau, Kaitlyn Henry, Conor Tuohy, Megan Hart, Sue Lott, Maria Lara, Staci Joseph, Denise Richard, Sara Fox, Brittany Weber, Randi Katz, and Aliaa Chehadeh.
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. FY18 was a year of change for our team with new leadership and a new organizational structure and through this change we were able to become more efficient and effective in supporting the department. 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 FY19 we look forward to becoming more streamlined and finding more ways to support the department.
Antimicrobial Stewardship

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 Diseases Control and Prevention (CDC).

Highlights/Accomplishments

- Overall, total antimicrobial expenditure remained decreased in 2017 compared to 2016 ($7,201,712 versus $7,220,049, respectively).
- Total antimicrobial utilization decreased by 8% from 812.6 in 2016 to 745.1 Days of Therapy (DOTs) per 1,000 patient days in 2017. Additionally, DOTs are down 9.8% from 2015 (826.3 DOTs/1,000 patient days).
- The University of Michigan Health System is one of 4 programs awarded, Infectious Diseases Society of America Antimicrobial Stewardship Center of Excellence.
- The antimicrobial stewardship program expanded its scope of services to meet new antimicrobial stewardship standards included in The Joint Commission Accreditation. Expansion included developing ambulatory care stewardship program, and improved patient education for inpatients, outpatients and ED patients.
- The stewardship program continues to identify areas for quality improvement and launched 8 new initiatives in 2017 including:
  - Penicillin Skin Testing for Patients with Documented Penicillin Allergies
  - Expansion of Antimicrobial Stewardship Services to Include Weekends and Holidays
  - Staphylococcus Aureus Best Practice Alert
  - Outpatient Stewardship Expansion
  - Seventh Edition of “Guidelines for Antimicrobial Use in Adult Patients”
  - Pediatric Antimicrobial Approval Pager
  - Improving Management of Community-Acquired Pneumonia (CAP) in Pediatric Outpatients
  - Vancomycin use in the Neonatal Intensive Care Unit (NICU)
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. The team responds to an average of 150 HITS help desk calls per month.
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.

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

Leadership

Carleen Penoza, MHSA, BSN, RN – Director, Inpatient Applications, Medical Center Information Technology
Heather Somand, PharmD, BCPS – Medication-Use- Informatics and Technology Manager
Christopher Zimmerman, Pharm.D., BCPS – Coordinator, Electronic Health Record (EHR) Decision Support; PGY-2 Pharmacy Informatics Residency Program Director
Matt Enell, PharmD – Medication-Use-Informatics Team Lead
Russ Burnham – Medication-Use-Technology Team Lead
Jason Matuszkiewicz – Medication-Use-Technology Team Lead
Education: Pharmacy Residency Programs

Pharmacy Residency Programs

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.
Our pharmacy residency programs underwent a rigorous accreditation process by the American Society of Health-System Pharmacists (ASHP) and received successful reaccreditation for 12 of our programs.

The 2017-2018 pharmacy residency class consisted of 27 residents in 15 different programs. The 2017-2018 residency class was supported by two Chief Residents; Brian Kurish (PGY1 Pharmacy Practice) serving as PGY1 Chief and Casey Spitzer (PGY1 & 2 Health Systems Pharmacy Administration) serving as PGY2 Chief. Oversight of the programs is provided by the Residency Advisory Committee (RAC) Chair (John Clark) and Co-Chair (Pam Walker).

We formally established a 2-year Health-System Pharmacy Administration Residency, combined with an optional Master’s Degree program, and graduated our first resident from that program. This coming year, we welcome our first resident into the new 2-year combined PGY-1/PGY-2 residency in Investigational Drugs and Research, the 2nd program of its kind in the country.

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, the residents traveled to Boston, MA where they visited three different pharmacy residency programs: Boston Medical Center, Massachusetts General Hospital and Tufts Medical Center. Despite their full schedules, our residents also find time to bond and enjoy social activities as a group, further strengthening their camaraderie and teamwork!
During the 2nd summer of the internship, Senior Pharmacy Interns complete a project usually related to their primary practice area. Interns then present their projects and results to the Department at the end of the summer. Once again we had many great projects that had a significant impact on our practice:

- Characterization of antiemetic use in ambulatory oncology
- Management of the pharmacy order verification queue
- Pharmacist presence in patient care areas
- Consolidation of UH pharmacy satellites to the central pharmacy area
- Pharmacist-managed therapy peer review process
- Ketamine low-dose infusions for pediatric pain management
- Quantifying waste in the C&W OR pharmacy

In addition to the excellent training and practice experience, our pharmacy interns have several professional development opportunities. We have a series of professional development meetings throughout the summer and the academic year, including speakers and facilitators that discuss leadership, professional development, and other topics to foster success for the interns throughout their careers. We implemented a formal Intern Mentoring Program, and interns also have on-the-job shadowing opportunities, in addition to opportunities for informal networking.

This past year, our Chief Interns successfully championed a proposal for our Department to support pharmacy intern travel and participation in professional meetings. The goal of this initiative is to foster professional development for pharmacy interns, promote their involvement in professional pharmacy organizations, and promote the Department of Pharmacy Services and Michigan Medicine within the profession of pharmacy. Senior Interns have the opportunity to attend a national pharmacy conference to present their Senior Intern Project (if accepted), and Junior Interns have the opportunity to attend a local or state conference. Interns are given specific assignments to attend educational sessions and prepare a report for the Department. This past year, we had 5 Senior Interns attend the ASHP Midyear Clinical Meeting and 5 Junior Interns attend the Michigan Pharmacists Association Annual Convention & Exposition.

In addition, our interns collaborated with interns at Ohio State University for the first UM-OSU Intern Exchange. Overall it was very successful, and UM will be hosting the OSU interns in the summer of 2019.

This coming year, we will expand our Pharmacy Internship to 23 total interns, and will continue to expand education and professional development opportunities.
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:

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

**IPPE:** Health-System practice, Direct Patient Care, and Community Pharmacy practice

This past year, we provided a significant number of experiential rotations for pharmacy students across the entire health-system:

- APPEs = 323 individual rotations led by 104 preceptors
- IPPEs = 92 individual rotations led by 38 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.

This past year, Jim Miller, PharmD, BCCCP was recognized by the UM College of Pharmacy as the Preceptor of the Year. Dr. Miller is a Clinical Pharmacist Specialist in the Surgical Intensive Care Unit at Michigan Medicine, and has served as a preceptor for the past 10 years.
2017


Pharmacy Publications
July 2017—June 2018

2018


In Press


“Patients and Families First” is the motto of the University of Michigan Health System. The pharmacy department strives to see patients and their families through a number of services and locations.

We serve our patients both in the inpatient and outpatient setting. When patients are in the hospital or receiving care at a UMHS facility, pharmacists are there working with physicians and nurses to ensure best care. Pharmacists serve as experts in drug therapy and dosing. Pharmacists perform functions like making sure chemotherapy orders are correct and properly dosed, helping patients and physicians with anticoagulation dosing, and dosing for drugs such as antibiotics and anticonvulsants.

The pharmacy also provides outpatient locations for patients to fill prescriptions. Because of the specialized care that UMHS provides, often other community-based pharmacies are not equipped to handle some of the complicated prescriptions that our patients receive.