ANNUAL REPORT

Department of Pharmacy

Fiscal year 2014



Duke University Hospital

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Duke Pharmacy
Duke University Hospital

Message from the Chief Pharmacy Officer Paul Bush

It is my pleasure to present the 2014 Annual Report for the Department of Pharmacy. This annual report highlights the exceptional work that the Duke pharmacists and staff accomplish on a daily basis and the successful initiatives that are transforming the quality of pharmaceutical care for our patients. These exceptional results are detailed in the report under the respective service areas and program categories.

It has been a busy and productive year with many accomplishments. I will highlight several accomplishments but ask that you review the entire report to fully understand all that has been accomplished.

The year began with the successful opening of the Duke Medical Pavilion (DMP). Final preparation for opening the new pharmacies was completed. Services, hours of operation and the staffing plan for the pharmacies and clinical services were confirmed, inventory was acquired and stored, and staff completed orientation and training. The Duke Medicine Pavilion Pharmacy and the Duke Medicine Pavilion Operating Room Pharmacy were opened and patient care pharmacists moved into conveniently located unit-based workrooms.

The department's initiative to improve care transitions and handoffs continued by expanding the number of patients that have a medication history completed by a pharmacy staff member and the number of patients that are provided their medications at discharge. A standard of services for patients was established which included an expanded pharmacy admission process and services for transition at discharge.

The department supported Transforming our Future (TOF) initiatives in care redesign, supply chain and operations. Financial management through stewardship continued as the Pharmacy Utilization Management Program (PUMP) activity increased with enhanced support of hospital and medical administration and the involvement of additional pharmacists, physicians and analysts. Documented financial savings achieved through PUMP this fiscal year was $2.2 million.

The department continued to support work to expand Maestro Care Beacon research protocols and optimize the capability of Maestro Care (Epic). A new bar-code based dose tracking technology (PharmTrac.PD) was implemented to enhance availability of medication. Hours of service in the Emergency Department were expanded on weekends. Staffing levels were reviewed and adjusted throughout the department to assure appropriate staffing to provide optimal patient care.

The department initiated the Milton W. Skolaut Leadership Award to recognize a past resident of the Duke University Hospital Pharmacy Residency Program. The award recognizes an individual for outstanding leadership and contributions to the profession of pharmacy. The 2014 award was presented to Jill S. Bates, PharmD, MS, BCOP at the Residency Certificate Ceremony.

All of this work directly supports our mission and vision for pharmacy services at Duke University Hospital. These accomplishments would not be possible without the commitment and personal dedication of the Duke University Hospital pharmacy leadership team and staff members.

I would like to thank each and every member of the staff for their commitment to the profession and dedication to the care of Duke Medicine patients.

Sincerely,

Paul W. Bush

Paul W. Bush, PharmD, MBA, BCPS, FASHP
Chief Pharmacy Officer

II. Departmental Overview

Mission

To work collaboratively with other healthcare professionals to provide optimal pharmaceutical care to all patients, to advance pharmaceutical knowledge through educational and scholarly activities, and to promote positive patient outcomes.

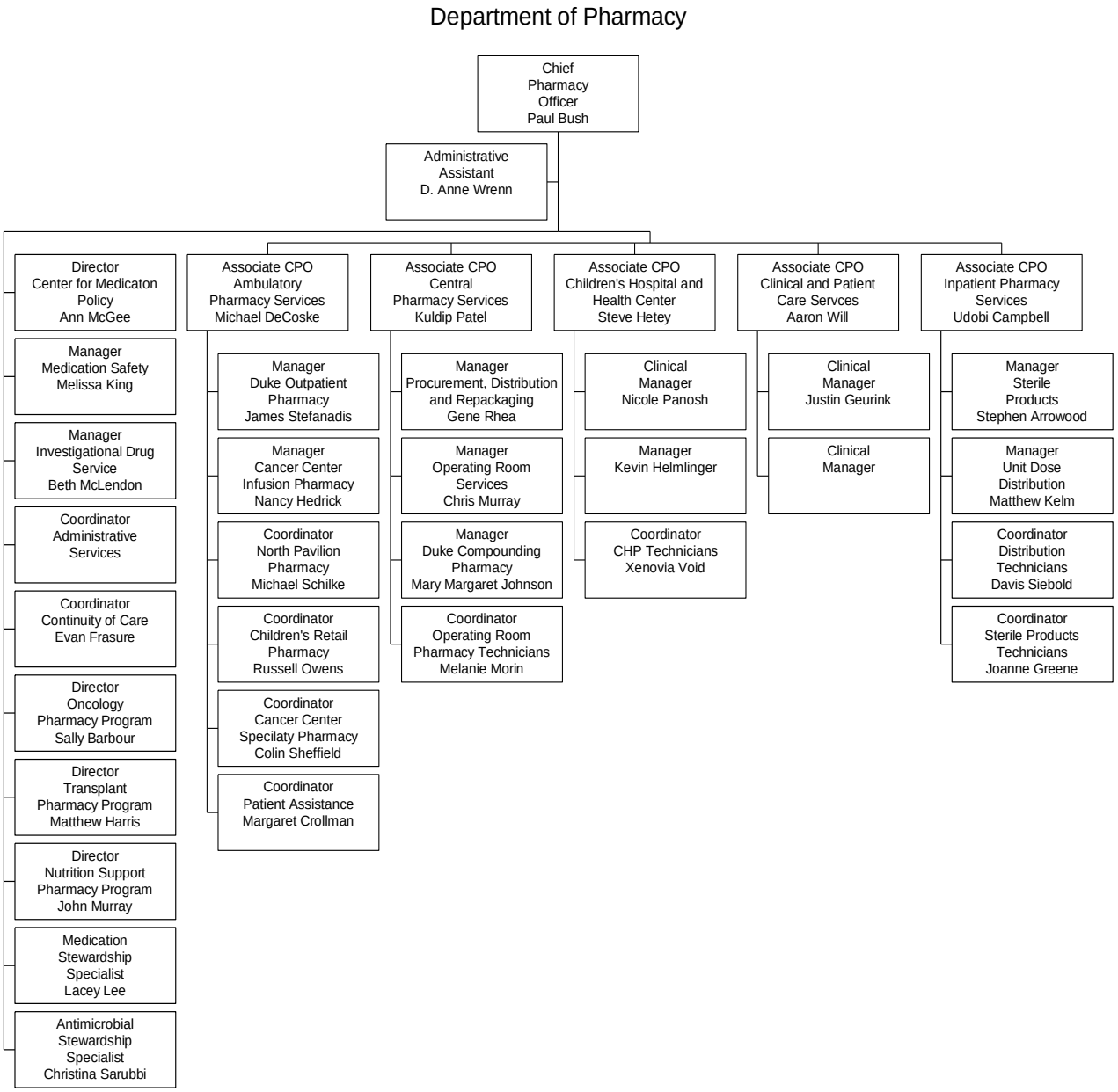
Vision

To provide optimal patient care and improve patient outcomes to meet or exceed customer expectations. The department will be recognized for quality and diversity of services, professional leadership, and educational excellence. We will advance the accessibility of pharmacy services through the innovative use of personnel and technology. Employees will work together to create an exceptional work environment.

Goals

- To improve patient outcomes and provide the highest standards of pharmaceutical care,
- To foster a collaborative approach to medication safety among all disciplines,
- To provide an exceptional work environment that will establish Duke as the pharmacy employer of choice,
- To integrate new technological developments which improve efficiency and safety,
- To promote research to improve patient outcomes and the efficiency of care, and,
- To expand and promote excellence in pharmacy education.

III. Organizational Chart



IV. Balanced Scorecard

Duke University Hospital/Pharmacy (2014-12 Jun)
Balanced Scorecard - All

Measure	Actual	Target	YTD Actual	YTD Target	Freq
QUALITY AND PATIENT SAFETY					
ADEs Attributable To Pharmacy	2.0	1.5	21.0	18.0	M
ADM Override Rate (ICU)	6.95%	13.00%	7.29%	13.00%	M
ADM Override Rate (Non-ICU)	0.62%	2.00%	0.71%	2.00%	M
Average Verification Time for High Priority Medications	12.4	10.0	12.5	10.0	M
Non-Formulary Usage	0.35%	0.50%	0.65%	0.50%	M
PATIENT EXPERIENCE					
HCAHPS: Communication About Medicines CSF	60.5%	64.8%	64.7%	64.8%	M
Percent Omnicell Stock-outs	0.54%	0.55%	0.51%	0.55%	M
Retail Pharmacy Customer Satisfaction	88.60%	75.00%	79.90%	75.00%	Q
FINANCE AND GROWTH					
Direct Contribution Margin for Outpatient Pharmacy	$1,444,641	$912,402	$11,453,495	$10,948,820	M
Flex Expense Percent Variance CSF	-0.28%	0.00%	-3.94%	0.00%	M
Flex FTE Percent Variance CSF	1.44%	0.00%	0.60%	0.00%	M
Pharmaceutical Utilization Management Program (PUMP) Program Savings	$479,617	$1,000,000	$2,231,594	$4,000,000	Q
WORK CULTURE					
Percent Terminations Annualized: Overall CSF	12.96%	13.10%	12.96%	13.10%	M
Work Culture Power Item Score CSF	3.84	3.87	3.84	3.87	YTD

Lighting Scheme: Blue = Exceeds Expectations; Green = Fully Achieves; Yellow = Between prior year's avg performance (or similar) and Fully Achieves; Red = Below prior year's avg performance, budget, or similar

Duke Pharmacy
Duke University Hospital

V. Overview of Pharmacy Services: Scope and Accomplishments

Duke University Hospital (DUH) is an academic learning center and serves as the flagship for Duke University Health System. A tertiary and quaternary care hospital, the 943-bed DUH is consistently rated as one of the top hospitals in the United States. It offers comprehensive diagnostic and therapeutic facilities, including: a regional Level 1 emergency trauma center; multiple surgical platforms including a major surgery suite containing 40 operating rooms; an endosurgery center; an ambulatory surgery center with nine operating rooms; an eye center with five operating rooms; and extensive diagnostic and interventional radiology facilities. DUH also functions as a research facility where innovations in medicine are consistently achieved and implemented. It is a teaching hospital for students of medicine, pharmacy, nursing, and the allied health sciences. The Department of Pharmacy provides a broad range of advanced pharmacy services. The mission of the Department of Pharmacy is to care for patients by assuming responsibility for the medication use process, and facilitating safe and effective use of medications.

To achieve this mission, the department employs multiple pharmacy practice models:

- Decentralized clinical practitioners;
- Specialized pharmacy services operating from discrete areas (e.g. Ambulatory pharmacies, Infusion pharmacies, Operating Room pharmacies, Investigational Drug Services, Production and Packaging and Sterile Products);
- Targeted patient care services (e.g. pain management, nutrition support, anticoagulation, transplantation, pharmacokinetic dosing consults); and
- Program-based services (e.g., performance improvement, medication safety, medication stewardship, antimicrobial stewardship, drug information and support to medical staff committees including the DUHS Pharmacy and Medication Management, DUHS Medication Safety Committee, DUH Pharmacy and Therapeutics Committee, DUH Medication Safety Committee, DUH Patient Safety and Clinical Quality Committee, Duke Medicine Institutional Review Committees, DUH Infection Control Committee and DUH Ethics Committee.

Services Provided to Duke Patients

- Admission
    - Assure a complete and accurate medication history and reconcile prescribed medication
    - Develop, document and initiate the medication-related components of the patient care plan
- Services
    - Review and approve medication orders before the first dose is administered
    - Review patient-specific medication profiles on a daily basis
    - Monitor the patient's response to medication therapy and adjust medication doses based on response or pharmacokinetic characteristics of the medication
    - Participate in the nutritional support of patients working collaboratively with team members to initiate parenteral nutrition and adjust formulations based on patient response
    - Monitor critically important medication serum concentrations and other clinically important laboratory analyses
    - Participate in patient care rounds
    - Participate in rapid response and resuscitation
- Discharge (Transition)
    - Educate patients about their medication, and establish processes to ensure complete and accurate prescriptions and medication-related continuity of care for discharged patients
    - Provide medications for home use

Ambulatory Pharmacy Services Michael A. DeCoske

Overview of services

The following represent the major Ambulatory Pharmacy presence at Duke University Hospital and the primary patient populations served within each area:

- CHC Retail Pharmacy
  - Pediatric patients
  - Duke employees
  - Discharge patients
- Duke Cancer Center Specialty Pharmacy
  - Oncology patients
  - Transplant patients
  - Hepatology patients
  - Patient Assistance Programs
    - Patient prescription enrollment for Duke Hospital Based Clinics
    - IV Drug Replacement for Duke Infusion Center patients
- Duke Cancer Center Infusion Pharmacy
  - Oncology Treatment Center
  - Oncology Clinics
  - Radiation Oncology
- Duke Outpatient Retail Pharmacy (OPD)
  - Duke Clinic patients
  - Duke employees
  - Duke University Students
- Morris Pharmacy
  - Non-Oncology Infusion Center
  - Duke Hospital Based Clinics
- North Pavilion Pharmacy
  - Ambulatory Surgery Center
  - Outpatient Bone Marrow Transplant
- Clinic Pharmacists
  - Oncology Clinics
    - Breast, Brain Tumor, HOA, GU, Sarcoma, BMT, Thoracic, GI
    - Oncology Treatment Center
  - Duke Outpatient Clinic
  - Duke Family Medicine Clinic
  - Anticoagulation Clinic
  - Infectious Disease Clinic
  - Thoracic Transplant Clinic

Mission

- Provide excellent clinical patient care in accord with accepted best practices
- Maintain fiscal responsibility over medication use
- Maintain compliance with all pertinent regulatory requirements
- Expand services in response to society's changing health care needs and the shift towards ambulatory care

Goals

- To foster an environment for responsible medication use

- To develop a business model for self-sustaining clinical pharmacy services within Hospital Based Clinics, specifically in high acuity areas such as primary care, transplant, and oncology
- To ensure continuity of care as patients transition from inpatient to outpatient and to strengthen the collaboration between inpatient and outpatient pharmacy services
- To optimize the use of technology and automation to support pharmacy services
- To support pharmacy practice and clinical research, residency training and student clerkships
- To serve as the preferred retail pharmacy for all Duke University Hospital patients and employees
- To positively contribute to the direct contribution margin for Duke University Hospital
- To ensure that pharmacists will be available, visible, and serve as the primary resource for all medication related issues across Duke University Hospital Outpatient Areas

Locations and Hours of Operation

- CHC Retail Pharmacy: 8:30 AM - 8:00 PM M-F; 9:00 AM -1:00 PM Saturday
- Duke Cancer Center Specialty Pharmacy: 8:30 AM - 6:00 PM M-F
- Duke Cancer Center Infusion Pharmacy: 7:30 AM - 6:30 PM M-F
- Duke Outpatient Retail Pharmacy (OPD): 8:30 AM - 6:00 PM M-F
- Morris Pharmacy: 7:30 AM - 5:00 PM M-F
- North Pavilion Pharmacy: 6:30 AM - 5:00 PM M-F; 7:00 AM – 11:00 AM Sat & Sun

Major Accomplishments

- Targeted service enhancements to improve retail pharmacy access for patients discharged from Duke Hospital
- Developed plan to implement prospective pharmacy review of medication orders in all Duke Cancer Center clinics (profiled Omnicell cabinets)
- Collaborated with Maestro Care team to optimize Willow and Beacon in Duke Cancer Center and Hospital Based Clinics
- Developed plan to implement technical billing for primary care pharmacy services
- Expanded and enhanced clinic pharmacy services in Duke Cancer Center
- Implemented a new specialty pharmacy services in the Duke Rheumatology
- Developed a plan for new specialty pharmacy services in Duke Gastroenterology clinics
- Developed plan to integrate pharmacy services within Duke Connected Care

Team Members



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Central Pharmacy Services Kuldip R. Patel

Overview of services

Central Pharmacy Services is composed of three separate operating departments inclusive of the Duke Compounding Pharmacy, Perioperative Pharmacy Services, and Pharmacy Procurement, Repackaging, and Distribution. The Duke Compounding Pharmacy prepares Compounded Sterile Preparations (CSPs) in compliance with the United States Pharmacopeia – National Formulary compounding standards. Furthermore, Duke Compounding Pharmacy also supports the organizational mission in supporting patient safety by preparing medications in the most ready to use medication packages when possible. The Duke Compounding Pharmacy also supports the research mission of DUH by supporting any specialized pharmaceutical needs. Perioperative Pharmacy serves the pre-, intra-, and postoperative patients by providing highly specialized clinical and technical pharmacy services to enhance surgery outcomes. They support this goal by collaborating with surgeons, anesthesiologists, nurse anesthetists, nurses, and other ancillary staff to deliver patient centered care by utilizing medications in a safe and cost effective manner. Pharmacy Procurement, Repackaging, and Distribution services provide logistical support by purchasing and distributing medications to DUH and DUHS Pharmacies and Clinics. The department uses highly innovative inventory management systems and high-speed solid and liquid packaging technology to organize and manage the supply chain efficiently.

Our Team

The Central Pharmacy Services team is made up of highly experienced, skilled and committed managers, pharmacists, technicians, accounting clerks, and material resource technicians who work collaboratively with internal and external customers to meet the needs of patients at Duke

Hospital. Staff members actively support the department's mission by participating in clinical quality and process improvement efforts, promoting and fostering a positive work culture, and making the best use of medications to produce positive patient and customer experiences.

Availability and Location

The Duke Compounding Pharmacy operates 6:00 AM – 3:00 PM (M-F). Designated pharmacists and technicians are available for afterhours emergency support for patient care needs. The pharmacy is located in Duke South, room 0010, Davison Building.

The Perioperative Pharmacy services operate two shifts (6:00 am – 9:30 pm) via the decentralized pharmacy satellites located on the 3rd Floor in the Duke North and Duke Medicine Pavilion. The Eye Center Perioperative Pharmacy services are available 6:00 AM – 3:15 PM (M-F). Designated support is available for afterhours emergency support via the Duke North Pavilion Perioperative Pharmacy.

The Pharmacy Storeroom (procurement) is open 24 hours and staffed from 5:00 AM – 11:30 PM (M-F) and 6:30 AM – 3:00 PM (Weekends).

Major Accomplishments

- Omnicell profiling enabled in Duke North (DN), Duke Medicine Pavilion (DMP), and Eye Center Post Anesthesia Care units (PACU)
- Implementation of the DN/DMP central Omnicell towers
- Compounding & Repackaging software implemented for antibiotics and promethazine (first step to capturing compounding productivity in the OR pharmacy)
- Implementation of a new orientation and training checklist for newly hired pharmacist and technician staff
- On-Q Pump and chemo pharmacist charging process developed to capture revenue that was previously missed
- Renovation of Storeroom including installation of three Omnicell carousels, removal of Remstar carousels and replacement of work desks.

- Implemented individual cabinet level restocking of Omnicell cabinets (previous was bulk restock by zones) via interface between ADC cabinets and Omnicell WorkflowRx
- Conversion of inventory from SAP perpetual to Omnicell WorkflowRx perpetual inventory.
- Made significant progress toward implementing Talyst Autosplit for mixed use areas
- Continued expansion of use of the Pentapack machine for unit dose liquids and solids (188 unique line items packaged in 2014 vs. 26 in 2013)
- Implemented 340B education program for all outpatient employees
- Established an IPPE pharmacy student rotation site in Pharmacy Procurement
- Initiated drug stability testing program with the Pharmaceutical Education and Research Center at Campbell University College of Pharmacy and Health Sciences
- Initiated preparation of pediatric narcotic syringes to provide a ready-to-use product for pediatric patients

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Clinical and Patient Care Services David Warner

Overview of services

The Clinical and Patient Care Services Division (CPCS) comprises all adult inpatient medical and surgical areas and their related subspecialties. Pharmacy practice models employed within CPCS include the integrated practice model for all adult patient care areas, specialized population-based services (e.g. nutrition support, anticoagulation, transplantation), geography-based specialized services for all intensive care units and oncology units, and order-review and processing in the Medication Management Center on evenings, overnights, weekends, and holidays. Clinical pharmacists participate in daily patient care rounds for many medical and surgical services, and all pharmacists maintain competency to recognize and manage the pharmacotherapy needs of adult and geriatric patients. Clinical pharmacists also participate actively on unit-based, department, hospital-wide, and health-system committees involving quality improvement, informatics, medication policy, and medication safety, to name a few.

Our Team

The CPCS team is made up of well trained, highly-committed pharmacists who work collaboratively with internal and external customers to meet medication needs of adult patients at Duke Hospital. Most staff members have greater than 5 years of experience at Duke and many are cross-trained to work in their specialty area as well as other areas across the division. Further, many pharmacists have completed one or two residency programs, and are board certified in their practice area. Some staff members hold full-time or adjunct faculty appointments at the University of North Carolina Eshelman School of Pharmacy and/or the Campbell University College of Pharmacy and Health Sciences. CPCS staff members also actively support the department's mission through ongoing participation in financial, quality and process improvement efforts, resident education, and research activities. Many CPCS staff members are members of, and some hold leadership roles in, state and national pharmacy organizations. Others have made contributions to the profession through publications and presentations and local, state, and national journals and professional












Availability:
Pharmacists provide services through the specialist and integrated practice model during the day shift, Monday through Friday, in patient care areas, and through order review/verification and clinical service delivery in the Medication Management Center during the weekday evenings, weekends, holidays, and all overnights.

Major Accomplishments

- Optimized the Medication Management Center
- Designed pharmacy services to meet needs of the new Duke Medical Pavilion Patient Care areas
- Implemented weekend first shift Emergency Department pharmacy services
- Provided support to the profession through publications, posters, and presentations
- Three preceptors recognized as Preceptor of the Year: Campbell University College of Pharmacy and Health Sciences; University of North Carolina Eshelman School of Pharmacy; and, Duke University Hospital Pharmacy Residency Programs.
- The CPCS team received the Duke Hospital Strength, Hope, and Caring Award for going above and beyond during the transition to Maestro Care.
- Recruited and hired eight new pharmacists in areas including: surgery, medicine, cardiology and night shift clinical services
- Optimized pharmacy services as part of Transforming our Future to include additional floor-based coverage during day shift
- Optimized Maestro Care and Beacon functions through ticket submissions and committee work
- Worked with the Center for Medication Policy and Procurement to resolve drug shortage issues
- Worked with the Center for Medication Policy to minimize alert fatigue within Maestro Care
- Increased preceptor attainment of adjunct faculty status at the University of North Carolina Eshelman School of Pharmacy
- Numerous pharmacists attained or recertified Board Certification in their respective practice areas

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Inpatient Operations Udobi Campbell

Overview of Services
The Department of Pharmacy Inpatient Operations Division provides an array of services which support care of patients in both the inpatient and outpatient arenas. These services include:

- Sterile preparation and distribution of both hazardous and non-hazardous medications in a USP 797-compliant environment
- Unit dose medication distribution utilizing a hybrid model which involves the use of patient care unit-based automated dispensing cabinets (ADC), unit dose cart-fill, and first dose dispensing
- Comprehensive ADC management
- Controlled substance management
- Code cart procurement, assembly, distribution and maintenance

- Night shift medication preparation, verification and distribution

Our Team

The Inpatient Operations team is made up of well trained, highly-committed pharmacists and technicians who work collaboratively with internal and external customers to meet the needs of patients at Duke Hospital. Many of the staff members have greater than 5 years of experience at Duke and are cross-trained to work across different areas of the division. Staff members actively support the department's mission through ongoing participation in quality and process improvement efforts, resident and student education, as well as, research activities.








Availability

Services that are provided by the Inpatient Operations Division are available 24 hours a day, 7 days a week.

Locations

Duke University Hospital, zero level, room 0415 and Duke Medicine Pavillion, room 6W60.

Methods of Drug Distribution

Our goal is to have the medication available at the patient care unit before the care nurse needs it for a patient. To meet this goal, we use different mechanisms to transfer medications from central pharmacy to the patient care unit. The most common methods, however, involve the use of highly motivated pharmacy technicians, who make routine deliveries, and STAT technicians who deliver urgent and emergent medications. The pneumatic tube system is another means by which medications are delivered to the patient care unit.

Use of Technology to Enhance Safety and Operational Efficiency

Several technology systems and software are utilized daily by staff members to accomplish the division tasks. Some of these key systems include:

- The unit dose dispensing robot, which is extensively used in the process of daily cart-fill of unit dose medications, fills approximately 3000 doses of medications. Medications intended to be dispensed by the robot are repackaged and bar-coded.
- Automated compounding devices primarily used to support parenteral nutritional admixtures, eliminating the need for multiple manipulations.
- Dispense Prep and Dispense Check barcode scanning solution which complements the work of both the technician and the pharmacist by providing added verification that drug product selection is accurate.
- Automated dispensing cabinets which provide secure storage of medications while supporting timely availability of medications to the nurse following verification by a pharmacist.
- Controlled substance monitoring software used for tracking movement of scheduled medications and report generation for monitoring and quality assurance.
- Targeted barcode verification of specific high alert mediations prior to dispensing or loading into an automated dispensing cabinet
- The i.v.STATION robot assures accurate preparation of sterile products through the use of gravimetric technology. Currently utilized for non-patient-specific preparations.
- Carousel technology is used for drug storage and dispensing. Includes guiding light and barcode technology which help assure accurate medication dispensing practices.
- PharmTrac.PD technology is used for tracking the location of medications once dispensed from the central pharmacy.

Major Accomplishments

- Implementation of PharmTrac.PD, a dose tracking technology
- Achievement of Tier II status for work culture
- Significant contributions to the Pharmaceutical Utilization Management Program
- Change in Maestro Care to remove most continuous infusion medications from the triggered fill list.
- Hospital-wide implementation of the delayed medication start time which supports timely availability of medications.
- Successful opening of the Duke Medicine Pavilion Central Pharmacy.
- Deployment of LAFW in the Duke North Sterile Preparation Cleanroom
- Successful passing of the Board of Pharmacy inspection without findings
- Redesign of the Omnicell daily medication pull procedures in partnership with Central Pharmacy Services team

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Women's and Children's Hospital and Health Center Steve Hetey

Overview of services

The Department of Pharmacy, Women's and Children's Hospital (~240 licensed beds) provides clinical and distributive services which support care of pediatric patients, obstetrics-gynecology, and 10 adult internal medicine patients in the inpatient setting. Distributive services are supported on the inpatient side by the 5th floor pediatric satellite pharmacy. The McGovern-

Davison Children's Health Center ambulatory pediatric pharmacy services are supported by an infusion center pharmacy located on the 4th floor of the health center.

Inpatient pharmacy services

Practice models within the pediatrics division are both integrated as well as specialized. Clinical pharmacists participate in daily patient care rounds to develop individual pharmacotherapy plans, provide medication and dosage recommendations/adjustments, pharmacokinetic evaluation and dosing, parenteral nutrition management, code blue and rapid response participation, education, research and publication. Specialized practice areas include pediatric bone marrow transplant (16 beds), pediatric intensive care (16 beds), pediatric cardiac intensive care (13 beds), and neonatal intensive care (60 beds) units. General pediatric pharmacists participate in rounds daily on 3 general pediatric services, infectious diseases, hematology-oncology, cardiology, neurology, gastroenterology, solid organ transplant and allergy/immunology. The 5th floor pediatric satellite pharmacy supports the medication needs of these patient populations in collaboration with the Inpatient Operations Division.

Ambulatory pharmacy services

The Children's Health Center Pharmacy is a sterile compounding facility located on the 4th floor of the Children's Health Center building. Both low and medium risk doses of hazardous and non-hazardous compounded sterile preparations are provided to ambulatory pediatric patients. Clinical pharmacists, in collaboration with providers, monitor appropriateness of drug, dosage, frequency, and adherence to protocols. Additionally, clinical pharmacists and technicians support investigational drug use.

Our Team

The pediatrics team is comprised of well-trained, highly committed pharmacists and technicians who collaborate with medical and nursing staffs and colleagues to optimize medication use among a high-risk, vulnerable patient population. Many staff members are tenured and cross-trained to function and support multiple sub-specialty practice areas. A number of pharmacists have completed one or two residencies and/or fellowships. Although board certification in pediatrics is not currently offered, a number (10) of pharmacists sat for and passed the BCPS examination. Staff members actively support the department's mission through ongoing participation in quality and process improvement efforts, resident and student education, as well as, research activities.





Availability

Women's and children's inpatient pharmacy services are provided 24 hours per day, 7 days per week through the clinical and distributive staff and satellite pharmacy. The pediatrics division collaborates with Inpatient Operations to provide comprehensive services. The Children's Health Center Ambulatory Pharmacy operates 8:00 AM to 5:00 PM, Monday through Friday. Weekend coverage is provided through inpatient services.

Major Accomplishments

- Initiated rounding on all pediatric nursing units and CHC on a weekly basis
    - Significant improvement in communication
    - Enhanced confidence in pharmacy services
    - Significant problem resolution achieved
- Completed PGY 2 Pediatric Residency Accreditation process and awarded a 6 year accreditation
- Standardized antibiotic pharmacokinetic notes
- Developed and implemented a pharmacokinetic guideline and competency
- Aligned vincristine preparation and dispensing with ISMP guidelines
- Converted Lennox Baker floor stock to 340B
- Implemented scan IV use in CHC clean room
- Completed physical improvements in 5th floor inpatient satellite including new paint, chairs, floor mats, camera installation and new flooring
- Implemented the call-attendant system in inpatient satellite
- Developed and implemented Pharmacy Admission Process throughout pediatric and adult patient populations
- Upgraded the security system in CHC pharmacy
- Standardized dexmedetomidine use in pediatric sedation
- Completed evaluation of technician workflow
- Defined pharmacist and technician responsibilities by shift
- Expanded the Women's and Children's Work Culture Workgroup
    - Implemented quarterly staff-led meetings
- Enhanced communication
    - Leadership rounds
    - Weekly safety huddles
- Standardized the anticoagulation progress note
- Updated the Medfusion pump library for Duke Lifeflight
- Standardized pediatric heparin infusion rates
- Standardized Rhogam the screening process
- Initiated the Pediatric Pharmacy Performance Improvement work group
- Established pediatric pharmacy oncology meetings
- Implemented the PharmTrac.PD dose tracking system

- Supported review of Beacon protocols
- Optimized the CHC facility list and automated dispensing cabinets
- Reorganized the inpatient staffing plan
    - New weekend workflow for pharmacists
    - New staffing model in NICU and Pediatric Heme/Onc services
    - Improved consistency of pharmacist coverage
- Standardized workflow in pediatric Hematology/Oncology in the following areas:
    - St. Jude's protocol
    - Late admissions to Pediatric Bone Marrow Transplant
    - Intrathecal-only OK to treat workflow
    - MD OK to treat as an ERX
- Developed and implemented partial dose workflow pilot
- Completed CHC staff 340B training
- Improved the oral syringe and respiratory batch process
- Standardized chemotherapy and other hazardous drug preparation for Children's Outpatient Pharmacy

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Center for Medication Policy Ann Scates McGee

Overview of services:
The Center for Medication Policy (CMP) is a team within the Department of Pharmacy that collects, organizes, analyzes, and disseminates information on medication use. The CMP integrates its activities with the clinical, safety, informatics, administrative, and drug distribution systems of the Department to optimize drug therapy for patients.

Functions of the CMP include:

- Answer patient specific and general inquiries regarding all aspects of medication use.
- Provide accurate, timely, unbiased evidence based drug information in support of rational medication therapy and policy.
- Provide support to the Pharmacy & Medication Management Committee and Pharmacy & Therapeutics Committee (P&T) and the respective subcommittees (Formulary Evaluation Teams, Formulary & Informatics Subcommittee, and Medication Safety Subcommittee).
- Participate in formulary management activities. Support the dissemination of drug information and medication policy updates via the Center for Medication Policy webpage, electronic newsletters, and staff meetings.
- Participate and support the conduct of medication use evaluations (MUEs). Query the MUE Universe tool to collect retrospective and real time medication utilization data for analysis for a variety of stake holders including P&T, Pharmaceutical Utilization Management Process (PUMP) and Value Analysis Team (VAT).
- Monitor and assist with the implementation of drug shortage action plans.
- Track and develop medication specific Risk Evaluation and Mitigation Strategies (REMS) programs.
- Review FDA safety communications to facilitate changes to formulary policies and informatics systems.
- Review and track departmental drug information reference subscriptions.

- Provide a learning environment in which pharmacy students and residents can acquire or enhance skills necessary to research and respond to medication related queries and review and develop formulary related policies.
- Provide a learning environment for the drug information resident to acquire and develop skills integral to the practice of hospital based drug information.

Our Team:

The CMP team is made up of well trained, highly-committed pharmacists who work collaboratively with those in the Department and throughout DUHS to help in the review and development of processes that help meet the medication needs of patients. All team members have completed one or two residency training programs. Some team members are Board Certified Pharmacotherapy Specialists. All support the department's mission through ongoing participation in quality and process improvement efforts, resident education, and research activities. Team members are members of state and national pharmacy organizations. The team makes contributions to the profession through internal and external publications and presentations.

Availability:

The CMP is staffed Monday through Friday from 8 AM to 5 PM. After hours consultations are provided by an on-call system (pager 919-970-8110). Non-emergency requests may be left on voicemail (919-684-5125).

References:

The CMP maintains an up-to-date core library of medical, pharmacology, and pharmacy practice texts and electronic references. Drug information references are evaluated as needed for suitability and need for purchase or renewal. Journals and textbooks may be "signed out" for use outside of the CMP. A drug-name based filing system is used to store reprints, product literature and correspondence from manufacturers and other data that may be useful in providing a drug information response or project support.

Major Accomplishments:

- In FY14, the CMP continued to lead formulary review through a health system process
- Continued to develop and implement therapeutic interchange programs as a way to guide the use of formulary medications.
- Supported Maestro Care teams, with input toward the development and review of order sets and building of medications supported with accurate formulary policies.

- Supported the drug shortage policy by participating in the development and implementation of drug shortage action plans.
- In FY14, the CMP supported the formulary review of 27 medications, and completion of 13 MUEs, 4 REMS policies, and 7 therapeutic interchange programs, via the hospital and health system P&T Committee processes. Additionally, more than 20 drug shortage action plans were implemented.
- Maintained an up–to-date Center for Medication Policy website that provides current medication formulary and policy information. This website is accessible across DUHS
- Supported the 9 Formulary Evaluation Teams (FET) to meet the desired health system goals as outlined in the FET charter.
- Collaborated with pharmacists and technicians from IT, operations, procurement and business finance to devise processes for implementing formulary changes and policy updates into IT systems in a timely manner.
- Monitored non-formulary medication use and made suggestions for change to reduce overall utilization. Improved balanced score card performance rating for non-formulary medication use.
- Collaborated with the Pharmacy Education Committee to implement a process by which 14 UNC students complete research projects at Duke.
- In FY14, the CMP precepted 16 pharmacy students and 5 pharmacy residents on rotation.

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Investigational Drug Services Beth McLendon-Arvik

Overview of services:

The Department of Pharmacy Investigational Drug Services supports clinical research involving study drugs for Duke Investigators and supports safety and care for research subjects in both the inpatient and outpatient care areas. The Investigational Drug Services integrates its activities with the clinical, safety, informatics, administrative, and drug distribution systems of the Department to optimize study drug therapy for patients.

These services include:

- Integrity of blinding
- Regulatory compliance
- Prevention of errors involving study drugs
- Dispensing of investigational products in a timely manner
- Contribution to study design and data integrity
- Randomization and study drug accountability
- Aseptic preparation in a USP 797-compliant environment and distribution of both hazardous and non-hazardous study drugs
- Procurement of drugs and supplies for studies as needed
- Preparation of Drug Data Sheets for study drugs not commercially available
- Inservices and education for inpatient studies
- Collaboration with DUH pharmacists to prepare and dispense study drugs as appropriate for patient care
- Education of Pharmacy students and residents regarding the research process and evaluation of literature

Our Team

Study drugs are dispensed from three primary areas, the Investigational Drug Service (IDS), the Investigational Chemotherapy Service (ICS) and the Infectious Diseases Research Pharmacy (IDRP). The Investigational Drug Service teams are made up of well trained, highly-competent and committed pharmacists, a clinical research coordinator, clinical trial specialists, a technician and an accounting clerk II. These members work collaboratively with internal and external customers to meet the needs of study coordinators, investigators, sponsors and subjects throughout the Duke Health System. Most of the staff members have greater than 15 years of experience at Duke and have worked with research for at least 6 years. IDS, ICS, and IDRP Team members actively support the department's mission through IRB membership, Clinical Research Unit membership, participation in quality and process improvement efforts, resident and student education, as well as, research activities.

Availability and Location

The Investigational Drug Services are staffed Monday through Friday from 8 AM to 4:30 PM. Arrangements are made to ensure study success for subjects needing study drugs outside of these hours. A team member from all services is on-call 24/7.
(IDS on-call pager 970-8392; ICS and IDRP: individual team members via paging web). Non-emergent requests may be left on voicemail (IDS: 684-3543; ICS: 668-0657; IDRP: 681-1788). The IDS is located on the basement level of Duke Clinic at 0101b, Yellow Zone. The ICS is located within the Cancer Center Infusion Pharmacy on the fourth floor, room 4N33, of Duke Cancer Center. The IDRP is located within the infectious disease clinic, 1K room 1346.

Major Accomplishments

- Maestro Care:
  - Creation of study drug builds for all IRB approved studies
  - Developed a policy which highlights collaboration with DOCR, IRB and study teams for validation of study drug order sets/protocols and study drug build and requirements for Institutional Approval, which allows a study to begin recruitment
  - Validation of over 130 order sets/protocols containing study drugs.
  - Ongoing education and collaboration with study coordinators and investigators regarding study drug order entry options for Maestro Care
- Comprehensive Cancer Center Core Grant Renewal
  - Developed and presented a poster at 3 separate meetings to highlight the work and support provided by the ICS for oncology research studies
  - Revised the ICS portion of the Shared Resources document needed for submission for core grant renewal

- ICS participated in the 60 Minutes filming of preparation of PVSRIPO, a new investigational agent developed at Duke for glioblastoma
- IDS participated in the preparation of a first-in-man dose gene therapy treatment that produces molecules that destroy the Hepatitis C virus (HCV) in infected cells
- The IDS teams collectively had:
  - 158 new studies initiated
  - 146 studies closed out

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Medication Safety Melissa King

Overview of Services

Three pharmacists, one full-time data manager and one part-time data manager comprise the dedicated and experienced staff in the Medication Safety division. Services provided include:

- Management, investigation, and scoring of medication-related events reported via the Safety Reporting System (SRS)
- Administration of peer review process for medication-related SRS events
- Generation of monthly and quarterly reports which permit ongoing monitoring, trending, and analysis of medication related safety issues
- Preparation of adhoc and custom reports to support the safety efforts at local, clinical service unit, institution, and health system levels
- Facilitation of discussions around trends or specific medication related events which lead to actions aimed at addressing system failures and associated root causes
- Biweekly distribution of the Institute for Safe Medication Practices Newsletter
- Development of formal and informal safety data presentations tailored to audiences across the health system
- Consultations regarding specific safety issues, new products, and label changes
- Education and promotion of safe medication practices

Availability

The Medication Safety Office is staffed weekdays 7 AM to 5 PM. Services are covered by pager at all times.

Major Accomplishments

- Reviewed, investigated, and analyzed 6403 medication-related SRSs in FY14
- Maintained an active and engaged Medication Safety Committee
- Continued to lead and participate on multiple CSU level safety committees
- Encouraged and recognized pharmacy participation in SRS reporting resulting in a 15% increase in voluntary medication related SRS reporting volume with record 226 pharmacy staff and students participating and 97.3% of pharmacy reporters identifying themselves by name
- Promoted “Good Catch” safety event reporting which increased overall “Good Catch” reporting to 42.6% of medication related safety events
- Generated over 63 adhoc reports for quality improvement and medication safety initiatives used to identify actions aimed at addressing system failures
- Maintained and provided regular updates to 24 trending analyses

- Successfully collaborated with members of the RL Solutions Workgroup to set up the RL Solutions Safety Reporting program, provide training and update policy as we prepared to transition from legacy Safety Reporting System to this vendor based product
- Developed expertise in the use of RL Solutions report writing tools to ensure continued ability to trend safety data during the transition from the legacy Safety Reporting System
- Created safety reporting templates to be utilized adhoc by file managers
- Eliminated risk of inadvertent intrathecal vincristine administration house-wide by requiring vincristine to be dispensed in a mini-bag rather than in a syringe
- Implemented 122 system improvements, enhancements and optimizations resulting in a safer medication use
- Joined the NoCVA Hospital Engagement Network to identify risk reduction strategies for the use of warfarin, insulins and opiates

Our Team

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Continuity of Care Evan Frasure

Overview of services

The Department of Pharmacy Continuity of Care (COC) Team was established in November of 2011 and serves to promote improvements in transitions of care experiences for patients at Duke University Hospital. Services provided by the COC team include:

- Interview patients admitted to Duke University Hospital (DUH) and in the Emergency Department (ED) at DUH to gather information regarding medications taken at home. In addition, COC team members will also call the patients pharmacy, provider, skilled nursing facility, caregiver, family members, or anyone else as needed to complete the most accurate medication list possible.
- Monitor the patient-pharmacy hotline established to allow patients a direct number to call with questions or concerns regarding any medication related issues

Our Team

The COC team expanded during 2014 to now include a residency trained pharmacist coordinator, 5 full-time pharmacy technicians, and 5 part-time pharmacy technicians. The

expansion of our team is in response to the growing demand for the services provided by the continuity of care team.

Availability

The COC team is available to see patients Monday through Friday from 7 AM until 10 PM and on the weekends and holidays from 8 AM until 6 PM. The Pharmacy Coordinator for the Continuity of Care team can be reached by phone M-F 8 AM – 5 PM (681-5008) or by pager (970-5584). The pharmacy technicians can be reached either by phone or via a triage pager (970-0357).

Major Accomplishments

- Integrated the work of the Continuity of Care technician into the clinical pharmacist pharmacy admission workflow on patient care units
- Created a patient tracking system within Maestro Care to enhance communication between the Continuity of Care technicians and clinical pharmacist.
- Developed a quick tip sheet and detailed manual to assist the clinical pharmacist and provide consistency within the pharmacy admission workflow.
- Established a multidisciplinary Health-system Medication Reconciliation Taskforce under the direction of the Health System Medication Safety Committee.
- Expansion of team nine to ten technicians
- Participation in multidisciplinary teams focused on improving transitions of care.
- Fostered patient pharmacy relationships through direct interaction with patients and introducing pharmacy to them early during their stay.

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Antimicrobial Stewardship Christina Sarubbi

Overview of services

The Antimicrobial Stewardship and Evaluation Team (ASET) is dedicated to enhancing the quality of antimicrobial use throughout Duke University Hospital. ASET works collaboratively with clinical pharmacists, medical staff and other healthcare workers to provide safe, efficacious, and cost-effective drug therapy to optimize outcomes in patients with infectious diseases.

Functions of ASET include:

- Performing hospital-wide prospective and retrospective antimicrobial review, feedback and intervention
- Participating in the development of infectious-diseases related protocols and order sets
- Updating DUH infectious diseases guidelines to improve antibiotic decision-support for clinicians relating to the selection, dose, duration, and monitoring of antimicrobials
- Analyzing prescribing and utilization patterns to identify trends and improvement opportunities
- Working to ensure optimal compliance with anti-infective related clinical pathways and guidelines
- Participating in the conduct of didactic and experiential training of present and future physicians and pharmacists in principles of antimicrobial stewardship

Our Team

Christina Sarubbi, PharmD, BCPS
Deverick Anderson, MD, MPH; ASET Medical Director
Coleen Cunningham, MD
Rebekah Moehring, MD, MPH
Richard Drew, PharmD, MS

Availability

An ASET member is available Monday through Friday 8 AM to 5 PM.

Major Accomplishments

- Implemented beta-lactam dose optimization protocols for piperacillin-tazobactam, cefepime, and meropenem
- Oversaw compliance of mandatory Infectious Diseases consults for patients with *Staphylococcus aureus* blood stream infections policy which resulted in over 250 ID consults
- Assisted in the development and implementation of a pharmacist-managed antimicrobial intravenous to oral medication conversion protocol
- Collaborated with CPCS in the development and implementation of the Pharmacokinetics Policy
- Reviewed numerous drug monographs, therapeutic interchange programs, and MUEs pertaining to antimicrobials
- Collaborated with Oncology FET on the development of the DUH Febrile Neutropenia protocol
- Provided quarterly expenditure and utilization reports to DUH administration
- Participated in quarterly internal medicine noon conference lecture series

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Pharmaceutical Utilization Management Program Lacey Lee

Program Overview

The Duke University Hospital Pharmacy Utilization Management Program (PUMP) was established in 2010. PUMP is dedicated to enhancing the quality and cost-effectiveness of medication utilization throughout Duke University Hospital and Health System. PUMP works collaboratively with the Center for Medication Policy, Medical and Surgical Leadership, and other healthcare team members to enhance performance in medication utilization in order to optimize

patient outcomes and improve overall quality of patient care.
Functions of PUMP include:

- Analyzing prescribing and medication utilization patterns using internal and external databases to identify trends and improvement opportunities
    - Clinical Service Unit (CSU) financial reports
    - Benchmarking via University Health System Consortium (UHC) Clinical Resource Manager
    - Clinical Pharmacist and Medical / Surgical staff reporting
- Participating with relevant policy-making committees to establish policy and implement initiatives that improve and enhance medication utilization
- Track progress and savings for all initiatives implemented pertaining to medication utilization improvement within the Department of Pharmacy

FY 2014 Tracking

B	C	D	E	F	G
PROCUREMENT PROJECTS	OUTCOME	TEAM	ANNUALPROJECTED SAVINGS	IMPLEMENTATION DATE	DOCUMENTED SAVINGS Through July 2014
Zometa (Zoledronic Acid) Brand to generic conversion	Cost avoidance	Pharmacy - Procurement	$80,000	March-13	$592,710
Argatroban (Product Switch)	Cost avoidance	Pharmacy - Procurement	$24,036	June-13	$16,024
Ambisome (Product Switch)	Cost avoidance	Pharmacy - Procurement	$190,000	July-13	$113,052
Gadavist (gadobutrol) (Product Switch)	Cost avoidance	Pharmacy - Procurement	$100,000	July-13	$84,119
Cardinal Generic Conversions through November 2013	Cost avoidance	Pharmacy - Procurement	$1,100,000	November-13	$341,735
Azithromycin (Product Switch)	Cost avoidance	Pharmacy - Procurement	$56,000	November-13	$14,080
Aztreonam (Product Switch)	Cost avoidance	Pharmacy - Procurement	$15,000	November-13	$2,298
Lorazepam (Product Switch)	Cost avoidance	Pharmacy - Procurement	$35,000	November-13	$32,456
Diprivan (Propofol) (Product Switch)	Cost avoidance	Pharmacy - Procurement	$42,000	November-13	$39,984
Surgifoam Contract Optimization	Cost avoidance	Pharmacy - Procurement	$72,000	December-13	$18,000
Quelicin to Anectine (Succinylcholine) (Product Switch)	Cost avoidance	Pharmacy - Procurement	$24,109	January-14	$2,009
Lidoderm Patch (Lidocaine) (Brand to generic switch)	Cost avoidance	Pharmacy - Procurement	$21,525	January-14	$7,100
Ziconotide (Purchasing in patient specific fashion)	Cost avoidance	Pharmacy - Ambulatory	$90,000	January-14	$32,480
Fluconazole (Product Switch)	Cost avoidance	Pharmacy - Procurement	$2,400	April-14	$265,676
Total Procurement			$1,852,070		$1,561,723
UTILIZATION / OPERATIONS PROJECTS	OUTCOME	TEAM	ANNUALPROJECTED SAVINGS	IMPLEMENTATION DATE	DOCUMENTED SAVINGS THROUGH July 2014
Piperacillin/Tazobactam Extended Infusion Protocol	Drug Utilization	ASET	$100,000	May-13	$95,333
Inpatient Hemodialysis: Epoetin Alfa Protocol	Drug Utilization	CPCS	$77,149	October-13	$177,000
Argatroban Waste Reduction	Waste Minimization	Inpatient Operations	$20,000	November-13	Product Currently on Backorder N/A
Alteplase (Cathflo) Utilization Optimization	Drug Utilization	Inpatient Operations	$60,000	December-13	$112,000
Filgrastim Stock Solution Adjustment	Waste Minimization	Inpatient Operations	$40,000	December-13	$30,800
IV Acetaminophen Guidelines for Use	Drug Utilization	CPCS, Children's	$500,000	December-13	$167,155
Dronase Alfa Non-CF Utilization Guidelines for Use	Drug Utilization	CPCS	$100,000	December-13	$62,748
Octreotide Administration Optimization	Drug Utilization	CPCS	$4,000	February-14	$24,835
Daptomycin Dose Rounding	Waste Minimization	CPCS	$75,000	April-14	Cost Savings Not Yet Accrued
Meropenem Extended Infusion	Waste Minimization	CPCS	$50,000	April-14	Cost Savings Not Yet Accrued
Daptomycin Batch Dosing	Waste Minimization	Inpatient Operations	$159,200	May-14	Cost Savings Not Yet Accrued
IVIG Optimization in Lung Transplantation (Revised Protoc	Drug Utilization	CPCS	$500,000	July-14	Cost Savings Not Yet Accrued
Outpatient Self Administered Injectables	Drug Utilization	Ambulatory	$100,000	Fiscal Year 2015	Cost Savings Not Yet Accrued
Gelfoam Product Standardization	Drug Utilization	Pharmacy - Procurement	$300,000	Fiscal Year 2015	Cost Savings Not Yet Accrued
Outpatient Oncology Premeds (Switch from IV to PO)	Drug Utilization	Ambulatory	$100,000	Fiscal Year 2015	Cost Savings Not Yet Accrued
Bivalrudin Utilization Interventional Cardiology	Drug Utilization	CPCS	$157,000	Fiscal year 2015	Cost Savings Not Yet Accrued
IV Chlorothiazide Utilization-Children's	Drug Utilization	Children's	$100,000	Fiscal year 2015	Cost Savings Not Yet Accrued
Lupron Depot Inpatient Restriction	Drug Utilization	CPCS	$40,000	Fiscal year 2015	Cost Savings Not Yet Accrued
Doxorubicin Liposomal Inpatient Restriction	Drug Utilization	CPCS	$15,000	Fiscal year 2015	Cost Savings Not Yet Accrued
Octreotide LAR Inpatient Restriction	Drug Utilization	CPCS	$100,000	Fiscal year 2015	Cost Savings Not Yet Accrued
Remifentanyl Utilization	Drug Utilization	CPCS	$100,000	Fiscal year 2015	Cost Savings Not Yet Accrued
Lacosamide Dose Supply Optimization	Drug Utilization	Inpatient Operations	$15,000	Fiscal year 2015	Cost Savings Not Yet Accrued
Rituximab Administration in Outpatient Setting	Drug Utilization	CPCS	$100,000	Fiscal year 2015	Cost Savings Not Yet Accrued
Albumin Utilization (Non-Transplant Indications)	Drug Utilization	CPCS	$50,000	Fiscal year 2015	Cost Savings Not Yet Accrued
Palivizumab Utilization	Drug Utilization	CPCS	$20,000	Fiscal Year 2015	Cost Savings Not Yet Accrued
Total Cost Avoidance			$2,882,349		$669,871
			$5,154,779		$2,231,594

Pharmaceutical Utilization Management Program Initiative Highlights

- Total Documented Savings for Fiscal Year 2014: $2,231,594
    - Total Procurement Savings: $1,561,723
    - Total Utilization / Operations Savings: $669,781
- IV Acetaminophen Guidelines for Use: Total savings through July 2014 $167,155
- Alteplase (Cathflo) Utilization Optimization: Total savings through July 2014 $112,000

- Inpatient Hemodialysis: Epoetin Alfa Utilization Optimization: Total savings through July 2014 $177,000
    - Second phase of initiative implementation FY2015
- Dornase Alfa Utilization for Non-Cystic Fibrosis Indications: Total savings through July 2014 $62,748

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Nutrition Support Pharmacy Programs John Murray

Overview of services

The Duke University Hospital Adult Nutrition Support-Total Parenteral Nutrition Team (NSS-TPN) is a multidisciplinary collaboration between physicians, pharmacists, dietitians and nurses. It is a consult service for TPN that works in concert with the primary team, as well as the patient, to evaluate the need for specialized nutrition support for the adult patient population. Once the patient is determined to require specialized nutrition therapy, the team:

- Evaluates and determines the appropriate route of therapy including enteral or parenteral therapy
- Develops a nutrition care plan; verifying proper type, placement, and care of parenteral or enteral access including inserting enteral feeding tubes with a specialized device (Cortrak)
- Documents nutrition care plan and goal of therapy in the electronic medical record as agreed upon by the ordering team
- Initiates and manages patient specific parenteral nutrition for adult inpatients, including nutrition product evaluation and management of significant product shortages
- Initiates and manages patient specific enteral nutrition or diet until deemed appropriate to sign over to unit-based registered dietitians
- Evaluates drug therapy (including antibiotic therapy, prokinetic and antimotility agents, opioid sparing pain management, appetite stimulants, short bowel drug therapy, iron replacement, etc.), electrolytes, fluid and recommending changes as it pertains to nutrition care for the patient
- Reevaluate patient periodically to transition patient to a lower level of support, as appropriate (eg. Return to oral diet or transition from TPN to tube feeds)
- Coordinate transition to home or facility (when applicable including proper patient transport and providing guidance to other institutions for making TPN with their available products and vice versa)
- Manages patients receiving parenteral nutrition at home

For patients who require parenteral support after discharge, the NSS-TPN Team plays an integral role in evaluating the adult patient for appropriate therapy and providing guidance to discharge planners to request financial approval and home health services. The NSS-TPN Team provides support for Home Total Parenteral Nutrition (HTPN) patients by:

- Coordinate training to the patient and/or caregiver to be independent with the therapy in the home environment
- Monitor patient clinical condition for response to therapy

- Adjust TPN therapy as appropriate
- Wean TPN once goals of therapy have been achieved.
- Document all interventions in the electronic medical record.

The education of future nutrition support practitioners is facilitated through mentoring of pharmacists, dietitians, students, residents and other multidisciplinary staff.

Major Accomplishments

- Supported implementation of Maestro Care and development of TPN and tube feeding order sets supporting standardization and enhanced safety with nutrition therapy for the Duke Health System
- A nutrition support curriculum, a combination of didactic and practicum, was crafted for unit based pharmacists and dietitians in order writing. The TPN education plan includes credentialing and validation as TPN clinicians.
- The team-based nutrition support model was restructured to integrate decentralized practitioners as they become credentialed. Collaboration with floor pharmacists, dietitians and the primary team for nutrition therapy on Duke North surgery 21/23 units, surgery intensive care unit, and adult bone marrow transplant unit was implemented, to provide redundancy for nutrition therapy.
- Establishment of a pharmacy led monthly multidisciplinary Nutrition Council meetings to assist with the development of and maintenance of skilled Nutrition Support practitioners for adults and pediatrics so that participants from several disciplines can come together to discuss ways to provide safer, more effective TPN therapy.
- Launched the nutrition support forum. The forum provides resources for nutrition therapy and is located on the Pharmacy Department website.

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Oncology Pharmacy Programs Sally Barbour

Overview of services

Oncology pharmacy specialists at Duke provide patient care to adult and pediatric cancer populations in both the inpatient and outpatient settings. Clinical services are tailored to patient care needs and include but are not limited to pharmacotherapeutic medication management, therapeutic drug monitoring, pharmacokinetic dosing, nutrition support, drug information, symptom management, supportive care, and patient education. The pharmacy team is also responsible for safely compounding and dispensing chemotherapy. Pharmacists work collaboratively with other health care providers to provide safe, efficacious, and cost-effective drug therapy to optimize outcomes in patients with malignant diseases. Oncology practitioners are involved in the development, support, and management of research/investigational protocols. Additionally, the education of future pharmacy practitioners is facilitated through mentoring of pharmacy students and residents in a variety of clinical settings.

Locations and Hours of Operation

Currently, oncology pharmacists practice in the following areas:

- Ambulatory Oncology Clinics
    - Hematologic Malignancies

    - GU
    - GI
    - Thoracic
    - Breast
    - Sarcoma
    - Brain Tumor
    - Adult BMT
    - Pediatric BMT
- Inpatient Oncology Services (CPCS)
    - Hematologic Malignancies
    - Solid Tumors
    - Adult Bone Marrow Transplant
    - Pediatric Bone Marrow Transplant
    - Pediatric Oncology
- Infusion Pharmacies
    - Cancer Center Infusion Pharmacy
    - North Pavilion
    - Rainbow Day Hospital
- Investigational Chemotherapy Services

Major Accomplishments

- Continued support and development of Beacon templates supporting standardization and enhanced safety with chemotherapy regimens
- Continuation of Duke Oncology Pharmacy Oral Chemotherapy Management Program
- Continuation and expansion of call back program for patients at high risk for chemotherapy induced nausea and vomiting
- Expanded and enhanced clinic pharmacy services in Duke Cancer Center
- Increase to 5 Clinical pharmacist practitioners
- Monthly in-services for Duke Cancer Center Treatment Center
- Participation in the Duke Oncology Network Pharmacotherapy Updates in Cancer Series
- Participation in oncology fellow lecture series
- Providing dinner at Caring House
- Creating and sending quarterly newsletter to oncology practitioners across Health system
- Participation in teaching daily Chemotherapy Education Class
- Participation in the development of standardized chemotherapy education information sheets

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Transplant Pharmacy Programs Matt Harris

Overview of services

Clinical pharmacy services are provided for heart, intestine, kidney, liver, lung, and pancreas transplant patients across the continuum of care at Duke Hospital. Per CMS requirements the Clinical Transplant Pharmacists are actively involved and document their role in the care of patients and donors in the pre-, peri-, and post-operative settings. The services provided include identifying, solving and preventing medication-related problems or deficiencies in the solid organ

transplant population and living donors for the kidney, liver, and lung programs. The Clinical Transplant Pharmacists also provide education regarding the safe and effective use of medications in the post solid organ transplant population to patients/families and the healthcare team. Further, Clinical Transplant Pharmacists assist the transplant teams in medication protocol development, review and revision on an on-going basis. The Clinical Transplant Pharmacists are also actively involved in the development and management of investigator initiated research and Pharmacy Utilization Management Programs. Additionally time is spent training students and residents in a variety of clinical settings.

Our Team

Matt Harris, PharmD, MHS, BCPS	Director Transplant Pharmacy Programs
Jennifer Gommer, PharmD, BCPS	Inpatient Abdominal Transplant Clinical Pharmacist
Mara Watson, PharmD	Inpatient Heart Transplant Clinical Pharmacist
Clark Benedetti, PharmD	Ambulatory Thoracic Transplant Clinical Pharmacist
Amanda Hulbert, PharmD, BCPS	Inpatient Lung Transplant Clinical Pharmacist

Locations

Currently transplant pharmacists practice in the following areas:

- Ambulatory Clinics
  - Lung Transplant
  - Heart transplant
- Inpatient Coverage (CPCS)
  - Adult abdominal transplant
  - Pediatric abdominal transplant
  - Heart transplant/heart failure
  - Acute lung transplant
  - Readmit lung transplant
- Ambulatory Pharmacy
  - Duke Cancer Center Specialty Pharmacy

Transplants performed (July 1, 2013 to June 30, 2014)

- Kidney 104
- Kidney/pancreas 12
- Liver 59
- Intestinal 6
- Lung 114
- Heart 64

Availability

Services are provided by a Transplant Clinical Pharmacist seven days a week and all of the pharmacists are available by pager for after-hours questions or concerns.

Major Accomplishments

- Heart transplant program performed its 1000th transplant in its 29 year history
- Establishment of the Transplant Pharmacy Council
- Created a policy and a Nursing Process Standard on the preparation and administration of anti-thymocyte globulin for pediatric abdominal transplant recipients
- Updated and disseminated the lung transplant protocols
- Created protocols for the prevention and management of pneumocystis jiroveci, cytomegalovirus, and Epstein Barr virus after pediatric liver or intestinal transplantation
- For the sixth year in a row the PGY2 Transplant Resident became a board certified pharmacotherapy specialist

- Continue to drive post-transplant prescriptions to the Duke Cancer Center Specialty Pharmacy with over 3 million dollars in revenue per year
- Two publications originated from the transplant pharmacy group

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Business and Finance

Overview of services

The Department of Pharmacy Finance and Business Services Team provides many services to members of the Department and serves as liaison to DUH Finance, Corporate Finance, Human Resources, Payroll & the Patient Revenue Management Organization (PRMO). Services include:

- Revenue cycle management
- Manual charge entry
- Routine charge capture and claims audits
- Human resource and payroll processes
- Coordination of the preparation of the annual Operational and Capital Budgets
- Expense trending & cost accounting reporting
- Inventory management accounting processes
- Project management support as needed

Our Team

The Finance and Business Services team is composed of a dedicated, diverse set of individuals committed to enhancing Departmental financial and business processes to improve decision support and efficiency within the context of the Department's Balanced Scorecard and Mission. Total experience of the team with Duke totals over 90 years. Some individuals are enrolled in graduate and technical degree programs which will further enhance skills and performance in support of Departmental and Heath System goals.

Major Accomplishments

- Provided routine and specialized expense and revenue trend analysis in support of strategic departmental business units
- Maintained timely charge capture and kept late charge postings below established thresholds

VI. Research Program

Pharmacy Research Committee

Purpose
The Pharmacy Research Committee is a scientific advisory committee designed to enhance pharmacy staff, resident and student knowledge and participation in research.

Committee Function
The scope of the committee responsibilities shall include:

- Oversee, guide and facilitate research activities to include:
  - study feasibility assessment
  - compliance with Investigational Review Board requirements
  - adherence to data security requirements via review of the Research Data Security Plan
  - compliance with institutional training requirements
- Identify and arrange extra-departmental research support resources which may include:
  - statistical consulting services
  - Clinical Research Unit /Institutional Review Board protocol review
  - Duke Office of Clinical Research (DOCR) review
- Issue a call for research project ideas on an annual basis and maintain a directory of interested research preceptors and their areas of research interests
- Establish guidelines/timelines for research projects
- Provide assistance to preceptors in developing suitable research projects
- Review and provide feedback to study investigators on Research Project Outlines and Research Protocols (including evaluation of scientific merit, design, feasibility, relevance to internal/external audiences, resources and regulatory compliance)
- Make recommendations to the Pharmacy Senior Management Group (SMG) regarding approval of projects
- Review and provide feedback on abstracts and presentations. Specific feedback shall be provided to pharmacy residents in preparation for the University Healthsystem Consortium (UHC) meeting and Southeastern Residency Conference (SERC)
- Review and provide feedback on final research report in manuscript format prior to publication
- Perform an annual assessment of the effectiveness of the resident research process
- Assess pharmacy staff and residents' learning needs regarding necessary research skills and facilitate the scheduling of research training sessions to meet these needs and those required by the institution
- Ensure that investigators maintain a regulatory file, which may be held electronically. Recommended contents of the files could include documents such as a project staff list and training updates, all IRB communications, a copy of the protocol and if applicable, consent templates.

Membership
Udobi Campbell, PharmD, MBA - Chair
Associate Chief Pharmacy Officer

Richard Drew, PharmD, MS, BCPS, FCCP
Professor, Campbell University College of Pharmacy and Health Sciences
Associate Professor of Medicine (Infectious Diseases), Duke University School of Medicine

Justin Geurink, PharmD, BCPS
Pharmacy Manager, Clinical and Patient Care Services

Matt Harris, PharmD, MHSc, BCPS
Director of Transplant Pharmacy Programs
Clinical Pharmacist, Abdominal Transplant
PGY2 Transplant Residency Program Director

Stephen W. Janning, PharmD
Director of Clinical Development
GlaxoSmithKline
(Formerly, Clinical Coordinator, Duke University Hospital Department of Pharmacy)

Bridgette Kram, PharmD, BCPS
Clinical Pharmacist

Beth McLendon-Arvik, PharmD
Manager, Duke Investigational Drug Service and Investigational Chemotherapy Service
Director, PGY1 Pharmacy Residency

Meredith T. Moorman, PharmD, BCOP
Clinical Pharmacist, Adult Hematology/Oncology Clinic

Russell Moore, PharmD, BCOP, CPP
Clinical Pharmacist, Genitourinary Medical Oncology

Cathy Vaughan, PharmD
Drug Information Specialist
Center for Medication Policy

VII. Educational Program

Pharmacy Education Committee

Purpose
To promote and support educational activities of the department of pharmacy.

Committee Function
- To establish and maintain an education committee,
- To support the educational needs of department of pharmacy staff (including residency programs offered by Duke University Hospital) and learners from affiliated schools/colleges of pharmacy through sub-committees charged with specific responsibilities and accountabilities

Subcommittees
Subcommittees for the following areas will assume accountability and responsibility for assigned educational needs:
- Residency Program Noon Conference: Grand Rounds and Case Conferences
- Annual Winter/Spring Symposium
- Preceptor Development
- UNC ESOP APPE Student Learning Experience Scheduling and Support
- UNC ESOP 4th Year Student Clerkship Research Projects
- UNC ESOP 4th Year Seminar Class: Fall and Spring Semester activities
- UNC ESOP and CU COP IPPE Student Clerkships
- Campbell University COP 4th Year Student Learning Experience Scheduling and Support
- UNC ESOP 4th Year Student Advisory Committee

Membership
David J. Warner, PharmD – Chair
Associate Chief Pharmacy Officer

Jenny Mando-Vandrick, PharmD, BCPS
Clinical Pharmacist – Emergency Services
Chair – Residency Noon Conference Subcommittee

Doug Raiff, PharmD, BCPS
Clinical Pharmacist – Medication Policy
Chair - Annual Winter/Spring Symposium Subcommittee

Dustin Wilson, PharmD, BCPS
Clinical Pharmacist – Medicine
Assistant Professor, Campbell University College of Pharmacy and Health Sciences
Chair – Preceptor Development Subcommittee

Kristen Bova Campbell, PharmD, BCPS, AQ-Cardiology, CPP
Clinical Pharmacist - Cardiology
Chair - UNC ESOP APPE Student Learning Experience Scheduling and Support Subcommittee

Ann Scates McGee, PharmD
Director, Center for Medication Policy
Chair - UNC ESOP 4th Year Student Clerkship Research Projects Subcommittee

Justin Geurink, PharmD, BCPS
Manager, Clinical and Patient Care Services
Chair - UNC ESOP 4th Year Seminar Class: Fall and Spring Semester activities

Mary Margaret Johnson, PharmD, MBA, MSCR
Clinical Pharmacist – Duke Compounding Pharmacy
Chair - UNC ESOP and CU COP IPPE Student Clerkships

VIII. Residency Programs

For over 40 years our program has been training residents to become competent pharmacy practitioners and leaders. Residents who complete our program have experienced success in obtaining competitive specialty residencies, fellowships, academic, clinical and pharmacy leadership positions.

Interest in our residency programs is consistently strong. This year was no different. Staff members reviewed hundreds of applications for 14 positions in our 2014-2015 class.

We extend our gratitude to our residency program directors:

- Beth McLendon-Arvik — Post Graduate Year (PGY) 1*
- Paul W. Bush — PGY1-2 Health-System Pharmacy Administration*
- Kimberly Hodulik — PGY2 Ambulatory Care*
- Kristen B. Campbell — PGY2 Cardiology*
- Jennifer Mando-Vandrick — PGY2 Critical Care*
- Ann Scates-McGee — Drug Information (with Glaxo Smith Kline)
- Richard Drew — Internal Medicine/Infectious Diseases/Academia (with Campbell University School of Pharmacy)
- Sally Barbour — PGY2 Oncology*
- Julia (Jill) Lawrence — PGY2 Pediatrics*
- Matthew T. Harris — PGY2 Solid Organ Transplantation*

*ASHP-Accredited

2013-2014 Residency Graduates and Current Positions

The 2013-2014 residents successfully completed all requirements for graduation from Duke programs. These graduates include:

PGY1:

Sheena Merwine	PGY2 Critical Care Residency, Duke University Hospital
Rachel Rogers	PGY2 Infectious Disease Residency, South Texas Veterans Health Care System, San Antonio, TX
Jessica Stover	PGY2 Oncology Pharmacy Residency, Duke University Hospital
Mary Vacha	PGY2 Solid Organ Transplant Residency, Duke University Hospital

PGY1-2 Health-System Pharmacy Administration:

Grayson Peek (PGY1)	PGY2 Health-System Pharmacy Administration Resident, Duke University Hospital
Kevin Helmlinger (PGY2)	Manager, Pharmacy Operations, Duke University Hospital – Children's Hospital Division

PGY2 Ambulatory Care:

Michelle Cefaretti	Outpatient Clinical Pharmacist, John Peter Smith Health Network Family Health Center, Fort Worth, TX

PGY2 Cardiology:

Lindsey Burgess	Clinical Pharmacist, Duke University Hospital

PGY2 Critical Care:

Jennifer Cole	Clinical Pharmacist, Duke University Hospital

Drug Information:

Sarah White	Clinical Specialist - Drug Information, Emory University Hospital, Atlanta, GA

Internal Medicine/Infectious Diseases/Academia:

Justin Spivey	Clinical Specialist – Infectious Disease, James H. Quillen VA Medical Center, Johnson City, TN

PGY2 Oncology:

Katie Cambron	Oncology Clinical Pharmacist, Novant Health, Charlotte, NC

PGY2 Pediatrics:

Jennifer Schriber	Clinical Pharmacist, Neonatal Intensive Care Unit, Duke University Hospital

PGY2 Solid Organ Transplantation:

Kristi Beermann	Clinical Pharmacist, Duke University Hospital

Chief Resident	Kevin Helmlinger
Preceptor of the Year	Bridgette Kram
Residency Advocate Award	Van Blalock

Duke University Hospital Pharmacy Residency Class of 2013-2014
(Residents and Program Directors Pictured)

The 2014-2015 recruiting campaign successfully filled 14 residency positions offered at Duke. Listed below are the current residents their College of Pharmacy and/or previous PGY1 residency program:

PGY1:

Nicole Casciello	University of Texas – Austin, TX
Jesse Fletcher	University of North Carolina – Chapel Hill, NC
Michael Wolcott	University of North Carolina – Chapel Hill, NC
Debbie Yen	University of North Carolina – Chapel Hill, NC

PGY2 Ambulatory Care:

Drew Armstrong	PGY1 Pharmacy Residency – Regional One Health, Memphis, TN

PGY2 Cardiology:

Teresa Cicci	PGY1 Pharmacy Residency – Virginia Commonwealth University Health System, Richmond, VA

PGY2 Critical Care:

Sheena Merwine	PGY1 Pharmacy Residency – Duke University Hospital

Drug Information:

Stacy Hoover	Purdue University – West Lafayette, IN

Internal Medicine/Infectious Diseases/Academia:

David Allen	PGY1 Pharmacy Residency – Cone Health, Greensboro, NC

PGY1-2 Health-System Pharmacy Administration/M.S.:

Laura Meleis (PGY1)	University of North Carolina – Chapel Hill, NC
Grayson Peek (PGY2)	PGY1 Pharmacy Residency – Duke University Hospital

PGY2 Oncology:

Jessica Stover	PGY1 Pharmacy Residency – Duke University Hospital

PGY2 Pediatrics:

Sharon Martin	PGY1 Pharmacy Residency – University of Maryland Medical Center, Baltimore, MD

PGY2 Solid Organ Transplant:

Mary Vacha	PGY1 Pharmacy Residency – Duke University Hospital

Chief Resident	Grayson Peek

IX. Milton W. Skolaut Leadership Award

Overview

The Milton W. Skolaut Leadership Award is awarded to a past resident of the Duke University Hospital Pharmacy Residency Program. This award recognizes an individual for outstanding leadership and contributions to the profession of pharmacy.

About Milton W. Skolaut

Milton W. Skolaut was born in San Antonio, Texas and earned a bachelor's degree in 1941 from the University of Texas College of Pharmacy. In 1952, Skolaut became Director of Pharmacy Services at the National Institutes of Health (NIH) Clinical Center in Bethesda, Maryland. While at the clinical center, Skolaut established the pharmacy as the central supply point for drug distribution, a relatively new concept at the time but one that quickly became the norm for hospitals nationwide.

Skolaut joined the staff of Duke Hospital in 1970, where he served for 17 years as Director of Pharmacy until his retirement in 1987. During Skolaut's tenure at Duke, the pharmacy established services that included the preparation of unit dose medication packages, intravenous admixtures, and total parenteral nutrient solutions. He was also responsible for the expansion of a pharmacy within the operating room suites, supplying all materials and medications to the Anesthesia Department. The Department of Pharmacy also instituted clinical services and a residency program under his leadership.

Mr. Skolaut was an active member of ASHP for many years, including serving as president from 1963-64. In 1968, he was one of the three visionary leaders that started the ASHP Research and Education Foundation. In 1979, Skolaut earned hospital pharmacy's highest honor, ASHP's Harvey A. K. Whitney Lecture Award.

Past Recipients

2014: Jill S. Bates, PharmD, MS, BCOP

Jill S. Bates, PharmD, MS, BCOP, is the inaugural recipient of the Milton W. Skolaut Leadership Award. Dr. Bates completed a PGY1 Pharmacy Practice and PGY2 Oncology Pharmacy Residency at Duke University Hospital from 2006-2008.

Dr. Bates currently practices as a Clinical Pharmacy Specialist in Malignant Hematology at the University of North Carolina Hospitals, and is an Assistant Professor of Clinical Education for the UNC Eshelman School of Pharmacy. Bates has been an active member of ASHP and HOPA for much of her career, and most recently served as Chair of the ASHP Section of Clinical Specialists and Scientists from 2013-2014.

X. Grants and Publications

Arrowood S. IV dose management: Bar coding, labeling, and tracking. Pharmacy Purchasing & Products. 2013 Sept;10(9).

Arrowood S. Interprofessional Fellowship Project: A Team-Based Transition to Practice Partnership Targeting Health Science Graduates in Rural Communities (Duke University Health System/Duke University School of Nursing). – Research Grant

Bender F, Cotter B, Ludwig B, **Murray C**, Nedved A, Parker M, et al. White paper: Building a business case for a central sterile compounding pharmacy. University HealthSystem Consortium. 2014 Feb.

Beermann K. American Society of Transplantation Fellows Symposium Travel Grant.

Byrns JS, Cornett D, Garrison KL, Bohm NM. Administration of antihypertensives prescribed "as needed" for blood pressure control in acutely ill patients. Journal of Health-System Pharmacy Residents. 2013;2(3):1-5.

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Causey HE, Hodulik K. Management of warfarin in patients desiring tattoo placement: A review of recommendations for cutaneous procedures. J Pharm Tech. 2013;29(6):250-4.

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Lassiter TF, Henkel Al. Pharmacological management of neuroscience patients. In: Hickey JV. The clinical practice of neurological and neurosurgical nursing, 7th. ed. Philadelphia: Lippincott Williams & Wilkins; 2014.

Nemerovski CW, Lekura J, **Cefaretti M,** Mehta PT, Moore CL. The safety and efficacy of statins in patients with end stage renal disease. Annals of Pharmacotherapy. 2013;47(9). Published online.

Pleasants R, Herrick H, Liao L. The prevalence, characteristics, and impact of chronic obstructive pulmonary disease in North Carolina. N C Med J. 2013;74(5):376-383.

Pleasants R, Ohar J, Croft J, Liu Y, Kraft M, Mannino D, et al. Chronic obstructive pulmonary disease and asthma. Patient characteristics and health impairment. J COPD. 2013;10:630-37.