

**University of Virginia Health System
Department of Pharmacy Services
PGY2- Critical Care Residency Program Overview
2009-2010**

ROTATIONS

A. REQUIRED RESIDENCY ROTATIONS FOR CRITICAL CARE RESIDENCY

The 6 required rotations include 5 week rotations in the following areas:

- Surgical / Trauma Intensive Care Unit (ICU)
- Medical ICU
- Neurology / Neurosurgery ICU
- Coronary Care Unit (CCU) Or the Thoracic/Cardiovascular Surgery ICU (TCVPO)
- Emergency Medicine/Toxicology
- Infectious Diseases

B. ELECTIVE ROTATIONS FOR CRITICAL CARE RESIDENCY: (5 weeks each)

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|-----------------------|---|
| ● Pediatric ICU | ● Neonatal ICU |
| ● Coronary Care Unit | ● Thoracic/Cardiovascular Surgery ICU (TCVPO) |
| ● Hematology/Oncology | ● Management/Administration |
| ● Nutrition | |

Opportunities exist for repeating the above rotations (except for ID, Hematology/Oncology, and Nutrition) in order to gain additional experience. Additional rotations may be developed based on resident interest and preceptor availability. Between the third and fourth rotation blocks (November and December), residents will have a mixture of research and mini-rotations. Mini-rotations will consist of one 2-week or two 1-week experiences (week of 11/16 and 12/14) of concentrated experience in any pharmacy clinical specialist practice area.

ROTATION LEARNING EXPERIENCE: Surgical Trauma Intensive Care Unit
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ROTATION DESCRIPTION:

The Surgical - Trauma Intensive Care Unit (STICU) rotation is a five week surgery / critical care rotation for pharmacy residents. Comprehensive pharmaceutical care is provided for those patients in the STICU, which is a 16 bed unit for complicated critically ill general surgery, solid organ transplant, burn injury, and trauma patients. The STICU is an “open” unit divided into two teams: the general surgery team and the trauma surgery team. The PGY-2 pharmacy resident would make rounds primarily with the general surgery STICU team which generally consists of an attending physician, 3 physician house-staff residents, respiratory therapists, and nurses. The PGY-2 critical care resident would also cover the trauma patients and round with the trauma team when possible. The resident must devise strategies for accomplishing the required activities in

a limited time frame while also balancing the other resident responsibilities. The PGY-2 critical care resident is expected to provide pharmacy services to both teams and function as the clinical pharmacist for the unit including assume responsibility and accountability for all pharmacotherapy management issues. The complete spectrum of pharmaceutical care services are experienced during the rotation including:

- Read and understand the required goals and objectives for this rotation.
- Patient profile review with identification and resolution of medication related problems
- Provide active involvement in medication therapy, selection, modification, and monitoring
- Review patients home medication regimen prior to admission addressing any problems
- Assistance with medication order entry, order review and order clarification
- Rounding with STICU team and primary surgery teams
- Round with the trauma team when possible (STICU and Trauma team rounds overlap)
- Providing pharmacokinetic and nutritional support consults
- Interaction with nurses, physicians, and nutritional support specialists
- Monitoring and reporting of adverse drug reactions
- Providing drug information to the STICU team
- Documenting clinical interventions
- Coordination of distribution problems not resolved by in-patient pharmacy
- Maintain a presence on the unit throughout the day whenever possible

MEDICATION THERAPY CORE TOPIC CONTENT

Rotation medication therapy core content will be covered via direct patient care experiences, reading assignments, discussions, written assignments and/or case presentations. The areas of emphasis include (but are not limited to) the following:

- Post-operative infectious complications
- Venous thrombosis prophylaxis
- Gastrointestinal stress ulcer prophylaxis
- Glycemic control in the intensive care unit
- ICU analgesia, sedation, and neuromuscular blockade
- Cardiovascular monitoring parameters when using inotropes
- Sepsis and inflammatory response syndrome (SIRS)
- Shock and related syndromes
- Nutritional support for critically ill surgery patients
- Pharmacokinetics in critically ill patients
- Fluid balance and acid / base disorders
- Fistulas and Ileus
- Burns
- Anemia of critical illness

ROTATION LEARNING EXPERIENCE: Medical Intensive Care Unit (MICU)

ROTATION DESCRIPTION:

The five week Medical Intensive Care Unit (MICU) rotation allows for the provision of pharmaceutical care to complex critically ill adults with multiple medical problems. The MICU is a 16-bed unit, and the MICU service averages 16-24 critically ill medicine patients. The MICU team is comprised of one attending (double board certified in pulmonary and critical care medicine), one pulmonary/critical care physician fellow, four second or third year medical residents, four medical interns, medical students, clinical pharmacy, bedside nursing, a nursing outcomes manager, and a clinical nutritionist. Subdivided into groups, the medical residents and students are separated into four sub-teams each having one intern, one upper level medical resident, and zero to one medical students. Exposure to a variety of disease states and pharmacotherapy management experiences occurs during the rotation. The critical care pharmacy resident (PGY2) is expected to progress to the level of serving as the clinical pharmacist for the service, assuming coverage for all patients on the MICU service. The resident must assume responsibility and accountability for all pharmacotherapy management issues for their assigned patients. The resident must provide the following pharmaceutical care services:

- ❖ Review and understand the goals and objectives for the rotation.
- ❖ Read the assigned rotation materials
- ❖ Round daily with MICU multidisciplinary team (rounds begin at 730 am)
- ❖ Review patient profile with medication/therapy problem identification and resolution
- ❖ Assist with medication order entry, order review and order clarification
- ❖ Provide proactive involvement in medication therapy selection, modification, and monitoring
- ❖ Provide pharmacokinetic and nutritional support consults
- ❖ Provide responses to drug information requests
- ❖ Participate in adverse drug reaction identification, management, and reporting
- ❖ Participate in institutional quality reporting and suggestions for process improvement
- ❖ Foster and provide good communication and interaction with nurses, physicians, and nutritional support specialists
- ❖ Coordinate of distribution problems not resolved by in-patient pharmacy.
- ❖ Document therapeutic interventions
- ❖ Provide the MICU team with one formal presentation. A written handout is required. Presentation slides are optional.

MEDICATION THERAPY CORE TOPIC CONTENT

Rotation medication therapy core content will be covered via direct patient care experiences, reading assignments, discussions, written assignments and/or case presentations. The areas of emphasis include (but are not limited to) the following:

- Sepsis and related shock issues
- ICU related Sedation, Analgesia, and Neuromuscular blockade
- Pulmonary processes - ARDS, Status asthmaticus, Acute COPD exacerbation, PE, Drug-induced
Pulmonary Disease
- Hypertensive emergencies
- Renal and Electrolyte Issues – AKD, CKD, Acid base imbalance, Fluid/electrolyte disorders, SIADH, Rhabdomyolysis
- ICU related GI Illness – Acute UGIB, LGIB, Pancreatitis, Liver failure, Hepatorenal syndrome, Portal HTN, Encephalopathy
- Endocrine issues- Acute and Relative adrenal insufficiency, DKA, HONK, Hypoglycemia

- Hematology Issues – DIC, Drug- induced blood dyscrasias
- ID issues – Numerous nosocomial and community acquired infections - CAP, HAP, Sepsis, etc
- Psychiatry Issues – ICU Delirium, ETOH withdrawal, Agitation
- Toxicology Issues – Acetaminophen OD, TCA OD, Miscellaneous OD

<p>ROTATION LEARNING EXPERIENCE: Neurosciences Intensive Care Unit (NNICU)</p>

ROTATION DESCRIPTION:

The Nerancy Neuro Intensive Care Unit (NNICU) rotation provides a five-week experience in critical care of neurological and neurosurgical patients. The NNICU is a 12-bed unit which provides care for critically ill neurosurgical, neurology, and occasionally, otolaryngology/head & neck surgery patients. The following activities represent the resident's responsibilities:

- Read and understand the required goals and objectives for this rotation
- Attend medical rounds daily with attending physicians, residents, and medical students and proactively participate in medication-related discussions
- Progress in skills and abilities throughout the rotation to be able to serve as the NNICU clinical pharmacist
- Review patient charts and medication profiles daily for the identification and resolution of medication-related problems
- Evaluate all medical regimens for therapeutic appropriateness and cost-effectiveness
- Proactively be involved in selecting, modifying, and monitoring medical therapy
- Provide medication information to physicians, nurses, and patients
- Provide formal in-service education to health care professionals
- Participate in the hospital adverse drug reaction monitoring and reporting program
- Document clinical interventions and other therapeutic activities
- Assist other healthcare providers in understanding and complying with the pharmacy department policies and procedures
- Maintain presence on the unit throughout the workday and proactively seek to assist in medication/pharmacy service related problems

MEDICATION THERAPY CORE TOPIC CONTENT

Rotation medication therapy core content will be covered via direct patient care experiences, reading assignments, discussions, written assignments and/or case presentations. The areas of emphasis include (but are not limited to) the following:

- Cerebrovascular disorders
- Subarachnoid hemorrhage
- Central nervous system (CNS) infections
- Electrolyte disorders of CNS origin
- Myasthenia gravis and myasthenic crisis
- Guillian-Barre syndrome
- Death by neurologic criteria
- Spinal cord injury
- Status epilepticus
- Traumatic brain injury
- Intracranial pressure management

ROTATION LEARNING EXPERIENCE:
Coronary Care Unit (CCU)

ROTATION DESCRIPTION:

The Coronary Care Unit (CCU) is a 10-bed intensive care unit and a 29 bed acute cardiology step-down unit. This is a 5-week rotation that provides experience in the management of patients with ischemic cardiac disease, heart failure, arrhythmias, hyperlipidemia, and other cardiovascular related issues. The following is a list of activities that are representative of the resident's responsibilities during the rotation:

- Daily medical rounds with attending physicians, residents, nurses, and medical students.
- Daily patient profile review and identification of and resolution of any medication related issues
- Daily review of laboratory data to monitor for appropriate dosing of drug therapy and evaluation of nutritional needs of the patient.
- Evaluation of all medical regimens for appropriateness and cost-effectiveness.
- Proactive involvement in selecting, modifying and monitoring drug therapy
- Provision of medication information to physicians, nurses, and patients.
- Monitor for and report Adverse Drug Reactions
- Documentation of pharmacist interventions and activities.
- Maintain an active presence in the unit throughout the day.

MEDICATION THERAPY CORE TOPIC CONTENT

Core content that will be covered by patient experiences, assigned readings, topic discussions, and/or case presentations includes but it not limited to the following:

- Ventricular and Atrial arrhythmias
- Acute Coronary Syndromes
- Acute Heart Failure
- Post PCI Management
- Hyperlipidemia
- Intra-aortic balloon pumps
- Left Ventricular Assist Devices
- Cardiac Transplantation Criteria
- Hypertensive Urgencies and Emergencies

ROTATION LEARNING EXPERIENCE:
Thoracic Cardiovascular Surgery (TCV)

ROTATION DESCRIPTION:

The Thoracic Cardiovascular Post Operative Unit (TCVPO) rotation provides a five-week experience in the care of thoracic as well as cardiovascular postsurgical patients. The TCVPO is a 12-bed unit which provides care for all postoperative cardiac, thoracic and vascular surgery patients with an occasional heart transplant, LVAD (left ventricular assist device) and lung transplant patient. Medical management of aortic dissections is also frequently seen as well. The critical care pharmacy resident (PGY2) is expected to progress to the level of serving as the clinical pharmacist for the service, assuming coverage for all patients on the TCV service. The resident must assume responsibility and accountability for all pharmacotherapy

management issues for their assigned patients. The resident must provide the following pharmaceutical care services:

- Read and understand the required goals and objectives for this rotation
- Round daily with the cardiac, thoracic and vascular surgical teams (rounds begin at 0530 on Monday and Thursday; 0600 for Tuesday, Wednesday and Friday)
- Participate in medication-related discussions
- Review patient charts and medication profiles daily for the identification and resolution of medication-related problems
- Evaluate all medical regimens for therapeutic appropriateness and cost-effectiveness
- Assist with medication order entry, order review and order clarification
- Proactively be involved in selecting, modifying, and monitoring medical therapy
- Provide pharmacokinetic and nutritional support consults
- Provide medication information to physicians, nurses, and patients
- Provide formal in-service education to health care professionals
- Participate in the hospital adverse drug reaction monitoring and reporting program
- Participate in institutional quality reporting and suggestions for process improvement
- Document medical histories, clinical interventions and other therapeutic activities
- Assist other healthcare providers in understanding and complying with the pharmacy department policies and procedures
- Maintain presence on the unit throughout the workday and proactively seek to assist in medication/pharmacy service related problems
- Foster and provide good communication and interaction with nurses, physicians, and nutritional support specialists
- Progress in skills and abilities throughout the rotation to be able to serve as TCV clinical pharmacist.

MEDICATION THERAPY CORE TOPIC CONTENT

Rotation medication therapy core content will be covered via direct patient care experiences, reading assignments, discussions, written assignments and/or case presentations. The areas of emphasis include (but are not limited to) the following:

- Cardiogenic shock
- ICU related Sedation, Analgesia, and Neuromuscular blockade
- Endocarditis
- Wound infections – sternal, mediastinitis,
- ID issues – Numerous nosocomial and community acquired infections - CAP, HAP, Sepsis, etc
- Hypertensive emergencies
- Acute aortic dissection
- Acute lung injury
- Endocrine issues- Acute and Relative adrenal insufficiency
- Arrhythmias
- Pericardial tamponade
- Stress ulceration
- Drug-induced thrombocytopenia

Learning Experience: Emergency Medicine
Preceptor: Stephanie Mallow Corbett, Pharm.D.

Rotation Overview

The Emergency Medicine rotation is a five week acute care rotation for critical care pharmacy residents. This rotation will consist of providing clinical pharmacy services to an emergency medicine service in the emergency department under the preceptorship of a clinical pharmacy specialist. The practice environment will require daily interactions with medical attendings, house staff, and mid-level practitioners, nursing staff, pharmacy staff and other healthcare professionals a necessary to optimize pharmacotherapy for patients with an emphasis on critically ill. In addition to monitoring and consulting on pharmacologic issues, the resident will also provide educational presentations to nursing, pharmacy and physician staff members.

Overall Rotation Goal

The major goal of this rotation is to provide a clinical pharmacy practice environment with an emphasis on critical care/toxicology for the resident to apply the clinical, communication and teaching skills necessary to interact in a multidisciplinary emergency medicine environment.

Rotation Responsibilities

The complete spectrum of pharmaceutical care services experienced during the rotation includes:

- Daily attend and participate in all Emergency Pharmacist consults to the Trauma/Resuscitation Rooms, Chest Pain Center, Orange Team, Blue Team, Express Care, Pediatric, and Observation units of the Emergency Department.
- Attend and participate in all STEMI, Trauma and Stroke Alerts and Code 12 (resuscitation) during scheduled ED rotation hours.
- Read, evaluate and present assigned readings to the preceptor.
- Review and evaluate the pharmacotherapy of patients, as well as provide ongoing prospective evaluation, taking into consideration drug interactions, medication allergies, past medical history, current medications, and subjective and objective information available
- Monitor patients for therapeutic efficacy, adverse drug reactions, or drug-drug, drug-food and drug-laboratory test interactions by:
 - Recording patient allergy history
 - Examining medication administration records
 - Reviewing pertinent laboratory results
 - Evaluating vital signs for therapeutic response when appropriate
 - Interacting with patients as required
- Provide pharmacokinetic consults to physicians recommending dosing regimens based on age, weight, renal and hepatic function.
- Provide formal and informal education to physicians/residents, medical students, nurses, pharmacists and patients (1 pharmacy formal presentation)
- Provide verbal and/or written drug information as requested by the preceptor and/or physicians/residents (1 formal written question)

- Interact and communicate with clinical specialist and clinical staff pharmacists regarding appropriate pharmacotherapy and other clinical issues affecting patient care

Required Meetings

- Daily patient discussions with the preceptor to present new patients and update existing patient status
- Participate in weekly topic discussions with the preceptor
- Attend all Department of Pharmacy meetings, conferences, and journal clubs
- Attend weekly Emergency Medicine Conference
 - Wednesdays from 7am-12pm in EM Conference Room
- Attend weekly Toxicology Conference
 - Friday Mornings 7:30am-12pm in Poison Control Center, JPA 1222, 4th Floor
- Attend an ED or Hospital Wide Emergency Preparedness Meeting if scheduled during rotation

Core Content

During this rotation, the resident will be expected become proficient through patient experiences; discussions of reading materials; and/or case presentations in the acute management for the following disease states and significant traumatic events as they present throughout the rotation (Note: Not all topics may be covered during the course of the rotation and some additional unique topics may replace those listed):

- Emergency Medicine
 - ACLS (VT/VF/PEA/Asystole)
 - Rapid Sequence Intubation
 - Trauma Code
 - Emergency Preparedness/HAZMAT
- Infectious Disease
 - Community-acquired pneumonia (CAP)
 - Tuberculosis (TB)
 - UTI/Pyelonephritis/Urosepsis
 - Meningitis
 - Septic Shock
 - Skin and Soft Tissue Infections
 - Assessment of patients with Fever of Unknown Origin (FUO)
 - Intraabdominal Processes (cholecystitis, pancreatitis, appendicitis, diverticulitis)
- Cardiovascular
 - Acute Coronary Syndrome
 - Acute Management of Heart Failure
 - Hypertensive Urgency/Emergency
 - Atrial Fibrillation/Flutter
 - Cardiogenic Shock
- Gastrointestinal

- GI Bleed
- Dehydration
- Hepatic Diseases (cirrhosis, hepatitis, drug-induced)
- Hematology
 - Coagulation abnormalities (DVT, PE, bleeding complications)
- Renal
 - Chronic Renal Failure/ESRD
 - Acute Renal Failure
- Pulmonary
 - Acute Asthma Exacerbation
 - Acute COPD Exacerbation
- Neurology
 - Pain/Sedation Management
 - Intracranial Hemorrhage
 - Status Epilepticus
 - Optimization of Anticonvulsant Drug Loading
 - Migraine
 - Spinal Cord Injury
 - Stroke
- Endocrinology/Metabolic
 - Hyper- / hypoglycemia/DKA
 - Electrolyte Abnormalities
 - Hypothermia
- Psychiatry
 - Acute Psychosis
- Toxicology
 - Overdose (APAP, ASA, Antidepressants, Opioids, Iron, etc)
 - Substance Abuse/Withdrawal (EtOH, cocaine, etc.)
 - Organophosphates
 - Snake Envenomations
 - Toxic Alcohols
 - Digitalis like substances
 - Lithium
 - Carbon Monoxide Exposure
 - Smoke Inhalation
 - Cyanide Toxicity
- Women's Health
 - Management of the Pregnant Patient
- Other
 - Adverse Drug Reactions

Medication Error Reporting

ROTATION LEARNING EXPERIENCE: Adult Infectious Diseases

ROTATION DESCRIPTION:

The Infections Diseases (ID) rotation provides a five-week experience in anti-infective pharmacotherapy within the context of the adult ID consultation service and the Antimicrobial Stewardship Team (AST). There are TWO ID consultation services: general and immunosuppressed. Each includes an attending physician, an ID fellow, and medical residents/students in addition to the clinical pharmacy specialist. AST is primarily a pharmacist-run service with consultation available upon request from ID faculty members. Although not all patients followed by these teams are critically ill, each provides a learning experience applicable to the care of ICU patients. Rotation activities will be divided depending on experience and interest.

Adult Inpatient ID Consultation Service:

- Daily rounds with team. If formal rounds do not occur, ID progress notes should be reviewed to ensure knowledge and appropriateness of team recommendations.
- Designing, and recommending appropriate antimicrobial therapy regimens and monitoring plans
- Redesigning regimens and corresponding monitoring plans based on evaluation of monitoring data
- Providing antimicrobial use education to medical staff
- Providing concise and timely responses to requests for drug information for patients and medical staff related to anti-infectives
- Monitoring and reporting Adverse Drug Reactions
- Attending weekly ID case/didactic conferences and ID bimonthly journal club

Activities on the Antimicrobial Stewardship Team may include:

- Daily review of all category A antimicrobials for approval and appropriateness
- Documentation of category A approvals in MIS
- Participating in daily assessment of inpatient antimicrobial regimens and communicating recommendations to primary team pharmacists or physicians. Interventions may involve consultation with attending infectious diseases physicians.
- Participation in monitoring and documentation of team interventions
- Evaluation of clinical outcomes of team interventions
- Participation in AST-related educational activities (e.g. inservices, development of guidelines and prescribing policies)

MEDICATION THERAPY CORE TOPIC CONTENT

Rotation medication therapy core content will be covered via direct patient care experiences, reading assignments, discussions, written assignments and/or case presentations. The areas of emphasis include (but are not limited to) the following:

- Antimicrobial stewardship
- Antimicrobial pharmacology/pharmacokinetics/pharmacodynamics
- Microbiological methods/susceptibility testing
- Mechanisms of antimicrobial resistance
- Bone and joint infections
- Catheter-related bloodstream infections
- Endovascular infection
- Invasive fungal infections
- Infections in the immunocompromised host
- Intraabdominal infections

- Meningitis
- Pneumonia (community-acquired, healthcare-associated, hospital-acquired, ventilator-associated)
- Skin and skin structure infections
- HIV/AIDS/antiretroviral basics

ROTATION LEARNING EXPERIENCE: Pediatric Intensive Care Unit (PICU)

ROTATION DESCRIPTION:

The Pediatric Intensive Care Unit (PICU) rotation is a five-week critical care rotation for pharmacy residents. The focus of this rotation is the provision of complete pharmaceutical care services to the PICU patient population. The PICU is a 12 bed medical/surgical tertiary care unit. The patients range in age from newborns to young adults. In addition to trauma and general medical cases, the most frequent post-operative admissions are for neurosurgical procedures, open heart surgery, orthopedic surgery, or solid organ transplantation. The PICU is also capable of providing many new and investigational therapies, including extracorporeal membrane oxygenation (ECMO) and inhaled nitric oxide. Residents will be required to provide the following services:

- Daily patient profile review with identification and resolution of patient medication problems
- Daily rounding with the PICU service
- Pharmacokinetic consultations
- Drug information services
- Coordination of pharmacy services

MEDICATION THERAPY CORE TOPIC CONTENT

Rotation medication therapy core content will be covered via direct patient care experiences, reading assignments, discussions, written assignments and/or case presentations. The areas of emphasis include (but are not limited to) the following:

- Pediatric resuscitation
- Pediatric trauma and traumatic brain injury/increased intracranial pressure
- Sepsis and meningitis
- Status epilepticus
- Status asthmaticus
- Diabetic ketoacidosis
- Post-operative care of the infant or child

ROTATION LEARNING EXPERIENCE: Neonatal Intensive Care Unit (NICU)

ROTATION DESCRIPTION:

The Neonatal Intensive Care Unit rotation is a five-week critical care rotation for pharmacy residents. The focus of this rotation is the provision of complete pharmaceutical care services to the NICU patient population. The NICU is a 45-bed unit. The patients include both premature infants and term babies with underlying disease. The NICU is involved in several investigational drug studies and is capable of providing many new therapies, including extracorporeal membrane oxygenation (ECMO) and inhaled nitric oxide. Residents will be required to provide the following services:

- Daily patient profile review with identification and resolution of patient medication problems
- Daily rounding with the NICU service
- Pharmacokinetic consultations
- Drug information services
- Coordination of medication ordering and distribution problems, working in conjunction with the inpatient pediatric pharmacy
- Participation with the NICU Interdisciplinary Clinical Council

MEDICATION THERAPY CORE TOPIC CONTENT

Rotation medication therapy core content will be covered via direct patient care experiences, reading assignments, discussions, written assignments and/or case presentations. The areas of emphasis include (but are not limited to) the following:

Neonatal physiology and pharmacokinetic/pharmacodynamic principles

Apnea of prematurity

Bronchopulmonary dysplasia (chronic lung disease)

Neonatal necrotizing enterocolitis

Retinopathy of prematurity

Patent ductus arteriosus

Congenital diaphragmatic hernia

Meconium aspiration syndrome

Neonatal resuscitation