

# Cardiovascular Pharmacy Specialty APhA-ASP Speaker Event

**Oksana Kamneva, PharmD, BCCP, BCCCP, BCPS**

Clinical Pharmacy Coordinator Cardiovascular,  
Critical Care, Neurology

09/20/2021



# Objectives

---

1. Describe cardiovascular specialty career track and preparation at a pharmacy school level
2. Discuss PGY1 and PGY2 specialty residencies with the focus on cardiology
3. Provide examples of cardiovascular job opportunities after specialty training in cardiology
4. Define the scope of cardiovascular services of a clinical pharmacist
5. Review cardiovascular services provided by cardiology clinical pharmacist
6. Discuss quality expectations of a healthcare system

# Cardiovascular Specialty Career Track

# Position Statement on Cardiovascular Clinical Pharmacist

---

A pharmacist who specializes in cardiology focuses on the care of cardiovascular patients based on evidence-based guidelines and pharmacotherapeutic knowledge. Pharmacists who specialize in cardiology work as members of multidisciplinary teams in a various settings, including coronary care units (CCU), telemetry units, medical wards, emergency departments (ED), medical intensive care units (ICU), surgical intensive care units (SICU), cardiovascular intensive care units (CVICU), and specialty outpatient clinics which focus on dyslipidemia, heart failure, hypertension, anticoagulation, cardiac transplant, and arrhythmias.



# Cardiovascular Specialty Career Track- Personal Example

---



- Campbell University Class of 2008
- Campbell University PGY1 Residency Program focus on Geriatrics
- Durham VA Community Based Outpatient Clinics- Ambulatory Care Cardiology
- WakeMed Health and Hospitals- Cardiology Critical Care
- UNC REX Healthcare- Cardiology Specialist, Cardiology Coordinator
- Residency Director for PGY2 Specialty Programs in Cardiology and Critical Care
- Certifications- BCPS vs BCCP vs BCCCP

# School of Pharmacy Preparation

# School of Pharmacy Preparation

---

- Electives based on interests
- Research through AHEC and mentors/advisors
- Networking during experiential rotations
- Medication Use Evaluation (MUE) on rotations
- Get involved in committees and volunteer events



# Residency Candidacy Preparation

---

- **Strength of rotations**
  - Hospital vs Community vs Ambulatory Care
- **Work experience**
  - Hospital vs Community Pharmacy
- **Research experience**
  - Data collection, data evaluation, abstract submission, poster presentations at local or national meetings, presentation to committees, practice change
- **Project management experience**
  - Collaboration with interdisciplinary team or system level, practice improvement
- **Volunteerism/ Extracurricular activities**
  - Ability to multitask and meet deadlines, leadership role vs participation
- **Involvement in organizations**
  - Member or leader of an organization

# Residency Track

# Residency Track- PGY1 Residency

---

Hospital PGY1 Pharmacy Residency provides postgraduate pharmacists an accelerated learning opportunity in inpatient and ambulatory pharmacy operations, clinical competency development, clinical research, and leadership development. Residents will experience medication-related care of patients with a wide range of conditions, be eligible for board certification and for postgraduate year two (PGY2) pharmacy residency training. At the end of the residency year, graduates of the program are prepared to begin practicing as clinical pharmacists in the institutional practice setting or to enter a PGY2 residency or fellowship in their desired specialty.

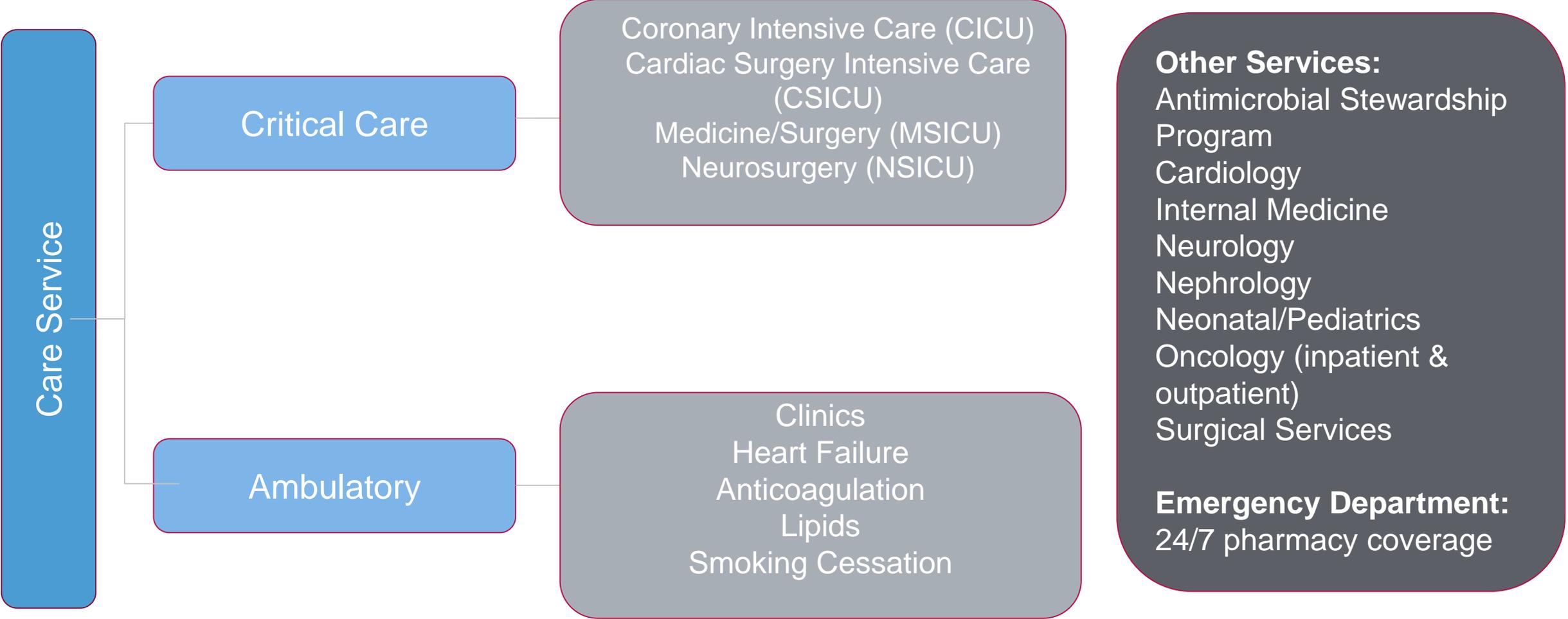


## Residency Track- PGY1 Residency

- General baseline knowledge residency
- Variety of experience to be a well-rounded resident
- Research and leadership
- Get involved in projects, MUE, protocol/policy development, presentations
- Precepting APPE/IPPE students, teaching certificate
- Focused electives
- PGY2 specialty residency prep
- Early Commitment vs Residency Interviews



# PGY-1 Pharmacy Residency example- UNC REX Healthcare



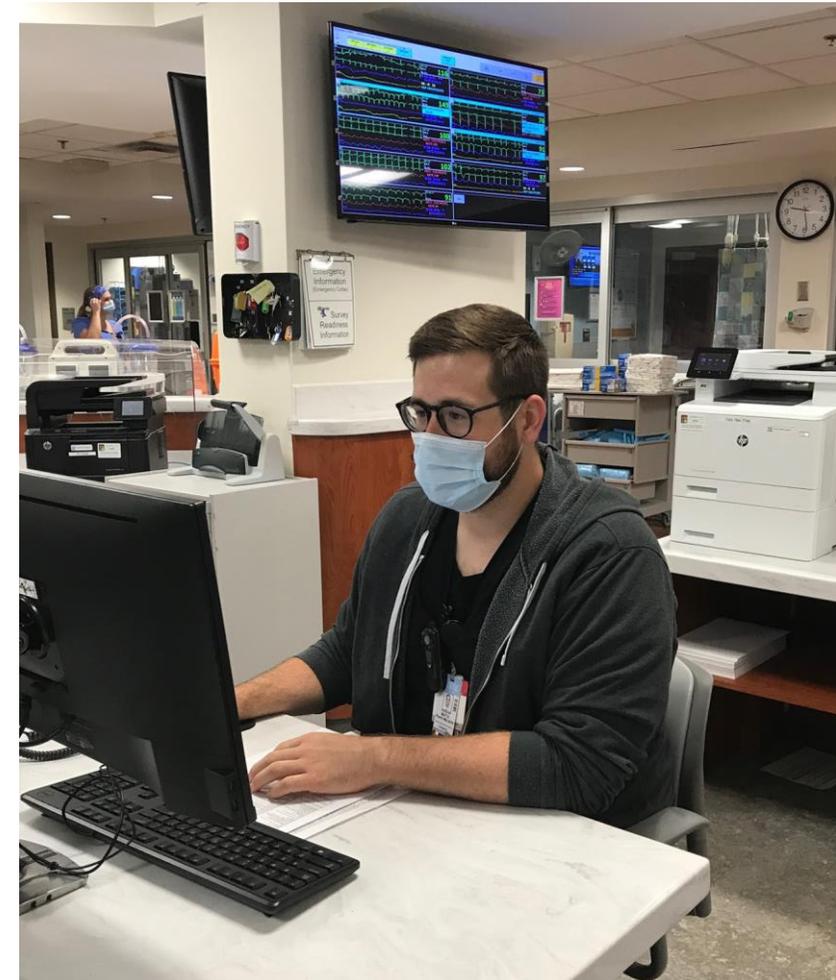
# Clinical Pharmacy Services at UNC Rex Healthcare

- Automatic dosing consults for all vancomycin, aminoglycoside, and warfarin orders
- Extensive automatic renal dosing policy encompasses 40+ medications
- Ambulatory Care Pharmacists are Certified Pharmacist Practitioner (CPP)
  - Within an independent practice model, CPP's provide medication management and prescribing services for high risk patient populations
- Pharmacists respond to all code blue and code strokes house wide.



# Clinical Pharmacy Services at UNC Rex

- Pharmacists educate all patients that are initiated on oral anticoagulants and select antiarrhythmics (dofetilide and sotalol)
- Pharmacists monitor and make dosage adjustments for patients receiving heparin in a variety of situations:
  - Patients who previously received DOACs
  - ECMO patients
  - Impella (LVAD) patients
- HIV anti-retroviral therapy monitoring service



# PGY1 Pharmacy Program at UNC REX Healthcare

## Required Rotations (1 month except orientation)

### Orientation (6 weeks)

- 1 week general hospital, clinical, and clinical computer orientation
- 5 weeks pharmacy orientation
- Cardiology
- MSICU
- Emergency Medicine
- Antimicrobial Stewardship
- Internal Medicine
- Outpatient Oncology
- Project
- Administration

## Elective Rotations (choice of 3)

- Ambulatory Care
- Administration II
- CICU
- CSICU
- Inpatient Oncology
- Neurology/Neurosurgery
- Neonatal ICU
- Nephrology

## Teaching Experience

- Serve as primary preceptor for 1 to 2 Advanced Pharmacy Practice Experience students
- Opportunity to apply for the UNC Eshelman School of Pharmacy Teaching Certificate Program
- Teaching opportunities: precepting Advanced Pharmacy Practice Experience (APPE) students, didactic lecturing and continuing education presentations
- Opportunity to serve as a TA for the UNC Eshelman School of Pharmacy
- Lead two CE lectures given to the entire UNC Healthcare System

## Staffing

- Residents staff the pharmacy every 4th weekend (8 hour shifts on Saturday and Sunday) and 1 weekday evening each week in addition to rotation hours.
- The first two weekends in December are excluded from this requirement to permit attendance at the ASHP Midyear meeting
- Residents expected to staff 2 holidays as defined in the UNC REX Policies and Procedures, based on department needs

## Research

- Create individual Research Advisory Committees
- Complete and present a residency research project to peers at the American Society of Health System Pharmacists (ASHP) Midyear Clinical Meeting and a regional pharmacy conference.
- Prepare a manuscript suitable for publication

## Longitudinal Activities

- Drug Information
- Research
- Medication Use Evaluation
- Chief Resident (each resident serves for 3 months of the residency experience)
- Code Blue Response

# Residency Track- PGY2 Specialty Residency

## Residency Track- PGY2 Residency in Cardiology

---

The PGY2 residency in Cardiology provides residents with opportunities to function independently as practitioners by conceptualizing and integrating accumulated experience and knowledge and incorporating both into the provision of patient care or other advanced practice settings.



## Residency Track- PGY2 Residency

- Specialty residency focused in fast tracking training for a clinical specialist
- Teaching- didactic and primary precepting of APPE students on specialty rotations
- Research- prospective vs retrospective
- Clinical/cost savings initiatives
- Practice change
- Piloting new services
- At the end meets ASHP standards to be a PGY1 preceptor within 6 months and PGY2 preceptor within one year for PGY2 specialty residency completion



# PGY2 Residency Programs- Cardiology Specialty at UNC REX Healthcare

## Required Rotations (9 months)

- Orientation (1 month)
- General Cardiology (2 months)
- Cardiothoracic Surgery ICU (1 month)
- Cardiac Medicine ICU (2 months)
- Vascular Medicine/Cardiology Ambulatory Care ( 2 months)
- Project ( 1 month in December)

## Elective Rotations (choice of 3)

- Cardio-Oncology (1 month)
- Advanced HF/LVAD (1 month)
- MSICU ( 1 month)
- Neuroscience ICU (1 month)
- Emergency Medicine (1 month)
- Admin (1 month)

## Teaching Experience

- Serve as Primary Preceptor for two Advanced Pharmacy Practice Experience (APPE) students on cardiology rotations and critical care cardiology (general cardiology second month and CICU second month)
- Co-precept PGY1 residents
- Teaching opportunities at school(s) of pharmacy (Campbell University College of Pharmacy & Health Sciences or UNC Eshelman School of Pharmacy) available as small and large group teaching sessions for the pharmacy practice skills lab
- Optional teaching certificate program is available through Campbell and UNC for those who have not yet completed one
- Present Continuing Education on Cardiology topics to interdisciplinary teams, including providers, nursing, pharmacists, and pharmacy technicians. Education of patients and family members on disease states and therapy plans is offered as a core experience on multiple rotations, including primary care.

## Longitudinal Activities

- Research Project
- AMI/HF Transition of Care
- Structural Heart
- Inpatient Cardiology QA:
  - Fall: Anticoagulation monitoring service
  - Spring:Antiarrhythmic/EP monitoring service
- Staffing

## Leadership

- Select and lead initiatives for cardiovascular services at UNC REX Healthcare
- Involved in quality assurance and education of pharmacy department
- Participate and present at the cardiovascular service line meetings

# PGY2 Residency Programs- Ambulatory Care Specialty at UNC REX Healthcare

## Required Rotations (9 months)

- Orientation (1 month)
- Hyperlipidemia (1 month)
- Anticoagulation (2 months)
- Heart Failure (1 month)
- Family Medicine (1 month)
- Transitions of Care- Inpatient (1 month)
- Population Health (1 month)
- Project (1 month- December)

## Elective Rotations (choice of 3)

- Cardio-Oncology (1 month)
- Geriatrics (1 month)
- Admin (1 month)
- Specialized Population (1 month)

## Teaching Experience

- Serve as Primary Preceptor for one-two Advanced Pharmacy Practice Experience (APPE) students on ambulatory care rotations
- Co-precept PGY1 residents
- Teaching opportunities at school(s) of pharmacy (Campbell University College of Pharmacy & Health Sciences or UNC Eshelman School of Pharmacy) available as small and large group teaching sessions for the pharmacy practice skills lab
- Optional teaching certificate program is available through Campbell and UNC for those who have not yet completed one
- Present Continuing Education on ambulatory care topics to interdisciplinary teams, including providers, nursing, pharmacists, and pharmacy technicians. Education of patients and family members on disease states and therapy plans is offered as a core experience on multiple rotations, including primary care.

## Longitudinal Activities

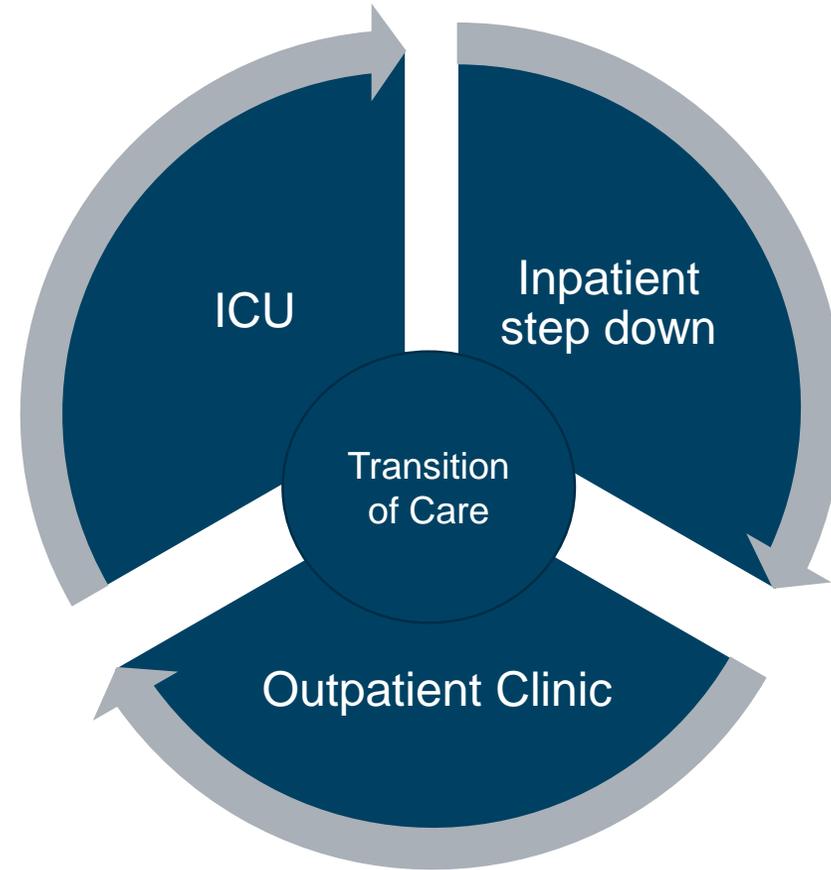
- Research Project
- Academia/Precepting
  - Staffing
  - UNC Specialty Pharmacy

## Leadership

- Select and lead initiatives for ambulatory care workgroup at UNC REX Healthcare
- Involved in quality assurance and education of pharmacy department

# Job opportunities with Cardiovascular Specialty Pharmacy

# Cardiovascular Pharmacist Areas of Practice



# Job opportunities with Cardiovascular Specialty Pharmacy

---

- Inpatient community or academic medical centers- working under collaborative practice agreements
- Outpatient ambulatory clinics- CPP
- Research and Development/ Industry



# Inpatient Cardiovascular Specialty Highlight: UNC REX Healthcare

# UNC REX Healthcare- Heart and Vascular Hospital

---

## Services and Treatments

- 72 Step Down/Telemetry Beds
- 20 CSICU beds
- 22 CICU/Acuity Adaptable Beds

## Diagnostic and Treatment procedure space includes:

- 6 Cath Labs - 4 Cardiac and 2 Vascular
- 2 Electrophysiology Labs
- 2 Interventional Radiology Labs
- 10 bed PACU
- 48 bed Prep Recovery Unit

## Other Services include:

- Cardiac surgery ( CABG, surgical valve replacement)
- Structural Heart Disease (WATCHMAN, TAVI)
- Extracorporeal membrane oxygenation (ECMO)
- Pulmonary Arterial HTN patient management
- Cardio-oncology



# NC Heart & Vascular Procedures at UNC Rex Healthcare

- **Cardiac Catherization lab**
  - **Electrophysiology (EP) lab**
    - MediGuide ablations, devices implantation, cardioversion
  - **Cardiac surgery- CABG, heart valve disorders**
  - **ECMO, Impella, IABP**
  - **TAVR (TAVI), Mitral Clip, WATCHMAN**
  - **Vascular surgery, EKOS, Catheter Directed thrombolysis, Carotid endarterectomy**
- **Diagnostics:**
    - Carotid Duplex
    - Stress Testing- cardiolute, adenosine, stress ECHO, dobutamine ECHO
    - TEE
    - ECHO
    - Peripheral Vascular Lab: Doppler



# Cardiovascular Clinical Pharmacist: Core Activities

---

- Multidisciplinary rounds
- Dosing consults via collaborative agreements approved by P&T or provider consult
- Monitoring consults
- Patient education
- Emergency response
- Order verification
- Prospective profile review
- Drug information
- Drug facilitation



# Cardiovascular Clinical Pharmacist: Additional Responsibilities

## Learners:

- **Pharmacy students:**
  - UNC Eshelman School of Pharmacy, Campbell University College of Pharmacy, Presbyterian School of Pharmacy
  - P4, P3, P2, P1
- **Pharmacy residents:**
  - PGY2 Cardiology residents
  - PGY2 Critical care residents
  - PGY1 Pharmacy Practice residents



## Activities:

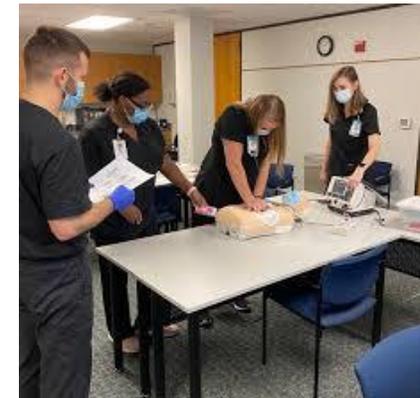
- Direct patient care
- Pharmacy rounds
- Topic discussions
- Quality improvement initiatives
- In-services
- Journal clubs
- Research
- Interdisciplinary meetings pharmacy representatives
- Protocol/Policy/Guideline development
- Formulary and drug shortage management

# A Day In The Life Of A Cardiovascular ICU Pharmacist

- 07:00-08:30- Comprehensive profile review for 20 ICU patients
- 08:30-09:00- Review recommendations with learners- PGY2, PGY1 residents and students on rotation to make during rounds
- 09:00-10:30- Attend interdisciplinary rounds with intensivist, mid-level providers, nurses, respiratory therapists, dietitians, case managers, physical therapy, and pastors and make recommendations to improve patient medication regimens
- 10:30-12:00- Complete pharmacy consults, complete follow up from rounds, answer drug information questions
- 12:00-12:30 -lunch
- 12:30-2:00- pharmacist walking rounds with learners and present patients
- 2:00-3:00- topic discussions
- 3:00-3:30- pass off to second shift pharmacist, wrap up consults

## **Multitasking activities in addition to schedule above at all times:**

- Order verification, phone calls from nurses and providers, emergency response, patient counseling, medication reconciliation, medication access, drug shortages, provider education



# Rex Readmission Prevention Clinic Raleigh (Heart Failure)

- Interdisciplinary ambulatory HF clinic focusing on patients with HFpEF and HFrEF and preventing readmissions
- MDs, NPs, RNs, PharmDs
- **Pharmacist role:** heart failure drug therapy target dose titrations, HF experts-drug information, medication reconciliation, heart failure disease state and medications education, medication access, interpretation of labs and imaging, and optimization of heart failure regimens
  - **Entresto, SGLT2i, Vericiguat, Traditional therapy dose titrations**



Agent Provided by  
**REX**  
HEALTHCARE FOUNDATION

# Outpatient Ambulatory Care Clinics

- Pharmacists are providers working under CPP license seeing patients independently in clinic
- **Rex and NCHV Vascular**
  - DOAC, Warfarin patient management
- **Lipid clinic**
  - PCSK9, TG management
- **Critical Limb Ischemia (CLI) clinic**
- **Structural Heart (TAVI, WATCHMAN) clinic**
- **Cardio-oncology consult clinic**
- **Smoking cessation**
- **Rural population health**
  - Primary care, DM, HTN, HLD, primary prevention, etc



# Quality Expectations and Return on Investment

# Why Incorporate Cardiovascular Clinical Pharmacists?

- Clinical practice is driven by national guidelines
- Health systems respond to standards set by regulators and accreditation organizations like CMS and TJC



# Quality Expectations

- Evidence-based protocols
- National Patient Safety Goals (TJC)
- Core Measures
- STAR ratings, Hospital Compare
- Value-based purchasing measures



# Quality Expectations



The Joint Commission 2019 NPSGs	
Goal 1	Improve the accuracy of patient identification <ul style="list-style-type: none"><li>• Use two patient identifiers</li><li>• Eliminate transfusion errors</li></ul>
Goal 2	Improve the effectiveness of communication among caregivers <ul style="list-style-type: none"><li>• Report critical results of tests and diagnostic procedures on a timely basis</li></ul>
Goal 3	Improve the safety of using medications <ul style="list-style-type: none"><li>• Label medications, medication containers, and other solutions on and off the sterile field in perioperative and other procedural settings</li><li>• Reduce the likelihood of harm associated with use of anticoagulants</li><li>• Maintain and communicate accurate patient medication information</li></ul>

# UNC REX Healthcare Cardiovascular Pharmacists: NPSG Actions

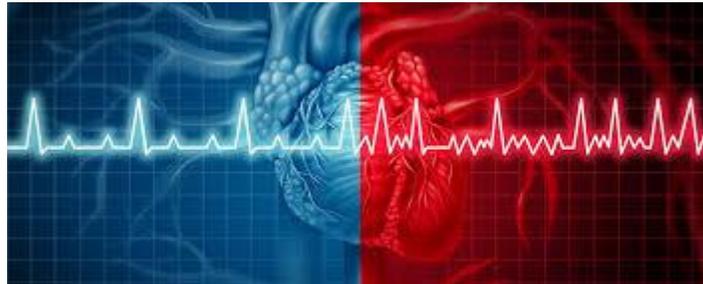


- **INR > 4 daily report**
- **Warfarin pharmacy to dose**
- **Evidence based guidelines and protocols on inpatient anticoagulant management**
- **Heparin infusion pharmacy to dose in high risk patient populations:**
  - Impella, ECMO, patients previously on oral Factor-Xa inhibitors exhibiting drug lab interference
- **All new start oral anticoagulants and LMWH patient education at discharge**
- **Antiarrhythmic loading protocol management:**
  - Dofetilide, Sotalol
- **Medication reconciliation in the ICUs and select high risk patient populations on cardiovascular step down units**

# Pharmacy Consult Workflow Example

## Sotalol/Dofetilide Pharmacy Consult

- **Review all medications prior or during hospitalization for drug-drug interactions**
  - Class I, III Antiarrhythmics, HCTZ, QT prolonging medications
- **Review pertinent labs:**
  - Scr, K, Mg, ECG including evaluation of the QT/QTc interval
- **Review vitals, personal history:**
  - Congenital long QT, history of QT prolongation/torsades, BP/HR
- **Doses 1 through 6 acute loading period**
- **Provide patient education**

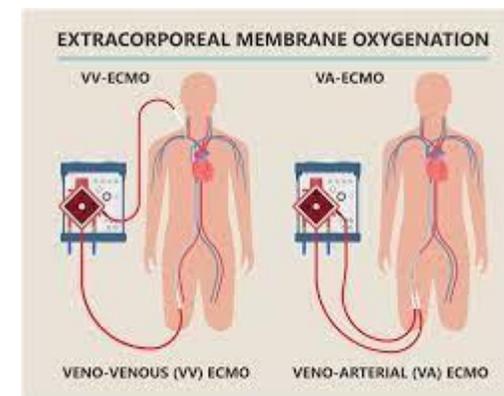


# Pharmacy Consult Workflow Example- ICU

## UNCREX/UNCMC ECMO program

- Similar to cardiopulmonary bypass- venous blood pumped through an oxygenator, oxygenated blood is then pumped back into the body
  - **Veno-venous-removal of venous blood from vena cava through oxygenator and delivery back to the right atrium**
    - Adequate right heart function is required for VV ECMO circuit modality
    - Indications: hypoxic or hypercarbic respiratory failure, severe air leak syndrome
  - **Veno-arterial- removal of venous blood from vena cava through oxygenator and delivery up to the aorta**
    - Adequate heart function is not required for VA ECMO circuit modality

**Pharmacy role:** Attending surgeon/intensivist rounds, management of anticoagulation, medication optimization



# Value-Based Purchasing



Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS)	
Communication with doctors and nurses	
Responsiveness of hospital staff	
Cleanliness and quietness of environment	
Pain management	
Communication about medicines	Medication Education Program
Care transitions and discharge	
Overall rating of hospital	

# CMS Core Measures

- **Acute myocardial infarction**
  - Transition of Care Pharmacists
- **Heart failure**
  - Discharge clinic and HF readmission prevention clinic pharmacist
- **Pneumonia**
  - ICU and step down CV floors pharmacists
- **Surgical Care Improvement Project (SCIP)**
  - ICU and step down CV floors pharmacists



# CMS Core Measures: Acute myocardial infarction

- **Transition of Care Pharmacists on Step Down CV floors:**

- **Defect free care:**

- Discharge medications
- ASA
- P2Y12 inhibitor
- BB
- High intensity statin
- ACE-I/ARB if LVEF<40%
- Aldosterone inhibitor if LVEF<35%
- No harmful medications, i.e. NSAIDs

- **Patient education**

- **Medication access**



# Examples of Process Improvements with Cardiology Clinical Pharmacists

- Systemwide Anticoagulation Reversal orderset and guideline development based on evidence based medicine
- Warfarin dosing algorithm
- Clinical Decision Support
- Antiarrhythmic inpatient loading protocol
- Standardized periprocedural antithrombotic management
- Aspirin Desensitization protocol
- Stewardship programs: antimicrobials, anticoagulants, analgesics
- Medication reconciliation: in the ICU, step down units, discharge, outpatient clinics
- Safe handling of drug shortages: IV hydralazine, IV Bumex



## Discussion



## Contact Information

**Oksana Kamneva, PharmD, BCCP, BCCCP, BCPS**

*PRONOUNS: SHE/HER*

Critical Care, Cardiovascular, Neurology Pharmacy Clinical Coordinator

Director of PGY-2 Pharmacy Residency Programs in Cardiology and Critical Care

Department of Pharmacy

UNC REX Healthcare

4420 Lake Boone Trail Raleigh, NC 27607

(919) 784-3274 | [Oksana.Kamneva@unchealth.unc.edu](mailto:Oksana.Kamneva@unchealth.unc.edu)

