



APPE Pharmacy Student Elective

Cardiology

GENERAL INTRODUCTION

UC San Diego's Sulpizio Cardiovascular Center was the first comprehensive heart hospital in San Diego providing heart and vascular programs in one central location. Our heart center optimizes both inpatient and outpatient cardiovascular care in a supportive environment attuned to the patient's needs and situation. When it opened in 2011, the center unified ambulatory, clinical, and inpatient heart and stroke care in one convenient location. The inpatient facility houses 54 beds, 4 smart operating rooms, 4 cardiac catheterization labs, an active emergency department, and an expanded imaging area.

The Sulpizio Cardiovascular Center is located at 9434 Medical Center Drive, La Jolla, CA 92037.

Rotation Preceptor:

Doug Humber, Pharm.D.

Clinical Professor of Pharmacy

UCSD Skaggs School of Pharmacy and Pharmaceutical Sciences

Sulpizio Cardiovascular Center – UCSD Health Sciences

Pager: 619-290-7174 Office: 858-534-8777

<http://heartcenter.ucsd.edu/Pages/default.aspx>

INTRODUCTION TO THE ROTATION

The Cardiology rotation at UCSD's Sulpizio Cardiovascular Center in La Jolla is considered an "**elective**" learning experience and is typically six (6) weeks in length. The student will be an active member of the Cardiology (MCD) Team which often will carry an average census of 10-15 patients total (both ICU and floor patients). The student will be exposed to patients of all ages, both genders, and all races / ethnicities who mostly live in urban areas and are insured.

The student will have various responsibilities such as participation in multidisciplinary work and attending rounds, reviewing their patient's profile for appropriateness of drug therapy, assisting in the pharmacokinetic monitoring on all therapeutically monitored drugs (TDM), educating healthcare providers and patients prior to discharge, and meeting with their preceptor to discuss patients and various disease states. The student will have an opportunity to interact with other members of the pharmacy team as well discussing important patient care issues during team sign-out. Transitions of care activities (i.e. discharge counseling, MedAction Plan patient materials) for the Cardiology patients will be expected throughout this experience.

Disease states that are often encountered as admitting diagnoses would include acute myocardial infarction, arrhythmias, heart failure, chest pain, unstable angina, and planned cardiac interventions.

This is a concentrated learning experience where the student will gain a breadth of knowledge when it comes to taking care of patients with cardiac problems. The student will gain practical insight into the pharmacotherapy related to treating these conditions while under supervision from their pharmacist preceptor. This opportunity will allow their knowledge base to expand while being supported in a multidisciplinary and academically based environment.

GOALS AND OBJECTIVES

Students will interact with a number of different healthcare providers and participate in a variety of patient care activities with the pharmacy preceptor and medical teams. The student will be provided with many opportunities to apply his/her academic basic science and clinical didactic course work to patient care in the hospital setting.

- 1) Given a patient's medical history (symptoms, physical examination laboratory values, current medications and diagnosis), the student will be able to:
 - a. Identify and prioritize the significant active and inactive medical problems.
 - b. Identify which of the above problems require drug therapy.
 - c. Identify those medical problems or laboratory values, which may be induced or aggravated by present or future drug therapy.
 - d. Identify potential drug interactions.
 - e. Identify the subjective and objective evidence for each problem.
 - f. Assess the response and appropriateness of current therapy and if necessary make an assessment and design an individualized drug therapy plan for each of the patient's problems.
 - g. For each drug which the patient takes (now or in the future):
 - i. Critically evaluate the rationale for use in this particular patient. This will include evaluating a drug's appropriateness, efficacy and toxicity as compared to other drugs, which may potentially be used for the medical problem in question. Also consider the impact of each drug on the patient's other medical problems.
 - ii. Design a safe and effective dosing regimen for the patient, taking into consideration the pertinent pharmaceutical (dosage form, stability, flavor, etc.) and pharmacokinetic (bioavailability, elimination) features of the drug. The impact that other medical problems (e.g. renal, liver, or gastrointestinal disease) may have on the biopharmaceutic and pharmacokinetic parameters of the drug will also be considered.
 - iii. Establish the therapeutic endpoints and toxic monitoring parameters of therapy. What is the expected time for the therapeutic endpoint to be achieved?
 - iv. Identify laboratory, physical and subjective parameters which may be used to follow the therapeutic and toxic effects of the drug.
 - v. Evaluate the most common adverse effects and drug interactions including the following points:
 - clinical significance (incidence, severity, reversibility)
 - pathogenesis
 - predisposing factors
 - presenting signs and symptoms
- 2) For those medical problems and drugs which were not covered in the curriculum, the student is expected to efficiently locate appropriate literature resources and assimilate the information required to meet the objectives stated in "A" above.
- 3) Students will demonstrate ethical and professional behavior in all practice activities.

APPE ACTIVITIES

The student learning activities that are outlined below are to be conducted using a consistent approach that is performed with the general basic understanding and depth of a student intern practitioner in pharmacy practice.

- 1) **Direct patient care**
 - a. Design, recommend, and evaluate patient-specific therapeutic regimens that incorporate the principles of evidence-based medicine.
 - b. Perform patient discharge counseling on high-risk medications (i.e. warfarin, antiarrhythmics, dabigatran, rivaroxaban, etc....).
 - c. Perform medication histories or initiate the reconciliation process on all patients' when consulted while demonstrating compassion and empathy when dealing with patients or their respective representatives.
 - d. Display initiative in preventing, identifying, and resolving pharmacy-related patient care problems.

- e. Observe procedures that are commonly performed on cardiac patients (e.g. cardiac catheterization, cardiac echo, TEE, TTE, PA catheter insertion, hemodynamic monitoring, electrophysiology procedures, IABP, etc....)
- f. Ensuring continuity of quality care as patients transition between healthcare settings

2) Interprofessional interaction and practice

- a. Participate in daily multidisciplinary rounds with the Cardiology service establishing collaborative working relationships with an emphasis on face-to-face interactions, but also incorporating other communication options
- b. Identify, evaluate, and communicate to the patient and other healthcare professionals the appropriateness of the patient's specific pharmacotherapeutic agents, dosing regimens, dosage forms, routes of administration, and delivery systems

3) Medication dispensing, distribution, administration, and systems management

- a. Document "pertinent" information into the EPIC note system as needed.
- b. Managing the medication therapy regimen by monitoring patient outcomes
- c. Identifying and reporting medication errors and adverse drug reactions
- d. Participating in the management of medical emergencies when appropriate

4) Professional development

- a. Participate in periodic didactic sessions with your preceptor discussing various disease states or procedures.
- b. Demonstrating attitudes and behaviors consistent with a respected member of the pharmacy profession

EVALUATIONS

The student will complete three evaluations throughout this experience: 1) a Midpoint/Formative Self-Evaluation, 2) a Preceptor Evaluation and 3) a Site Evaluation. The preceptor, in addition to commenting/signing off on the student Midpoint/Formative Self-Evaluation, will complete a Summative Evaluation at the end of the rotation. Students may be evaluated at any other time at the discretion of the preceptor. Preceptors may evaluate students more frequently, so that the student is informed of areas requiring improvement early in the rotation. The primary preceptor should obtain feedback from all team members as well as any patient comments.

ORIENTATION TO THE ROTATION

On day 1, the preceptor will orient the student to the rotation. During this orientation, the rotation syllabus will be reviewed as well as the experiential goals and objectives.

This is a full-time clerkship experience. The student is expected to arrive at this site early enough to pre-round on the Cardiology patients prior to 8:00 rounds. This typically means arriving between 6:00-7:00. Students typically stay until 17:00; long enough to complete their daily responsibilities and address any outstanding patient care issues.

If the student is sick and cannot make it to the rotation site, they will contact the UCSD CVC satellite pharmacy at (858) 657-6679 and report to the pharmacist-on-call that they will not be in for rotation duties. In addition, the student will e-mail the preceptor that they are sick and won't be in that day.

If the student needs to be absent from the rotation for legitimate professional reasons, a time off request will be discussed with the preceptor in advance of the requested day(s) off.

The student will dress professionally (men are to wear a shirt and tie; women are to wear attire appropriate to a business setting) and wear their white coats and ID badges at all times while on site.

SUPPLEMENTARY MATERIALS AND ASSIGNMENTS

Active review of year 3 cardiovascular-related therapeutics topics (i.e. Ischemic Heart Disease, Arrhythmias, Heart Failure) is highly encouraged prior to the start of this rotation.

During the six-week rotation, the student will be required to give one (1) formal review of an article (i.e. Journal Club), one (1) Disease State review (~30 minutes in length), and one (1) formal Patient Presentation (~30 minutes in length). These requirements typically will be completed during week 2 (Journal Club), week 4 (Disease State review), and week 6 (Patient Presentation) of the rotation.

Throughout the rotation, the student learner will meet with the preceptor to discuss various topics. Potential topics include:

1. ECG interpretation
2. Percutaneous Coronary Intervention (PCI)
3. Stable angina
4. ACS medical management
5. Chronic HF
6. ADHF
7. Atrial fibrillation / atrial flutter
8. Antiarrhythmics
9. Vasopressors / inotropes
10. Devices (IABP, LVAD)
11. Hemodynamics / swan numbers
12. Anticoagulants, anti-platelet agents
13. Pharmacokinetics of cardiovascular medications (lidocaine, digoxin, procainamide)
14. Valvular disease (aortic regurgitation, aortic stenosis, mitral regurgitation, mitral stenosis)
15. Surgical repair for cardiovascular problems (CABG, TAVR, etc....)
16. ACC / AHA guidelines
 - a. 2013 STEMI
 - b. 2014 NSTEMI-ACS
 - c. 2014 Atrial Fibrillation
 - d. 2014 Valvular Disease
 - e. 2011 PCI
 - f. 2013 Blood cholesterol
 - g. 2013 Heart Failure

The following clinical trials are merely a handful of landmark cardiovascular trials that you may encounter during your elective experience.

ACS	EPIC	TRITON TIMI-38	GESICA
ACUITY	EPILOG	WOEST	MADIT
ASSENT-2	EPISTENT		MADIT-CRT
CADILLAC	ESSENCE	Heart Failure	MERIT-HF
CAPRICORN	EARLY-ACS	A-HeFT	RALES
CAPRIE	HEAT-PPCI	CARRESS-HF	SCD-HeFT
CAST	HORIZONS-AMI	CHARM-Added	SOLVD
CLARITY-TIMI 28	ISAR-REACT 4	CHARM-Preserved	V-HeFT
COURAGE	MIRACL	COMET	
CURRENT-OASIS 7	PLATO	DIG	
CURE	PROVE IT-TIMI 22	DOSE	
EPHESUS	TRANSFER	EMPHASIS-HF	

REFERENCES and RESOURCES

- CURRENT Diagnosis & Treatment in Cardiology (Crawford)
- Pharmacotherapy: A Pathophysiologic Approach (DiPiro, et.al.)
- Cardiovascular Physiology (Berne and Levy)
- SSPPS 212B Therapeutic Syllabus and Slides (Arrhythmias, Ischemic Heart Disease, Heart Failure)
- The Heart (Hurst, et.al.)
- Basic Clinical Pharmacokinetics (Winters)
- ICU Book: Intensive Care Unit (Marino)
- Cardiology Secrets (Adair and Havranek)
- www.theheart.org
- Primary literature