Medicine Clerkship Goals and Objectives

OBJECTIVES:

At the completion of this clerkship the student should be able to:

A) Appropriately and effectively communicate with other health care professionals and patients to assure complete and accurate information concerning drug therapy and patient response.

B) For all typical patients encountered in a general medicine practice:
   - effectively obtain the necessary information from the patient and other health care providers to ensure appropriate drug treatment
   - correctly interpret disease state signs and symptoms
   - utilize laboratory data for both diagnosis and monitoring of drug therapy
   - identify therapeutic endpoints
   - formulate a rational drug treatment plan utilizing a standardized workup of drug therapy (PWDT/PHARME)

C) Consistently demonstrate proper documentation of pharmaceutical care activities. Proper documentation should minimally include: records of specific therapy decisions about each patient; and records of the pharmacy student’s actions to achieve desired pharmacotherapeutic outcomes for each patient.

D) Interpret, describe, and apply the pathophysiology and therapeutics of the minimum knowledge base disease states into patient care activities. Given an oral or written patient simulation (exam), be able to demonstrate clear understanding of the minimum knowledge base disease state objectives.

E) Understand, interpret, critically evaluate, and apply in a clinical context primary literature encountered during the Medicine clerkship.

COURSE OUTLINE:

In order to both ensure standardization and prevent duplication between clerkship sites, there are identified minimum knowledge base disease states for each clerkship.

While preceptors are strongly encouraged to facilitate learning of the minimum knowledge base disease states, it is the student’s obligation to ensure that the learning objectives have been mastered.
Each Medicine clerkship site and preceptor has the option of requiring additional site specific topics. Therefore, in addition to the minimum knowledge base disease states, students should discuss with their preceptor which additional subjects they will be expected to know.

The students in the Medicine clerkship are responsible for the following minimum knowledge base disease states and therapies:

Central Nervous System
1. Acute Stroke
   a. Be able to define ischemic, embolic, lacunar stroke and TIA.
   b. Be able to explain TIA and its implication as a precursor to ischemic stroke.
   c. Discuss the drug therapy for both the management and prevention of acute ischemic stroke including the role of thrombolytics, LMWH, warfarin, heparin, aspirin, and ticlopidine.

2. Status Epilepticus
   a. Define Status Epilepticus (SE) in terms of duration and types of seizure activity.
   b. Discuss first line pharmacological interventions including thiamine, dextrose, lorazepam, diazepam, phenytoin and fosphenytoin. Also discuss alternative therapy for refractory SE.

Cardiovascular Disease
3. Myocardial Infarction
   a. Discuss both typical and atypical presentation of an acute myocardial infarction.
   b. Briefly discuss the EKG changes that occur during myocardial ischemia, myocardial injury and myocardial death.
   c. Be able to describe the role of the following agents in the treatment of a myocardial infarction including: aspirin, heparin, thrombolytics, morphine, beta-blockers, ACE inhibitors, nitroglycerin, nitroprusside and magnesium.

4. Hypertensive Urgency/Emergency
   a. Discuss the diagnostic differences that determine hypertensive urgency and emergency.
   b. Be able to discuss the use of oral clonidine, captopril and labetolol for the treatment of hypertensive urgency.
   c. Be able to discuss intravenous drug options (nitroprusside, nitroglycerine, esmolol, labetalol, trimethaphan) for the treatment of hypertensive urgency/emergency based upon the following underlying conditions: MI, eclampsia, CHF, pheochromocytoma, dissecting aortic aneurysm, acute ischemic or hemorrhagic stroke and renal failure.
   d. Discuss therapeutic guidelines (JNC VI) for the lowering of blood pressure for hypertensive emergency/urgency.
5. Pulmonary Edema/CHF
   a. Explain the pathophysiology and diagnosis of diastolic and systolic dysfunction.
   b. Be able to discuss the drug treatment approach to systolic and diastolic CHF including ACE inhibitors, calcium channel blockers, digoxin, angiotensin II antagonists, diuretics, beta-blockers, and vasodilators.
   c. Discuss the use of morphine, diuretics, vasodilators and inotropic agents in the treatment of pulmonary edema/CHF.

6. Unstable Angina
   a. Define the difference in clinical presentation between chronic stable and unstable angina.
   b. Discuss diagnostic approach of unstable angina.
   c. Discuss the use of the following drugs in the treatment of unstable angina: nitroglycerin, heparin, LMWH, beta-blockers and calcium channel blockers, aspirin.

7. Antiarrhythmic Agents/ACLS
   a. Discuss the pharmacological interventions of bradycardia, paroxysmal supraventricular tachycardia, atrial fibrillation, asystole, ventricular fibrillation and ventricular tachycardia as outlined in ACLS.

8. Shock
   a. Discuss the basic hemodynamic changes (CI, PWCP, SVR, HR, SBP) and clinical presentation of shock secondary to heart failure, hypovolemia, and sepsis.
   b. Be able to discuss the use of dopamine, dobutamine, norepinephrine, amrinone and fluid replacement in the various types of shock.

Endocrinology
9. Diabetic Ketoacidosis
   a. Be able to recognize the clinical presentation of diabetic ketoacidosis.
   b. Be able to discuss the treatment options including fluid replacement, electrolyte management, insulin (including loading dose, maintenance dose and glucose monitoring) and sodium bicarbonate.

Pulmonary Disease
10. Asthma/COPD
    a. Be able to discuss the use of beta-agonists, anticholinergics, theophylline, and corticosteroids in the patient admitted to the hospital with acute exacerbation of asthma/COPD.

Renal Disease
11. Acute Renal Failure
    a. List the common causes of pre-renal, post-renal and intra-renal failure.
b. Be able to discuss the diagnostic approach to acute renal failure including the presence of urinary casts, cells, sodium and proteinuria. Also be able to interpret the BUN/Cr ratio and its relationship to renal failure.
c. Be able to discuss the role of fluid replacement, loop diuretics, osmotic diuretics, and dopamine in the management of acute renal failure.

Fluid and Electrolyte Management
12. Acid Base
   a. Be able to interpret pH changes based upon blood gases, electrolytes and albumin.
   b. Be able to discuss the causes of anion gap acidosis.
   c. Be able to discuss the causes of metabolic alkalosis and list the ones that are NaCl responsive and NaCl unresponsive.
   d. Explain how changes in chloride concentration can alter pH.
   e. Be able to discuss therapeutic interventions that are used to connect signs and symptoms of acid/base disorders.

13. Electrolytes
   a. Be able to discuss etiology, diagnosis, and treatment of electrolyte abnormalities including high and low sodium, calcium, bicarbonate, potassium, magnesium, and phosphorous.
   b. Know how to estimate 24 hours water and electrolyte requirements.
   c. Discuss how to estimate water excess or deficit.

Gastrointestinal Disease
14. Liver Disease
   a. Discuss the clinical presentation and laboratory findings in a patient presenting in hepatic failure.
   b. Outline a therapeutic regimen for a patient presenting with acute encephalopathy.
   c. Discuss the different stages of alcohol withdrawal syndrome and the appropriate treatment.
   d. Be able to discuss the pathophysiology, signs and symptoms, and treatment options for a patient with ascites.
   e. Compare the difference in laboratory findings with acute hepatic necrosis versus hepatic damage. Give examples of drugs associated with each.
   f. Discuss the difficulty in evaluating renal function in the patient with severe hepatic damage, and recognize the difference between hepatorenal syndrome and pre-renal failure associated with hepatic disease.
   g. Be able to discuss the diagnosis and treatment of spontaneous bacterial peritonitis (SBP). Know the common bacteria that cause SBP and the antibiotics that are used in the treatment.

Thromboembolic Disease
15. DVT/PE
a. Be able to recognize the clinical presentation and differential diagnosis of a patient presenting with deep vein thrombosis and pulmonary emboli. Discuss the use of heparin, LMWH, thrombolytics and warfarin in the patient with DVT and PE. Include patient and laboratory monitoring parameters.

16. Antibiotics
a. Recognize the common nosocomial pathogens that form the following groups of bacteria: Enterobacteriaceae, non-enterics gram negative bacilli and gram-positive cocci and fungal pathogens.
b. Recognize the spectrum of activity of the common intravenous antibiotics against the bacteria above (a).

17. Community-acquired/Nosocomial Pneumonia
a. Discuss the common bacteria that are associated with community-acquired and nosocomial pneumonia based upon patient-specific risk factors.
b. Differentiate the classical presentation of typical vs atypical pneumonia.
c. Be able to offer antibiotic treatment options for both community-acquired and nosocomial pneumonia.

18. Pyelonephritis
a. Know the common pathogens associated with acute pyelonephritis and the antibiotic treatment options.
b. Be able to interpret a UA to help make antibiotic decision. This includes nitrate positive/negative, pH, leukocyte esterase and wbc casts.

19. Skin/Soft Bone Tissue Infections
a. Recognize the presentation, bacteria, and treatment options associated with diabetic foot/decubitus ulcer infections.
b. Discuss the presentation, bacteria and treatment approach to necrotizing soft-tissue infections.
c. Discuss the bacteria and antibiotic options for the treatment of uncomplicated cellulitis.
d. Discuss the bacteria as antibiotic options for the treatment of osteomyelitis.

20. Acute Endocarditis
a. Know the common bacteria, diagnostic approach and antibiotic options for the treatment of acute bacterial endocarditis.
Nutrition

21. TPN
   a. Detail appropriate monitoring parameters when initiating parenteral nutrition.
   b. Discuss the formula limitations of peripheral vein and enteral nutrition.
   c. Discuss formulation approach to patients in renal, hepatic and pulmonary failure.
   d. Discuss the pathophysiology and monitoring parameters of refeeding syndrome. Be able to identify patients who are at risk.
   e. Discuss the treatment considerations when feeding a patient with enteral products.

CRITERIA FOR PERFORMANCE EVALUATION:

Preceptors utilize a variety of methods for assessing performance, and there is not a definitive standardized method of performance evaluation between Medicine clerkship sites.

Subjective clinical skills are evaluated utilizing the Anchor evaluation standardized grading instrument. Evaluative components of the Anchor evaluation include: problem solving abilities, student responsibility and motivation, student patient interactions, professional interactions, and pharmacy / educational interactions.

Additional student evaluations and outcome measures include: journal clubs, written and oral tests, formal oral presentations, and written assignments.

TEXTBOOK:

No textbook is officially required. However, some preceptors may require that specific references be utilized. The student will be expected to have access to drug information sources necessary for the student to appropriately monitor patients (ie. AHFS Drug Information, Facts and Comparisons, Pharmacotherapy: A Pathophysiological Approach, or Applied Therapeutics.)

Purchase of a current pocket reference such as Drug Facts and Comparisons, Clinical Drug Data, Drug Information Handbook for use while directly attending to patient care activities is strongly recommended.
APPENDIX A

Description of Traditional Internal Medicine Sites

Naval Medical Center
San Diego, California

The hospital provides all types of medical and surgical care typically found in a tertiary care center. The pharmacy provides comprehensive distributive and clinical services and employs several clinical pharmacy specialists.

Bannock Regional Medical Center
Pocatello, Idaho

BRMC is a community owned and operated 147-bed acute care hospital located near the campus of Idaho State University. Patient populations include obstetrics, gynecology, pediatrics, general surgery, neurosurgery, and cardiac patients. The pharmacy is a 24-hour, unit-dose operation with full IV additives and a number of clinical services.

Pocatello Regional Medical Center
Pocatello, Idaho

PRMC is a 110-bed acute care community hospital that sees a wide variety of patients with many acute and chronic diseases. General medicine, general surgery, neurosurgery, orthopedic surgery, and patients with renal disorders are the most common patient populations. The pharmacy has a centralized unit-dose, IV additive, and clinical program.

St. Alphonsus Regional Medical Center
Boise, Idaho

Saint Alphonsus Hospital is a 269-bed private hospital that is a member of the Holy Cross Health Care system. Patients admitted to this acute care setting include adult medicine, general and specialized surgical, trauma, orthopedic, and neurosurgical patients. The pharmacy department offers 24-hour unit dose, IV additive, and numerous clinical services. Additionally, an outpatient pharmacy providing pharmaceutical care to ambulatory and discharge patients is available.

Reno VA Medical Center
Reno, Nevada

This is primarily an adult male ambulatory and inpatient treatment facility. Essentially all medical conditions found in this population are treated at this site. It is an affiliated teaching hospital of the University of Nevada-Reno Medical School. The pharmacy offers comprehensive clinical and distributive services and has several clinical specialists who are part of the staff.
University Medical Center
Las Vegas, Nevada

This 560-bed county owned and operated acute care hospital supports obstetric, gynecology, pediatric, general surgery, neurosurgery, and orthopedic patients with on- and off-site pharmacy outpatient services. The pharmacy offers centralized unit-dose and IV additive and clinical programs which include specialized services such as decentralized quick cares, level 2 trauma center, and level 1 neonatology center. They also have an off-site rehabilitation hospital.

APPENDIX A — Example I

Internal Medicine
Naval Medical Center
Pharmacy Department
San Diego, California  92134-5000

Introduction

The purpose of this six-week rotation is to enable the student to participate as part of an Internal Medicine Team, to gain an appreciation for the diagnosis of various disease states, and to gain competence in the drug treatment of these disease states. This rotation is precepted by an internal medicine pharmacist and a clinical pharmacist.

Objectives

The student will learn the presenting symptoms, diagnostic criteria, and recommended treatment of the following diseases:

I. Cardiovascular Disorders
   A. Hypertension
   B. Congestive Heart Failure
   C. Cardiac Arrhythmias
   D. Angina Pectoris/Myocardial Infarction
   E. Pulmonary Embolism/Deep Vein Thrombosis

II. Respiratory Disorders
   A. Asthma
   B. Chronic Obstructive Airway Disease
   C. Pneumonia

III. Gastrointestinal Disorders
   A. Inflammatory Bowel Disorders
   B. Peptic Ulcer Disease
IV. Hepatic Disorders  
V. Renal Disorders  
VI. Seizure Disorders  
VII. Diabetes  
VIII. Thyroid Diseases  
IX. Joint and Connective Tissue Disorders  
A. Gout and Hyperuricemia  
B. Rheumatic Disorders  
X. Anemia  
XI. Infectious Disease  
A. Pneumocystis carinii pneumonia  
B. Tuberculosis  
XII. Hyperlipidemia  
A. The student will learn the actions, usual doses, common adverse reactions, routes of excretion, and potential drug interactions with the drugs commonly used to treat the above diseases.  

Specific Responsibilities  
A. Workup patients in a timely manner, attempting to cover as many disease states as possible. Evaluate the adequacy of the initial treatment regimen.  

1. Workups to include:  
a. Chief Complaint (CC)  
b. Past Medical History (PMH)  
c. Social History (SH)  
d. Family History (FH)  
e. Physical Exam (PE)  
f. Assessment  
g. Conclusion  

2. Daily SOAP notes on disease states.  
   S: Subjective  
   O: Objective  
   A: Assessment  
   P: Plan  

3. Write up on major drugs to include:
a. Mechanism of Action  
b. Pharmacokinetics  
c. Major Adverse Reactions  
d. Drug Interactions  
e. Parameters to Monitor

B. Monitor the patient’s disease process and response to treatment. Evaluate the drug treatment including efficacy, adverse reactions, and drug interactions.

C. Recommend alterations in drug therapy where appropriate.

D. Provide drug information for Internal Medicine Team Members and preceptor. Formally write up four drug information questions (pre-approved by preceptor) to include a brief history of the problem, information found, conclusion, and references used.

E. Attend all Internal Medicine rounds and conferences.

F. Attend all student presentations and continuing education lectures.

G. Present one topic to Internal Medicine Team with a separate presentation to Nursing/Corpsman and one to pharmacy technicians.

H. Conduct rounds with your preceptor at least weekly to review patient workups. Formally write up two patients with presentation of disease state (include references).

I. Present one lecture on an Internal Medicine topic (best of above formal write ups) to other students and pharmacy staff.

APPENDIX A — Example II

Internal Medicine  
Bannock Regional Medical Center  
651 Memorial Drive  
Pocatello, Idaho  83201

I. Staff pharmacist-oriented activities.

A. The first week may include a variety of pharmacy shifts as well as orientation.

II. Responsible for DUE, MIC, and ADR screening Monday through Friday. If Pharmacy and Therapeutics or Clinical Monitoring Meetings are scheduled during the rotation, the student will attend with the designated pharmacist.

III. One day in surgery, and follow up on all patients observed that day.
IV. Discharge counseling.

V. Student should attend all Core Zeros, Traumas, Diabetic Teaching, and all Clot Lysis Procedures occurring during the time they are in house.

VI. Six patient presentations.

VII. Six literature evaluations.

VIII. Ten patient admission histories.

IX. Kinetics on all patients who have drugs with narrow therapeutic indices.

X. One in-service.

XI. Read Dubin's *Rapid Interpretation of EKGs*.

XII. Written final exam (optional, at the discretion of the preceptor).

XIII. Daily discussions with the instructor about patients being monitored. There will be an emphasis on drug interactions, disease states, and valid drug use. All patients in CCU as well as selected patients on other floors should be monitored.

APPENDIX A — Example III

Internal Medicine  
Pocatello Regional Medical Center  
777 Hospital Way  
Pocatello, Idaho 83201

Today's pharmacist is part teacher, part clinician and part practicing professional and the Integrated Medicine Rotation at Pocatello Regional Medical Center will provide the student the opportunity to develop skills utilized by practicing pharmacists and also provide insight into the intricacies facing the professional in the day to day delivery of healthcare.

The first part of the rotation will require the student to spend time becoming familiar with the daily operations, procedures and systems of the Department of Pharmacy as well as the Hospital. Gradually, the student will incorporate these activities into the Patient Care segment of the operations and ultimately will be able to provide dispensing, clinical/consultation and teaching activities as they occur in the daily practice of today's hospital pharmacist.

The following is a list of objectives for this rotation:

1. Familiarity with department and hospital operations.
2. Practical experience in dispensing unit dose and IVs
3. Introduction to patient care
4. Case review
5. Case presentation
6. Pharmacokinetics
7. Patient interviews
8. Discharge, consultation
9. Formal, written presentation of selected topics
10. Inservice presentations
11. Clinical consulting

By the conclusion of the rotation, the student will have experience in and responsibility for patients on the medical floor, ICU/CCU, the dialysis unit, and physician rounds.

APPENDIX A — Example IV

Internal Medicine
Saint Alphonsus Regional Medical Center
1055 North Curtis Road
Boise, Idaho 83706

This six week clerkship integrates the student's responsibilities in the inpatient pharmacy with following patients on the medicine floor.

The main goals of this clerkship are to learn how to provide appropriate pharmaceutical care to hospitalized patients and then to carry out what they have learned.

Each student must continue to build and reinforce their therapeutic, distributive, and administrative knowledge bases throughout this clerkship.

Weekly Schedule

• Provide daily pharmaceutical care to assigned patients.
• The students will be required to work two 4-hour shifts (one on Tues and one on Thurs) during the week as well as an 8-hour shift every third Saturday as assigned throughout the rotation. The pharmacists will make sure the students complete activities as outlined on the students performance plan during their shifts.
• Meetings with preceptors on a day to day basis
• Staff, staff development, P&T, and other specified meetings
• Portion of clerkship may include meetings with the family practice residents and rounding with family practice residents
• Evaluations will be performed at least three times over the clerkship by both hospital and internal medicine preceptors.
• Written quizzes and one role-playing exercise will be given.
• Nine patient presentations plus follow-up on all patients being monitored.
• Learn the disease states as outlined in the internal medicine syllabus.
• Critically evaluate drug-related literature in scheduled journal clubs.

Projects Required

• 1 internal medicine project — i.e. DUEs, procedural guideline development, therapeutic guideline development, newsletter article, etc....

Assignments Required To Be Turned In/Checked

• Diary with daily entries to be collected every 2 weeks
• 2 adverse drug reaction (ADR) reports - typewritten and presented to group
• 10 medication admission histories
• 6 discharge consultations

Patient Care Responsibilities Required

• Follow all assigned patients and be responsible for the outcome of their medications or lack of medication.
• Check for the eight categories of drug-related problems
• Document all interventions
• Pharmacokinetic monitoring of drugs with narrow therapeutic ranges on all assigned patients
• Coumadin teaching
• Admit histories and discharge counseling
• Medication compliance assessment

APPENDIX A — Example V

Internal Medicine
RENO VA Medical Center
1000 Locust Street
Reno, Nevada  89520

At the completion of this rotation, the student should be able to briefly discuss the pathophysiology of the particular disease states of a patient. This discussion should include signs and symptoms, laboratory tests for both diagnosis and monitoring of drug therapy, identification of specific therapeutic endpoints and formulation of a rational drug therapy plan utilizing a standardized workup of drug therapy as outlined in the Global Clerkship Learning Objectives (P.H.A.R.M.E. format).

The student will be assigned an internal medical team. The student will monitor all patients on that team. The medical team usually consists of an attending physician, senior medical resident, and two junior medical residents (interns). Students from other specialties (e.g. medical
students, nursing students, etc.) may also be assigned to the team depending on the month. The student is required to round daily with the team and provide pharmaceutical care input for those patients assigned to that particular medical team. Other duties include attending daily medical conferences (e.g. morning report, noon conference, etc.) and any pharmacy service conferences or meetings. Students will also be required to provide informal and formal educational services to the team and pharmacy service. Written assignments and reports will also be required.

The student will be assigned to a staff pharmacist daily for two hours each afternoon to provide services in the inpatient areas of the hospital. The duties performed under the supervision of a pharmacist will include responsibility for unit dose drug distribution, discharge prescription screening, patient counseling, pharmacokinetic dosing of selected medications, and sterile preparation of intravenous piggyback and large volume parenteral solutions including central and peripheral TPN solutions. At the end of the rotation, the student should be able to interpret drug orders for appropriateness, duplication, drug interactions, accurate dosing, and therapeutic endpoints.

APPENDIX A — Example VI

Internal Medicine
University Medical Center
1800 West Charleston Boulevard
Las Vegas, Nevada  89102

Hospital

The majority of the teaching will be actual hands-on experience in the satellite pharmacies.

The emphasis will be on order interpretation, intervention with the medical staff, pharmacy/nursing relations, and drug delivery.

Time may also be spent in the IV room and main pharmacy. The emphasis here will be to validate ability to work in a clean environment (TPN preparation, large volume parenterals, piggyback preps, and compatibility tables, order interpretation, narcotic drug accountability, and working with technicians and pharmacists).

Medicine

Student will participate in work rounds with the medical team and will be the team "Drug Information Specialist" for actual patients. Duties in general will include: daily rounds, daily Internal Medicine Morning Report, patient profiles, drug knowledge/patient presentations, one formal talk, and two informal talks.