PROGRAM FACULTY AFFILIATIONS AND LEARNING OBJECTIVES

SESSION 1: BIOSTATISTICS, STUDY DESIGNS: FUNDAMENTALS, INTERPRETATION, AND RESEARCH TOPICS, PHARMACOKINETICS, PHARMACODYNAMICS, AND PHARMACOGENOMICS, AND PRACTICE MANAGEMENT ACTIVITY NO. 0217-0000-16-037-H04-P; 4.0 CONTACT HOURS.

BIOSTATISTICS

Robert DiCenzo, Pharm.D., FCCP, BCPS
Professor and Chair, Department of Pharmacy Practice, Albany College of Pharmacy and Health Sciences, Albany, New York

1. Describe the differences between descriptive and inferential statistics.
2. Select an appropriate statistical test according to sample distribution, data type (nominal, ordinal, and continuous [ratio and interval]) and study design.
3. Distinguish the primary differences between parametric and nonparametric statistical tests.
4. Explain the strengths and limitations of different measures of central tendency (mean, median, and mode) and distribution of data (standard deviation [SD], range, and interquartile range).
5. Summarize the differences between the SD and the standard error.
6. Identify different types of statistical decision errors (type I and type II) and how they relate to sample size and power.
7. Use p values and confidence intervals for hypothesis testing.
8. Explain the application and limitations of statistical significance when interpreting the medical literature.
9. List the differences between correlation and regression analysis.
10. Describe how survival analysis is used in clinical trials.

STUDY DESIGNS: FUNDAMENTALS, INTERPRETATION, AND RESEARCH TOPICS

Kevin M. Sowinski, Pharm.D., FCCP
Professor of Pharmacy Practice, Purdue University College of Pharmacy, Adjunct Professor of Medicine, Indiana University School of Medicine, Indianapolis, Indiana

1. Define, compare, and contrast the concepts of internal and external validity, bias, and confounding in clinical study design.
2. Identify potential sources of bias in clinical trials; select strategies to eliminate or control for bias.
3. Outline the hierarchy of evidence generated by various study designs.
4. Compare and contrast the advantages and disadvantages of various study designs (e.g., prospective; retrospective; case-control; cohort; cross-sectional; randomized controlled clinical trials; systematic review; meta-analysis). Delineate the difference between parallel and crossover study designs.
5. Select from various biostatistical measures to appropriately compare groups or their assessments from various study designs and use their findings/output to interpret results.
6. Define and evaluate odds, odds ratio, risk/incidence rate, risk ratio/relative risks (RRs), and other risk estimates. Compute and evaluate number needed to treat and number needed to harm. Define and calculate terms such as point and period prevalence, incidence rate, prevalence rate, absolute risk difference, and RR difference.
7. Define and calculate terms such as true positive, false positive, true negative, false negative, sensitivity, specificity, positive predictive value, negative predictive value, positive likelihood ratio, and negative likelihood ratio.
8. Define research and differentiate it from quality improvement activities.
9. Define the composition, functions, and roles of the institutional review board (IRB).
10. Describe the various steps of the professional writing and peer-review processes.

PHARMACOKINETICS/PHARMACODYNAMICS/PHARMACOGENOMICS

Edmund V. Capparelli, Pharm.D.
Clinical Professor, University of California, San Diego (UCSD), School of Medicine and Skaggs School of Pharmacy and Pharmaceutical Sciences, San Diego, California

1. List alterations in pharmacokinetics (PK) and pharmacodynamics (PD) that result in changes in response to drug therapy in neonates, infants, children, and adolescents.

2. Summarize pharmacogenomic considerations in pediatric patients.
3. Identify medications that cause pediatric-specific adverse reactions.
4. Differentiate routes of administration related to pediatric care and their PK and PD implications.
5. Describe age-associated differences in pathophysiology and clinical manifestations of disease dynamics across patient populations.

PRACTICE MANAGEMENT

Elizabeth A. Sinclair Goswami, Pharm.D., BCPS, BCPPS
Clinical Pharmacy Specialist, Pediatric Nephrology, Johns Hopkins Hospital Baltimore, Maryland

1. Demonstrate skill in the responsibilities of a pediatric pharmacy representative to the pharmacy and therapeutics (P&T) committee to ensure appropriate formulary management for the pediatric population.
2. Design a medication use evaluation that ensures appropriate evaluation of use outcomes in a pediatric population.
3. Integrate data and unique knowledge of a pediatric pharmacist in the development of a medication use guideline or protocol for use in pediatric patients.
4. Use the American Society of Health-System Pharmacists guidelines and the Pediatric Pharmacy Advocacy Group comment to devise a plan for the provision of pharmaceutical services to pediatric patients in a health care system.
5. Develop a plan to implement optimal information technology for pediatric patients.
6. Discuss the strategies for expanding the quality and capacity of pediatric clinical pharmacists, pertinent to practice management, recommended by the joint opinion group.
7. Support the development of quality assurance plans to meet core measures.

SESSION 2: GASTROENTEROLOGY/HEPATOLOGY, FLUIDS, ELECTROLYTES, AND NUTRITION, AND ENDOCRINE AND METABOLIC DISORDERS
ACTIVITY NO. 0217-0000-16-038-H01-P; 4.0 CONTACT HOURS.

GASTROENTEROLOGY/HEPATOLOGY

Christina Cox, Pharm.D., BCPS, BCPPS
Assistant Professor-Pediatrics, South Carolina College of Pharmacy, Columbia, South Carolina

1. Apply national guideline and consensus statement treatment strategies for the following pediatric gastrointestinal (GI) disorders, where applicable: gastroesophageal reflux disease (GERD), diarrhea, constipation, irritable bowel syndrome (IBS), pediatric Crohn disease (CD), ulcerative colitis (UC), short bowel syndrome (SBS), appendicitis, nausea and vomiting, and ulcers.
2. Design treatment and monitoring regimens for the management of GERD in pediatric patients.
3. Identify causes of diarrhea in pediatric patients, and recommend appropriate treatment and supportive care management to prevent associated complications.
4. Generate appropriate prevention and treatment strategies for pediatric constipation.
5. Distinguish between and recognize clinical criteria for types of IBS in order to provide appropriate recommendations for each type.
6. Discuss the role of pain management in the treatment of IBS and identify treatment options.
7. Compare and contrast the different clinical signs and symptoms of UC and pediatric CD.
8. Identify severity staging of UC and pediatric CD to recommend corresponding treatment regimens.
9. Discuss the risks and benefits of treatment options for UC and pediatric CD.
10. Describe the influence of bowel length and residual function on the management of SBS in pediatric patients.
11. Design pharmacotherapy and monitoring plans for diarrheal management in patients with SBS.
12. Identify the need for surgical management of appendicitis, and recommend appropriate antibiotic therapy.
13. Identify age-related etiology differences of nausea and vomiting and resulting differences in pharmacotherapeutic plans.
14. Determine treatment options in the management of *Helicobacter pylori* infections in pediatric patients.

FLUIDS, ELECTROLYTES AND NUTRITION

Allison B. Blackmer, Pharm.D., BCPS
Assistant Professor of Pharmacy, University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences , Denver, Colorado

1. Identify the changes in total body water, body compartments, and electrolytes during human development.
2. Calculate maintenance intravenous fluid and electrolyte requirements in pediatric patients.
3. Interpret laboratory data and physical assessment in the evaluation of fluid status and dehydration.
4. Design intravenous fluid regimens to treat identified deficits.
5. Determine adequate nutrition across various states of human development.
6. Compare and contrast human milk to various infant formulas.
7. Explain the benefits of additives such as docosahexaenoic acid, arachidonic acid, and iron to infant formulas.
8. Recognize the indications for enteral and parenteral nutrition.
9. Design enteral and parenteral nutrition regimens according to the changing nutritional needs and clinical status of infants and children at various stages in their development.
10. Identify the characteristics, causes, risk factors, and treatment approaches to failure to thrive.

ENDOCRINE & METABOLIC DISORDERS

Thomas M. Parker, Pharm.D., CDE, CPT
Assistant Professor, Pharmacy Practice, Pediatrics Division, Texas Tech University Health Sciences Center (TTUHSC) School of Pharmacy, Amarillo, Texas

1. Identify diagnostic and goal levels for common screening or monitoring tests for diabetes in children.
2. Given a specific patient, design or evaluate the effectiveness of an insulin regimen to optimize glycemic control in a child with diabetes mellitus.
3. Identify treatment strategies for obesity in children.
4. Develop a treatment strategy for thyroid disorders in children.
5. Differentiate between various treatments for disorders of water metabolism in children.
6. Create a management plan for a patient with a diagnosis of PKU.

SESSION 3: PEDIATRIC NEPHROLOGY, INFECTIOUS DISEASES, AND IMMUNOLOGY
ACTIVITY NO. 0217-0000-16-039-H01-P; 3.5 CONTACT HOURS.

PEDIATRIC NEPHROLOGY

Karen Kovey, Pharm.D., BCPS, BCPPS
Pediatric Clinical Specialist, Parkview Women's and Children's Hospital, Fort Wayne, Indiana

1. Differentiate between treatment strategies for primary nephrotic syndrome.
2. Develop a plan for managing the long-term complications of nephrotic syndrome.
3. Identify the different grades of hydronephrosis and for which grades treatment is indicated.
4. Determine which alkalizing agent may be appropriate for a given subset of renal tubular acidosis.
5. Identify acute kidney injury (AKI) in infants and children, and know which AKI criteria are correctly applied to neonates versus children.
6. Explain to caregivers the management of comorbidities commonly found in children with chronic kidney disease.
7. Propose empiric therapy and therapy modifications based on culture results for a child with a peritoneal dialysis catheter infection.
8. Summarize the differences between atypical and typical hemolytic uremic syndrome, and explain the different treatment approaches to each.
9. Detect medications that may contribute to tubulointerstitial nephritis in children.

INFECTIOUS DISEASES

Kalen B. Manasco, Pharm.D., BCPS, AE-C
Residency Program Director-General Pediatrics, Clinical Associate Professor, Department of Clinical and Administrative Pharmacy, University of Georgia College of Pharmacy, Atlanta, Georgia

1. Determine appropriate treatment of pediatric patients with respiratory tract infections, central nervous system (CNS) infections, soft tissue infections, bone and joint infections, urinary tract infections, intra-abdominal infections, and endocarditis.
2. Describe appropriate first-line treatment of fungal infections, tuberculosis, and parasitic infections in pediatric patients.
3. Identify appropriate surgical prophylactic strategies for pediatric patients.
4. Determine appropriate prophylactic agents for pediatric patients with respiratory tract infections, CNS infections, and endocarditis.

IMMUNOLOGY

Jenana Halilovic, Pharm.D., BCPS
Associate Professor, Department of Pharmacy Practice, University of the Pacific School of Pharmacy and Health Sciences, Stockton, California

1. Develop a treatment strategy for childhood atopic dermatitis.
2. Assess different treatment strategies for juvenile idiopathic arthritis.
3. Explain the treatment approaches to severe combined immunodeficiency.
4. Describe parental hesitancy to vaccinate children.
5. Identify the adverse effects of standard pediatric vaccinations, and determine their appropriateness.
6. Differentiate between preventive and treatment strategies of IgE-mediated hypersensitivity reactions in children.
7. Distinguish between common food allergies in children.
8. Propose preventive and treatment measures to manage common food allergies in children.
9. Determine the appropriateness of prophylactic and treatment strategies for the management of pediatric acute rheumatic fever and rheumatic heart disease.
10. Discuss disease characteristics and treatment strategies for pediatric systemic lupus erythematosus.
11. Design a postexposure prophylactic regimen for adolescents deemed at high risk of acquiring HIV.
12. Design an antiretroviral prophylactic regimen for infants at risk of perinatal HIV transmission.
13. Discuss commonly used pediatric treatment regimens for HIV/AIDS.
14. Summarize common adverse effects associated with antiretroviral therapies.
15. Determine when primary or secondary antimicrobial prophylaxis is indicated in patients with HIV/AIDS.

SESSION 4: PEDIATRIC TRANSPLANTATION, CARDIOLOGY, AND PULMONARY

ACTIVITY NO. 0217-0000-16-040-H01-P; 3.5 CONTACT HOURS.

PEDIATRIC TRANSPLANTATION

Barrett R. Crowther, Pharm.D., BCPS
Clinical Pharmacist, Pediatrics & Solid Organ Transplant University Health System San Antonio, Texas

1. Summarize the components that are included in the pretransplant assessment, including ABO compatibility, panel of reactive antibody, HLA tissue typing, and crossmatch testing.
2. Examine how current strategies used to prevent and treat solid organ transplantation (SOT) rejection affect cellular and antibody-medicated immune responses.
3. Compare therapeutic effects, drug interactions, and safety of current immunosuppressants used in SOT.
4. Distinguish which immunosuppressants require therapeutic drug monitoring.
5. Determine the therapeutic goals for individual SOT recipients with respect to balancing preventing rejection and avoiding infections and other complications.
6. Discuss the pharmacologic agents used to prevent and treat infectious complications in SOT recipients.
7. Differentiate how recommended immunizations for pre-SOT candidates and SOT recipients vary from the U.S. recommendations for immunocompetent pediatric patients.
8. Describe preventive and treatment strategies for non-infectious pediatric SOT complications, including malignancy, linear growth impairment, posttransplant diabetes mellitus, and cardiovascular complications.
9. Discuss factors that influence adherence and strategies to improve adherence in pediatric SOT recipients.

CARDIOLOGY

Shannan K. Eades, Pharm.D., BCPPS
Pediatric Pharmacy Clinical Specialist, PGY2 Pediatric Pharmacy Residency Program Director, Children's Memorial Hermann Hospital, Houston, Texas

1. Develop strategies for the acute treatment and long-term treatment of patients with a diagnosis of Kawasaki disease.
2. Differentiate between acyanotic and cyanotic congenital heart defects, and discuss the pharmacologic agents used to manage the consequences associated with congenital heart diseases.
3. Define hypertension in neonates, children, and adolescents, and determine appropriate first-line and alternative antihypertensive agents for the control of blood pressure in these populations.
4. Describe the pharmacologic management of the most commonly occurring arrhythmias in the pediatric population.
5. Identify risk factors for thrombosis, and determine appropriate pharmacologic agents for the prevention and treatment of thrombosis in the pediatric population with cardiac disease.
6. Describe the underlying pathophysiology of pulmonary hypertension, and discuss the therapeutic agents used to manage acute and chronic pulmonary hypertension in pediatric patients.

PULMONARY

Rebecca S. Pettit, Pharm.D., MBA, BCPS, BCPPS
Pediatric Pulmonary Clinical Specialist, Riley Hospital for Children Indiana University Health, Indianapolis, Indiana

1. Design an optimal treatment regimen for pediatric patients with asthma.
2. Discuss the role of pharmacologic therapies in the treatment of status asthmaticus.
3. Assess and recommend treatment for a cystic fibrosis (CF) acute pulmonary exacerbation.
4. Review the management of CF-related comorbidities, including CF-related diabetes and pancreatic insufficiency.
5. Identify the most common causes of community-acquired pneumonia (CAP) in pediatric patients.
6. Design a treatment regimen for a pediatric patient with CAP.

SESSION 5: PICU I, PICU II, AND NEONATOLOGY

ACTIVITY NO. 0217-0000-16-041-H01-P; 4.0 CONTACT HOURS.

PICU I

Joseph M. LaRochelle, Pharm.D., BCPPS
Clinical Associate Professor, Xavier University of Louisiana College of Pharmacy, Clinical Associate Professor of Pediatrics, Louisiana State University Health Sciences Center, School of Medicine, New Orleans, Louisiana

1. Identify the signs and symptoms of the different classifications of sepsis.
2. Develop an appropriate treatment plan for patients with sepsis.
3. Identify common sedation strategies.
4. Choose appropriate agents for sedation in critical care patients.
5. Describe techniques to prevent withdrawal from sedative agents.
6. Describe the pharmacokinetic changes that occur during extracorporeal membrane oxygenation (ECMO).
7. Modify drug therapy while a patient is deployed on ECMO.
8. Choose an appropriate algorithm to follow according to the specific rhythms in cardiac arrest.
9. Given a patient's clinical situation, differentiate between various therapeutic options for cardiac arrest and explain when to use each therapy.
10. Compare and contrast various modalities for optimizing mean arterial pressure in patients with traumatic brain injury (TBI).
11. Given a patient scenario, select appropriate agents for increased intracranial pressure management caused by TBI.
12. Devise a fluid replacement plan for patients with severe burns.
13. Describe therapies to decrease the secondary responses to burns.

PICU II

Jennifer L. Morris, Pharm.D., BCPS
Clinical Pharmacy Specialist, Pediatric Critical Care, Texas Children's Hospital, Houston, Texas

1. Classify primary and compensatory acid-base disorder given pertinent patient details including laboratory values.
2. Interpret details of a patient presentation and biochemical data to differentiate between diabetic ketoacidosis (DKA) and hyperglycemic hyperosmolar state (HHS).
3. Develop a treatment plan including fluid management, electrolyte management, and insulin therapy for DKA and HHS.
4. Define status epilepticus, and determine emergent initial and urgent control treatment strategies for it.
5. Outline the therapeutic options for and management of acute respiratory distress syndrome in children.
6. Describe the common organism associated with hospital-acquired pneumonia (HAP) and ventilator-associated pneumonia (VAP).
7. Develop an empirical antibiotic regimen for a patient with a clinical presentation consistent with HAP or VAP.
8. Discuss prevention strategies for HAP and VAP in the pediatric intensive care unit (PICU).
9. Explain the rationale for prevention of stress-related mucosal bleeding in the PICU and treatments that can be used for prevention.
10. Delineate the medication therapies that can be used for upper gastrointestinal bleeding.

NEONATOLOGY

Kirsten H. Ohler, Pharm.D., BCPS, BCPPS
Clinical Assistant Professor, University of Illinois Hospital and Health Sciences System, Chicago, Illinois

1. Compare the exogenous surfactant products available for the prevention and treatment of respiratory distress syndrome.
2. Describe the pharmacologic options for the prevention and treatment of bronchopulmonary dysplasia.
3. Describe the use of methylxanthines for the treatment of apnea of prematurity.
4. Describe the role of indomethacin for the prevention of intraventricular hemorrhage.
5. Compare the drugs available and the various therapeutic approaches (i.e., prophylaxis, early treatment, delayed treatment) for patent ductus arteriosus.
6. Discuss the supportive and targeted therapies for persistent pulmonary hypertension of the newborn.
7. Discuss therapeutic strategies to prevent and treat necrotizing enterocolitis.
8. Identify potential treatment options for common congenitally acquired infections, including herpes, syphilis, toxoplasmosis, cytomegalovirus, and hepatitis B.
9. Discuss the assessment and management of neonatal abstinence syndrome.
10. Explain important considerations, including the risk of fetal/neonatal harm and factors affecting drug transfer across the placenta or into breast milk, when choosing drugs for use during pregnancy or lactation.

SESSION 6: TOXICOLOGY, NEUROLOGY/PSYCHIATRY, AND HEMATOLOGY/ONCOLOGY

ACTIVITY NO. 0217-0000-16-042-H01-P; 3.0 CONTACT HOURS.

TOXICOLOGY

Jeanette D. Trella, Pharm.D., BCPPS
Managing Director, The Poison Control Center, Children's Hospital of Philadelphia, Philadelphia, Pennsylvania

1. Describe the U.S. Poison Control Systems structure and the common pediatric poisonings reported.
2. Review the modalities of gastric decontamination and their role in the present-day management of poison ingestion.
3. Recognize the common toxidrome classifications.
4. Understand the pathophysiology and management of select poisonings.

NEUROLOGY/PSYCHIATRY

Naomi House, Pharm.D., BCPP
Clinical Pharmacy Practitioner, Psychiatry and Pharmacy Residency Coordinator, Wolfson Children's Hospital/Baptist Medical Center-Jacksonville, Jacksonville, Florida

1. Apply evidence-based medication therapy for the acute and prophylactic treatment of migraines.
2. Distinguish between various seizure medications for type of seizure, age, drug interactions, and adverse effects.
3. Differentiate between the medication therapies for cerebral palsy symptoms of spasticity, drooling, and bone mineral density loss.
4. Evaluate between the medications for autism spectrum disorders for target symptoms and adverse effects.
5. Select appropriate medication therapy for pediatric bipolar depression on the basis of symptoms, bipolar phase, and adverse events, including monitoring parameters.
6. Develop treatment plans for attention-deficit/hyperactivity disorder, including medication recommendations, dose, adverse events, and dosage formulations.
7. Describe the medications used for various eating disorders and their place in therapy.
8. Differentiate between various substances of abuse by symptoms of intoxication, symptoms of withdrawal, and treatment options.
9. Identify treatment options and potential adverse effects of medications for pediatric depression.

HEMATOLOGY/ONCOLOGY

M. Brooke Bernhardt, Pharm.D., M.S., BCOP, BCPPS
Assistant Director, Clinical Services and Outcomes, Texas Children's Hospital, Houston, Texas

1. Discuss the epidemiology, pathophysiology, risk factors, diagnosis, and general treatment approaches to common pediatric malignancies.
2. Explain the role of hematopoietic stem cell transplantation in children with hematologic or oncologic disorders.
3. Identify late treatment-related complications in survivors of childhood cancer.
4. Prescribe preventive pharmacologic measures for the treatment of children with sickle cell disease.
5. Propose a treatment approach to a bleeding child with hemophilia.