

PCOA Content Areas

The PCOA content areas and subtopics for the 2016 administration are based upon the outcomes from the US College of Pharmacy Curricula Survey. The assessment is composed of four content areas that are broken down into 28 subtopic areas.



Note: A curricular survey was completed in 2015. The results are expected to be implemented at the beginning of the traditional 2016-2017 academic year.

For a representative sample of the item types see page 23 of this guide.

Area 1 Basic Biomedical Sciences **(Approximately 16% of Test)**

1A Physiology

- 1A01 structure and function of major body systems; as it applies to integumentary, muscular skeletal, cardiovascular, lymphatic, respiratory, digestive, nervous, endocrine, urinary, reproductive, and body fluids and electrolytes, cells in tissue.

1B Biochemistry

- 1B01 chemistry of biomacromolecules (proteins, lipids, carbohydrates, and DNA)
- 1B02 nucleic acid biosynthesis and metabolism
- 1B03 enzymology and coenzymes and kinetics
- 1B04 metabolic pathways to energy utilization

1C Microbiology

- 1C01 general principles of microbial concepts
- 1C02 principles of infectious diseases
- 1C03 host-parasite relationships
- 1C04 pathogenic microorganisms of man
- 1C05 inflammatory responses to infectious agents

1D Molecular Cell Biology/Genetics

- 1D01 gene expression
- 1D02 carrier proteins/membrane transport
- 1D03 mechanics of cell division
- 1D04 ion channels and receptor physiology
- 1D05 chromosomes and DNA
- 1D06 gene transcription and translation processes
- 1D07 recombinant DNA technology

1E Immunology

- 1E01 human immunity and immune responses
- 1E02 principles of antigen-antibody relationships
- 1E03 antibody synthesis, development, function, and immunopathology

Area 2 – Pharmaceutical Sciences (30%)

2A Medicinal Chemistry

- 2A01 physiochemical properties of drugs in relation to drug absorption, distribution, metabolism, and excretion (ADME)
- 2A02 chemical basis for drug action
- 2A03 fundamental pharmacophores for drugs used to treat diseases
- 2A04 structure activity relationships in relation to drug-target interactions
- 2A05 chemical pathways of drug metabolism
- 2A06 applicability to making drug therapy decisions

2B *Pharmacology and Toxicology*

- 2B01 mechanisms of action of drugs of various categories
- 2B02 pharmacodynamics of drug action and absorption, distribution, metabolism, and elimination
- 2B03 adverse effects and side-effects of drugs
- 2B04 drug-target interactions
- 2B05 drug discovery and development
- 2B06 mechanism of toxicity and toxicokinetics
- 2B07 acute and chronic toxic effect of xenobiotics, including drug and chemical overdose and toxic signs of drugs of abuse
- 2B08 interpretation of drug screens
- 2B09 principles of antidotes and alternative approaches to toxic exposures
- 2B10 functions of poison control centers
- 2B11 bioterrorism and disaster preparedness and management

2C *Pharmacognosy and Alternative and Complementary Treatments*

- 2C01 concepts of crude drugs, semi-purified, and purified natural products
- 2C02 evaluation of alternative and complementary medicine purity, bioavailability, safety, and efficacy
- 2C03 classes of pharmacologically active natural products
- 2C04 Science of dietary supplements (vitamins, minerals, and herbals)
- 2C05 Dietary Health Supplement and Education Act and Impact on regulation of dietary supplements and herbal products

2D *Pharmaceutics*

- 2D01 physiochemical principles of dosage forms
- 2D02 principles of drug delivery via dosage forms (eg, liquid, solid, semi-solid, controlled release, patches, and implants)
- 2D03 principles of dosage form stability and drug degradation in dosage forms
- 2D04 materials and methods used in preparation and use of drug forms

2E *Biopharmaceutics/Pharmacokinetics*

- 2E01 biological principles of dosage forms
- 2E02 basic principles of in vivo drug kinetics (linear and nonlinear)
- 2E03 principles of bioavailability/bioequivalence
- 2E04 physiologic determinates of drug onset and duration
- 2E05 drug, disease, and dietary influences on absorption, distribution, metabolism, and excretion
- 2E06 the pharmacokinetic-pharmacodynamic interface

2F *Pharmacogenomics*

- 2F01 genetic basis for disease and drug action
- 2F02 genetic basis for alteration and drug metabolism
- 2F03 genome and proteomic principles in relation to disease and drug development
- 2F04 genetic basis for individualizing drug doses

2G *Extemporaneous Compounding/Parenteral/Enteral*

- 2G01 United States Pharmacopeia guidance on compounding and FDA regulation of compounding
- 2G02 techniques and principles used to prepare and dispense individual extemporaneous prescriptions including dating of compounded dosage forms
- 2G03 extemporaneous liquid (parenteral, enteral), solid, semi-solid, and topical preparations
- 2G04 dosage form preparation calculations
- 2G05 sterile admixture techniques
 - a United States Pharmacopeia (USP) requirements for sterile compounding
 - b stability and sterility testing and dating
 - c clean room requirements
 - d infusion devices and catheters

Area 3 – Social/Behavioral/Administrative Sciences (22%)

- 3A *Health Care and Public Health Delivery Systems*
 - 3A01 introduction to United States, state, and local health care delivery systems and their interfaces and how they compare to those in other industrialized countries
 - 3A02 social, political, and economic factors influencing the delivery of health care (including financing and reimbursement mechanisms, health disparities, reform, etc)
 - 3A03 pharmacy and health care organizations (private and public insurers of third party administration, pharmaceutical industry, managed care organizations, PBMs, etc)
 - 3A04 health policy development and evaluation
 - 3A05 importance of involvement in pharmacy organizational, regulatory, state, and federal issues
 - 3A06 conflict between medical care and public health
 - 3A07 contributions of public health efforts to health status improvements (infectious disease control, chronic disease preventions, demographics, and social and physical environmental factors, etc)
- 3B *Economics/Pharmacoeconomics*
 - 3B01 use of pharmacoeconomic analyses (ie, cost-benefit analysis, cost-effectiveness analysis, cost-minimization analysis, cost-utility analysis)
 - 3B02 applications of economic, clinical, and humanistic outcomes to improve allocation of limited health care resources
 - 3B03 general macro and micro economic principles
- 3C *Pharmacy Management*
 - 3C01 management principles (planning, organizing, directing, and controlling pharmacy resources) applied to various pharmacy practice setting and patient outcomes
 - 3C02 personnel management – including leadership
 - 3C03 managing goods and services (marketing, purchasing/inventory management, and merchandising)
 - 3C04 financial accounting
 - 3C05 risk management in pharmacy practice
- 3D *Pharmacoepidemiology*
 - 3D01 application of epidemiological study designs to study drug use and outcomes in large populations
 - 3D02 data sources and analytic tools that provide an estimate of the probability of beneficial or adverse effects of medication use in large populations
 - 3D03 methods for continually monitoring unwanted effects and other safety-related aspects of medication use in large populations
- 3E *Pharmacy Law and Regulatory Affairs*
 - 3E01 administrative, civil, and criminal liability
 - 3E02 a pharmacist's responsibilities and limits under the law
 - 3E03 the authority, responsibilities, and operation of agencies and entities that administer laws and regulations related to prescription, and over-the-counter medications
- 3F *Biostatistics and Research Design*
 - 3F01 commonly used experimental and observational study designs
 - 3F02 commonly used statistical tests and their appropriate application
 - 3F03 evaluation of statistical results including an understanding of statistical versus clinical significance
- 3G *Ethics*
 - 3G01 principles of biomedical ethics
 - 3G02 ethical dilemmas in the delivery of patient-centered care, including
 - a conflicts of interest
 - b end-of-life decision making
 - c development, promotion, sales, prescription, and use of drugs
 - d working in groups

- 3G03 research ethics
- 3G04 professional behavior (ie, professionalism, code of ethics, oath of the pharmacist)

3H *Core Communication Concepts and Skills*

- 3H01 patient counseling skills including active listening and empathy
- 3H02 assertiveness and problem-solving techniques, handling difficult situations – patients and other core providers
- 3H03 interviewing techniques
- 3H04 health literacy
- 3H05 cultural competency

3I *Social and Behavioral Aspects encountered in Practice*

- 3I01 health, illness, and sick role behaviors
- 3I02 principles of behavior modification
- 3I03 patient adherence
- 3I04 caregiving throughout the life cycle
- 3I05 death and dying
- 3I06 patients' and other health care providers' perceptions of pharmacists' capabilities

3J *Medication Dispensing and Distribution Systems*

- 3J01 safe and effective preparation and dispensing of medications in all types of practice settings
- 3J02 development and maintenance of patient medication profiles
- 3J03 role of automation and technology
- 3J04 continuous quality improvement programs or protocols in the medication-use process, including identification and prevention of medication errors and establishment of error reduction programs, technology of drug information retrieval for quality assurance

Area 4 – Clinical Sciences (32%)

4A *Literature Evaluation – Practice Guidelines and Clinical Trials*

- 4A01 principles of clinical practice guidelines for various disease states and their interpretation in the clinical setting
- 4A02 integration of core scientific and systems-based knowledge in patient care decisions
- 4A03 reinforcement of basic science principles relative to drug treatment protocols and clinical practice guidelines
- 4A04 evaluation of clinical trials that validate treatment usefulness

4B *Drug Information*

- 4B01 fundamentals of the practice of drug information
- 4B02 application of drug information skills for delivery of medication therapy management
- 4B03 the ability to judge the reliability of various sources of information

4C *Clinical Pathophysiology*

- 4C01 pathophysiology of disease states amenable to pharmacist intervention

4D *Clinical Pharmacokinetics/Pharmacogenomics*

- 4D01 clinical pharmacokinetics/pharmacogenomics of commonly used and low-therapeutic-index drugs
- 4D02 clinical basis for individualizing drug therapy

4E *Clinical Prevention and Population Health*

- 4E01 promotion of wellness and nonpharmacologic therapies
- 4E02 disease prevention and monitoring

- 4F *Medication Therapy Management - Patient Assessment, Clinical Pharmacology, and Therapeutics*
- 4F01 concepts of pharmacist-provided patient care and medication therapy management services
 - 4F02 importance of and techniques for obtaining a comprehensive patient history
 - 4F03 patient assessment (eg, inspection, palpation, percussion, auscultation), terminology, and the modifications caused by common disease states and drug therapy
 - 4F04 common clinical laboratory values and diagnostic tests and their clinical role
 - 4F05 OTC point-of-care testing devices (eg, glucometers, pregnancy tests, home testing for HbA1c, drug screening).
 - 4F06 false positive and false negative results
 - 4F07 therapeutic drug concentrations and their interpretation
 - 4F08 problem identification (eg, duplication dosage, drug interactions, dietary interactions, adverse drug reactions and interactions, frequency dosage form, indication mismatches) and resolution planning
 - 4F09 triage and referral skills
 - 4F10 designing of patient-centered, culturally relevant treatment plans
 - 4F11 application of evidence-based decision making to patient care
 - 4F12 nonprescription and dietary supplements
 - 4F13 drug monitoring for positive and negative outcomes (including drug induced disease)
 - 4F14 clinical management of drug toxicity and overdose

PCOA Sample Items

The following are examples of item formats that a student may encounter when taking the PCOA. These questions are presented as examples to familiarize students with their formats and are not intended to represent content areas of the PCOA.

Multiple-Choice Question Format

Which of the following vaccines is contraindicated in immunocompromised patients?

- A. Pneumococcal polysaccharide
- B. Varicella
- C. Meningococcal conjugate
- D. Subcutaneous influenza

Multiple-Response Question Format

What counseling information should a pharmacist provide to a patient taking oral tacrolimus?
(Select **ALL** that apply.)

- A. Avoid live virus vaccinations
- B. Avoid grapefruit and grapefruit juice
- C. If a dose is missed, double up on the next dose
- D. Do not drink alcohol while taking this medication
- E. Medication levels need to be monitored

Constructed-Response Question Format

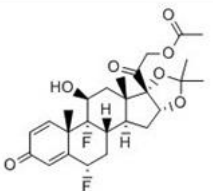
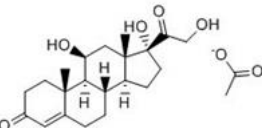
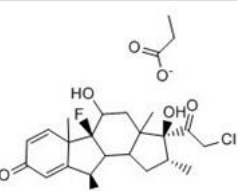
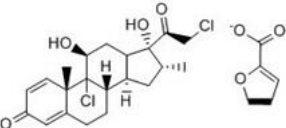
Griseofulvin oral suspension contains 125 mg/5 mL. A physician prescribed 250 mg bid for 2 weeks for a patient. How many milliliters of griseofulvin should be dispensed in order to fill this prescription?

(Answer must be numeric; round the final answer to the nearest **WHOLE** number.)

Ordered-Response Question Format

The following corticosteroids are formulated as topical ointments. Rank their potency from highest to lowest starting with the highest on top.

(ALL options must be used)

Unordered Options	Ordered Response
	
	
	
	

Hot Spot Question Format

Using the diagram below, identify where in the HIV life-cycle maraviroc exerts its mechanism of action. (Select the TEXT response, and left-click the mouse. To change your answer, move the cursor, select alternate TEXT response and click.)

