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ADVANCES IN CLINICAL PHARMACY EDUCATION & TRAINING

2019 Update to the American College of Clinical Pharmacy Pharmacotherapy Didactic Curriculum Toolkit

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Abstract

Introduction: The American College of Clinical Pharmacy (ACCP) Pharmacotherapy Didactic Curriculum Toolkit was created by the 2008 ACCP Educational Affairs Committee to provide guidance to schools and colleges of pharmacy for didactic pharmacotherapy curricular development. The toolkit was revised and updated by the 2016 ACCP Educational Affairs Committee.

Objectives: In accordance with the ACCP Board of Regents decision to update the toolkit every 3 years, the 2019 ACCP Publications Committee was charged with updating the 2016 toolkit to guide adequate disease state inclusion and depth of pharmacotherapy coverage in pharmacy curricula.

Methods: The committee retained the competency-based tier definitions and organization of the 2016 toolkit. Multiple literature resources were reviewed to assess medical conditions responsive to drug therapy for inclusion in the 2019 toolkit. The committee also reviewed the tier designation for all toolkit entries for appropriateness, given recent advances in medical care and evolving patient care responsibilities of clinical pharmacists. Updates to the toolkit were made by consensus with electronic voting when required.

Results: The 2019 toolkit contains 302 topics, including 94 (31%) tier 1, 133 (44%) tier 2, and 75 (25%) tier 3 entries. There are 26 additional topics in the updated toolkit, including 12 new tier 1 topics that are generally treated with nonprescription medications. Eleven new topics were added to tier 2, and 20 topics were added to tier 3 (including 11 topics in the Oncologic Disorders section). The tier classification of some conditions was changed to reflect current pharmacy practice expectations.

Conclusion: As with the 2016 toolkit, the large number of tier 1 topics will require schools and colleges to employ creative teaching strategies to achieve practice competence in all graduates. The large number of tier 2 topics highlights the importance

of postgraduate training and experience for pharmacy graduates desiring to provide direct patient care.

KEYWORDS
accreditation, curriculum, disease, pharmacotherapy, pharmacy education

The 2019 American College of Clinical Pharmacy (ACCP) Publications Committee was charged with updating the 2016 ACCP Pharmacotherapy Didactic Curriculum Toolkit.[1] The committee responsible for the 2016 revision recommended that the toolkit be updated on a regular basis, and the Board of Regents subsequently decided that the toolkit should be reviewed every 3 years.[2,3] Periodic updates are needed to reflect advances in health care and the evolving patient care responsibilities of clinical pharmacists.

The Accreditation Council for Pharmacy Education (ACPE) standards for professional programs in pharmacy[4] set minimum requirements for the structure and educational outcomes expected for the didactic Doctor of Pharmacy curriculum. However, colleges and schools of pharmacy are challenged to teach all of the necessary diseases, medical conditions, and increasingly complex drug treatments in the appropriate breadth and depth within limited curricular space. This toolkit is designed as a resource for guiding decisions on disease state inclusion and depth of coverage as schools and colleges of pharmacy evaluate and enhance their pharmacotherapy curricula to ensure that students have achieved the expected educational outcomes and practice competencies upon graduation.

Previous editions of the toolkit have been used by researchers and academic institutions in the United States[5-14] and internationally[15] to guide curricular development and revision. A recent survey of U.S. schools and colleges of pharmacy found a median of 23 credit hours devoted to pharmacotherapy, which the authors determined was adequate to provide coverage of tier 1 and tier 2 topics from the ACCP toolkit.[16]

1 | PROCESS FOR REVISION

The 2019 Publications Committee consisted of 10 pharmacist ACCP members, each with their own content expertise based on clinical practice area and teaching experience within the Doctor of Pharmacy curriculum, as well as one pharmacy resident and one student member of ACCP. The committee met face to face at the 2018 ACCP Global Conference on Clinical Pharmacy in Seattle, Washington. At this meeting, the committee reviewed the 2016 edition of the toolkit and identified key resources to review, including national and international accreditation standards for schools and colleges of pharmacy,[4,17,18] licensing examination competency statements,[19] several pharmacotherapy textbooks,[20-25] literature regarding disease burden on society,[26] competency areas from residency training programs,[27] board certification content outlines,[28] and new Food and Drug Administration drug approvals since 2015.[29] Committee members were assigned various sections of the toolkit with at least two members reviewing each organ system. After the Global Conference, committee members solicited feedback on the 2016 toolkit from pharmacists and faculty associated with their individual institutions and personal networks. Resulting comments were stored in a Google Sheets spreadsheet for reference and review by the entire committee. Recommendations from committee members about their assigned organ system sections were presented to the entire committee during seven 2-hour teleconference calls over a 3-month period. Changes to the toolkit were agreed upon by consensus during these teleconference calls. If there were conflicting opinions regarding a particular issue, the chair conducted an email vote after the call, with a simple majority decision rule. After this first round of revisions was completed, the updated draft of the toolkit was disseminated to the officers of the ACCP Practice and Research Networks (PRNs) for review and input. Of the 26 PRNs invited to comment, 21 provided feedback on the draft toolkit. The committee carefully considered this feedback during subsequent conference calls and made additional revisions to the toolkit as appropriate. The final toolkit was reviewed and approved by the ACCP Board of Regents in July 2019.

2 | COMPETENCY-BASED TIER DEFINITIONS

The 2019 toolkit update (Table 1) retained the focus and tier classification used in the 2016 toolkit, which had shifted the focus of the 2009 toolkit from "topic coverage" to "practice competence."[1-3]

The three-tier definitions are as follows:

1. *Tier 1*: Students receive education and training on this topic to prepare them to provide collaborative, patient-centered care upon graduation and licensure.
2. *Tier 2*: Students receive education and training on this topic, but additional knowledge or skills may be required after graduation (eg, residency training or equivalent experience) to prepare them to provide collaborative, direct patient care.
3. *Tier 3*: Students and residents may not receive education and training on this topic; rather, they will be expected to obtain the required knowledge and skills on their own to provide collaborative, direct patient care if required in their practice.

From a curricular development standpoint, tier 1 topics should be emphasized in pharmacy curricula with the goal of students demonstrating competence in disease state management upon graduation

TABLE 1 2019 Update to the American College of Clinical Pharmacy Pharmacotherapy Didactic Curriculum Toolkit

Tier[a]	Organ systems
	Cardiovascular conditions
1	Atherosclerotic cardiovascular disease, primary prevention
1	Atherosclerotic cardiovascular disease, secondary prevention
1	Arrhythmias, atrial (eg, atrial fibrillation)
1	BLS
1	Dyslipidemia
1	Heart failure, chronic
1	Hypertension
1	Ischemic heart disease, stable
1	Venous thromboembolism, prevention, and treatment
2	Acute coronary syndromes (STEMI, NSTEMI, unstable angina)
2	ACLS
2	Arrhythmias, ventricular
2	Drug-induced cardiac disease
2	Heart failure, acute decompensated
2	Hypertensive crises
2	Peripheral arterial disease
2	Pulmonary arterial hypertension
2	Stroke (ischemic, hemorrhagic, and transient ischemic attack)
2	Valvular heart diseases
3	Aneurysm
3	Aortic dissection
3	Cardiomyopathies (eg, dilated, hypertrophic, restrictive)
3	Myocarditis
3	Pericarditis
	Dermatologic conditions
1	Acne vulgaris
1	Burn injuries, minor (eg, sunburn, self-treated burns)
1	Dermatitis (eg, atopic, contact, diaper)
1	Insect bites and stings, prevention, and treatment
1	Sun-induced skin disorders, prevention
1	Warts, calluses, and corns
1	Wounds, minor (eg, lacerations, punctures, bites, incisions, abrasions, avulsions)
1	Xerosis (dry skin)
2	Alopecia
2	Drug-induced dermatologic disorders (eg, drug reaction with eosinophilia and systemic symptoms [DRESS], Stevens-Johnson syndrome, toxic epidermal necrolysis)
2	Photoaging (eg, actinic keratosis, solar lentigines)
2	Psoriasis
2	Wounds, major (eg, pressure ulcers)
	Ear, nose, mouth, and throat conditions
1	Allergic rhinitis
1	Cerumen impaction
1	Common cold
1	Cough
1	Oral lesions (eg, cold sores, aphthous ulcers)
1	Otitis externa (eg, swimmer's ear)
1	Sore throat
1	Xerostomia (dry mouth)
2	Sialorrhea (excessive salivation)
3	Ménière disease
	Endocrine conditions
1	Diabetes, type 1
1	Diabetes, type 2
1	Hypothyroidism
1	Prediabetes
2	Adrenal gland disorders (eg, adrenal insufficiency, hypercortisolism)
2	Diabetes, due to other causes (eg, monogenic diabetes syndromes, cystic fibrosis, pancreatitis, organ transplantation)
2	Drug-induced endocrine disorders
2	Hyperglycemic crises (DKA, HHS)
2	Hyperthyroidism
2	Male hypogonadism
3	Gender-affirming hormone therapy
3	Pituitary gland disorders (eg, growth hormone deficiency, acromegaly, hyperprolactinemia)
	Gastrointestinal conditions
1	Anorectal disorders (eg, hemorrhoids)
1	Constipation
1	Diarrhea (including traveler's diarrhea)
1	Drug-induced hepatic disorders
1	Gastroesophageal reflux disease (including heartburn)
1	Nausea and vomiting, simple (eg, acute viral gastroenteritis, overindulgence, motion sickness)
2	Cirrhosis, end-stage liver disease, and complications (eg, portal hypertension, ascites, varices, hepatic encephalopathy, hepatorenal syndrome)
2	Inflammatory bowel disease (Crohn's disease, ulcerative colitis)
2	Irritable bowel syndrome
2	Nausea and vomiting, complex (eg, postoperative)
2	Nonalcoholic steatohepatitis
2	Peptic ulcer disease (including stress-related mucosal injury, gastrointestinal bleeding)
2	Pancreatitis (acute, chronic, and drug-induced)
3	Celiac disease
3	Liver diseases, metabolic (eg, hemochromatosis, Wilson disease)
	Gynecologic and obstetrical conditions
1	Contraception (including emergency contraception)
1	Lactation (eg, drugs and breastfeeding)

(Continues)

TABLE 1 (Continued)

(Continues)

TABLE 1 (Continued)

Tier[a]	Organ systems
1	Menopausal symptoms (eg, hot flashes, vaginal dryness, vulvovaginal atrophy)
1	Pregnancy (eg, pregnancy testing, preconception care, nutrition and supplementation, drug dosing, teratogenicity, nausea/vomiting)
2	Diabetes mellitus, gestational
2	Endometriosis and uterine fibroids
2	Female sexual dysfunction
2	Hypertensive disorders of pregnancy (eg, pregnancy-induced hypertension, preeclampsia, eclampsia)
2	Infertility
2	Labor and delivery (eg, labor induction, preterm labor, pain management, postpartum hemorrhage)
2	Menstrual cycle disorders (eg, dysmenorrhea, menorrhagia, premenstrual dysphoric disorder)
2	Polycystic ovary syndrome
2	Postpartum depression
3	Pregnancy termination
	Hematologic conditions
1	Anemias (eg, iron deficiency, vitamin B_{12} deficiency, folic acid deficiency, chronic disease/inflammation)
1	Drug-induced hematologic disorders (including heparin-induced thrombocytopenia)
2	Coagulation disorders (eg, hemophilia, von Willebrand disease, antiphospholipid syndrome, clotting factor deficiencies)
2	Sickle cell disease
3	Aplastic anemia
3	Disseminated intravascular coagulation
3	Hemolytic anemias (eg, autoimmune, hemolytic uremic syndrome, paroxysmal nocturnal hemoglobinuria)
3	Platelet disorders (eg, idiopathic thrombocytopenic purpura, thrombotic thrombocytopenic purpura)
3	Porphyrias
3	Thalassemia
	Immunologic conditions
1	Allergies/drug hypersensitivities (eg, anaphylaxis)
2	Drug desensitization
2	Solid organ transplantation (eg, heart, liver, lung, kidney; including immunosuppressive therapy)
2	Systemic lupus erythematosus
3	Immunodeficiency
3	Sarcoidosis
	Infectious diseases and conditions
1	*Clostridioides* (formerly *Clostridium*) *difficile* infection
1	Common parasitic diseases (eg, head and body lice, pinworm)
1	Fungal infections, superficial (eg, vulvovaginal and oral/esophageal candidiasis, dermatophytoses)
1	Immunization (including vaccines, toxoids, and other immunobiologics)
1	Influenza virus infection
1	Lower respiratory tract infections (eg, community- and hospital-acquired pneumonia)
1	Skin and soft tissue infections
1	Upper respiratory tract infections (eg, otitis media, sinusitis, bronchitis)
1	Urinary tract infections, uncomplicated
2	Antimicrobial prophylaxis in surgery and other procedures
2	Bloodstream and catheter infections
2	Bone and joint infections (eg, osteomyelitis, prosthetic joint infections)
2	CNS infections (eg, meningitis, encephalitis, brain abscess)
2	Fungal infections, invasive (eg, histoplasmosis, coccidioidomycosis, cryptococcosis, blastomycosis, hematogenous candidiasis, aspergillosis)
2	Gastrointestinal infections (eg, infectious diarrhea, enterotoxigenic poisonings)
2	Hepatitis, viral
2	HIV infection (including pre- and post-exposure prophylaxis)
2	Infections in immunocompromised patients (eg, febrile neutropenia, opportunistic infections in AIDS)
2	Infective endocarditis
2	Intra-abdominal infections (eg, peritonitis, abscess)
2	Prostatitis
2	Sexually transmitted infections (eg, syphilis, gonorrhea, chlamydia, trichomoniasis, human papilloma virus, pelvic inflammatory disease)
2	Tickborne illnesses (eg, Lyme borreliosis, ehrlichiosis, Rocky Mountain spotted fever, relapsing fever)
2	Travel medicine (eg, vaccinations, malaria)
2	Tuberculosis
2	Urinary tract infections, complicated
2	Viral infections (eg, varicella, cytomegalovirus, herpes simplex, measles [rubeola], mumps, rabies)
3	Mycobacterial infections, other (leprosy, nontuberculous mycobacterial infections)
3	Spirochetal diseases (eg, treponematosis, leptospirosis)
3	Viral infections, miscellaneous (Zika, West Nile, Ebola, dengue fever)
	Musculoskeletal and connective tissue conditions
1	Gout and hyperuricemia
1	Osteoarthritis
1	Osteoporosis
1	Soft tissue injuries (eg, strains, sprains, tendinitis, bursitis, myalgias)
2	Psoriatic arthritis
2	Rheumatoid arthritis
3	Familial Mediterranean fever and other hereditary autoinflammatory diseases

(Continues)

TABLE 1 (Continued)

Tier[a]	Organ systems
3	Mixed connective tissue disease
3	Myopathies (eg, dermatomyositis, polymyositis)
3	Reiter syndrome
3	Rhabdomyolysis
3	Sjögren syndrome
3	Spondyloarthritides (eg, ankylosing spondylitis)
3	Systemic sclerosis
3	Vasculitides (eg, polymyalgia rheumatica, giant cell arteritis, granulomatosis with polyangiitis [Wegener granulomatosis])
	Neurologic conditions
1	Headache (eg, tension-type, migraine, cluster)
1	Pain, neuropathic (eg, diabetic, posttherpetic)
1	Pain, nociceptive (acute and chronic)
2	Drug-induced movement disorders
2	Epilepsy
2	Essential tremor
2	Fibromyalgia
2	Multiple sclerosis
2	Neurocognitive disorders (eg, Alzheimer disease, vascular dementia, frontotemporal dementia)
2	Parkinson disease
2	Sleep-wake disorders (eg, narcolepsy, restless legs syndrome, circadian rhythm disorders; see also "Insomnia" in the Psychiatric and Behavioral Disorders section)
2	Status epilepticus
3	Amyotrophic lateral sclerosis
3	Autoimmune neurologic disorders, other (eg, Guillain-Barré, autoimmune encephalopathy)
3	Bell's palsy
3	Cerebral palsy
3	Dystonia
3	Huntington disease
3	Myasthenia gravis
3	Tic disorders (including Tourette disorder)
	Nutritional conditions
1	Nutrient deficiency and excess (including vitamins and trace minerals)
1	Overweight and obesity
2	Malabsorptive syndrome (including metabolic surgeries)
2	Malnutrition prevention and treatment (eg, enteral and parenteral nutrition)
	Oncologic conditions
1	Supportive care I (pain, nausea, vomiting, constipation, diarrhea, fatigue, mucositis)
2	Breast cancer
2	Cervical cancer
2	Colorectal cancer
2	Renal cell carcinoma

(Continues)

TABLE 1 (Continued)

Tier[a]	Organ systems
2	Leukemias, acute
2	Leukemias, chronic
2	Lung cancer
2	Lymphomas (Hodgkin's lymphoma, non-Hodgkin's lymphoma)
2	Melanoma
2	Myelodysplastic syndromes
2	Oncologic emergencies (eg, tumor lysis syndrome, hypercalcemia, coagulopathy, superior vena cava syndrome)
2	Ovarian cancer
2	Plasma cell disorders (eg, multiple myeloma)
2	Prostate cancer
2	Supportive care II (eg, myelosuppression, thrombosis, extravasation)
3	Bladder cancer
3	Endometrial cancer
3	Germ cell tumors (eg, testicular cancer)
3	Head and neck cancer
3	Hematopoietic stem cell transplantation
3	Gastrointestinal cancers, other (eg, carcinoid, esophageal, gastric, hepatobiliary, pancreatic)
3	Mesothelioma
3	Myeloproliferative disorders (eg, polycythemia vera, myelofibrosis)
3	Pediatric malignancies (eg, Ewing sarcoma, Wilms tumor, osteosarcoma, rhabdomyosarcoma)
3	Skin cancer, nonmelanoma (eg, basal cell carcinoma, cutaneous squamous cell carcinoma)
3	Thyroid cancer
	Ophthalmic conditions
1	Blepharitis
1	Conjunctivitis (eg, bacterial, viral, allergic)
1	Drug-induced ophthalmic disorders
1	Hordeolum (stye)
1	Keratoconjunctivitis sicca (dry eye syndrome)
2	Glaucoma
2	Macular degeneration
2	Ophthalmic disorders, other (eg, corneal abrasions, bacterial keratitis)
	Psychiatric and behavioral conditions
1	Alcohol use disorder (including alcohol withdrawal)
1	Anxiety disorders (eg, generalized anxiety, panic, social anxiety disorder)
1	Depressive disorders (eg, major depressive disorder)
1	Insomnia (see other sleep–wake disorders in the Neurologic Disorders section)
1	Opioid use disorder (including opioid withdrawal)
1	Tobacco/nicotine use disorder (including smoking cessation)
2	Attention-deficit/hyperactivity disorder
2	Bipolar disorder (eg, mania, bipolar depression, maintenance therapy)

(Continues)

TABLE 1 (Continued)

Tier[a]	Organ systems
2	Delirium/acute agitation (non-critically ill patients)
2	Eating disorders (eg, anorexia nervosa, bulimia nervosa, binge eating disorder)
2	Obsessive-compulsive disorders
2	Schizophrenia
2	Substance use disorders, other (eg, hallucinogens, stimulants, depressants, performance-enhancing drugs)
2	Trauma- and stressor-related disorders (eg, posttraumatic stress disorder)
3	Autism spectrum disorders
3	Personality disorders
3	Phobias
	Renal, fluid, and electrolyte conditions
1	Chronic kidney disease, prevention of progression
1	Drug dosing in renal dysfunction
1	Drug-induced renal disorders
1	Electrolyte disorders (potassium, calcium, phosphorus, magnesium)
2	Acid-base disturbances
2	Acute kidney injury (prerenal, intrinsic, and postrenal)
2	Chronic kidney disease, complications (anemia, bone, and mineral disorders)
2	Dialysis and renal replacement therapies (including drug dosing)
2	Sodium and water disorders (including syndrome of inappropriate antidiuretic hormone, diabetes insipidus)
3	Glomerulonephritis
3	Nephrolithiasis
3	Nephrotic syndrome
3	Polycystic kidney disease
	Respiratory conditions
1	Asthma
1	COPD
2	Cystic fibrosis
2	Drug-induced respiratory disorders
2	Obstructive sleep apnea
3	Interstitial lung disease
	Urologic conditions
1	BPH
1	Erectile dysfunction
1	Urinary incontinence (including overactive bladder)
3	Interstitial cystitis
3	Neurogenic bladder

Tier	Conditions of special populations
	Pediatrics
1	Dehydration and oral replacement therapy
1	Fever
1	Growth and development

(Continues)

TABLE 1 (Continued)

Tier	Conditions of special populations
1	Nutrient deficiency and excess in infants and children
1	Pediatric drug dosing and delivery
1	Teething discomfort
2	Bronchiolitis (including RSV)
2	Congenital heart disease (including patent ductus arteriosus)
2	Neonatal and pediatric critical care (eg, apnea of prematurity, bronchopulmonary dysplasia, sepsis, respiratory distress syndrome)
2	PALS
3	Enuresis
3	Juvenile idiopathic arthritis
3	Kawasaki disease
3	Necrotizing enterocolitis
	Geriatrics
1	Age-related inappropriate medication use (eg, unnecessary medications, PIMs, underuse, nonadherence, ADEs, drug interactions, deprescribing)
1	FRIDs
1	Geriatric drug dosing and monitoring
2	Geriatric syndromes (eg, swallowing issues, gait problems, frailty)
	Critically ill patients
2	Acute respiratory distress syndrome
2	CNS trauma (eg, traumatic brain injury, spinal cord injury)
2	Hemodynamic support
2	Pain, agitation, and delirium
2	Respiratory support (including rapid sequence intubation)
2	Sepsis
2	Shock syndromes (including cardiogenic, hypovolemic, septic, vasogenic)
2	Subarachnoid hemorrhage, aneurysmal
3	Burns, major/severe
3	ECMO, pharmacologic considerations
3	Mechanical circulatory support devices, pharmacologic considerations
3	Targeted temperature management with ACLS
	Terminally ill patients
2	End-of-life care and symptom management (eg, pain, dyspnea, constipation, restlessness)
2	Palliative care and hospice care
3	Organ procurement
3	Medical aid in dying

Tier	Toxicologic conditions
1	Acetaminophen toxicity
1	Opioid overdose
1	Pediatric unintentional exposures
1	Poison prevention

(Continues)

TABLE 1 (Continued)

Tier	Toxicologic conditions
2	Anticoagulation overdose and reversal
2	Antidepressant overdose (including serotonin syndrome)
2	Antihypertensive medication toxicity (eg, calcium channel blockers, β-blockers, clonidine)
2	Aspirin poisoning
2	Benzodiazepine overdose
2	Cannabinoid toxicity
2	Digoxin toxicity
2	Envenomations (eg, snakes, scorpions, spiders)
2	Sympathomimetic toxicity (eg, cocaine, amphetamines, novel synthetic cathinones)
2	Toxic alcohol poisoning (eg, ethylene glycol, methanol)
3	Anticholinergic toxicity (eg, atropine, antimuscarinic chemical weapons)
3	Cholinergic toxicity (eg, anticholinesterase insecticides, nerve agent chemical weapons)
3	Disaster/emergency preparedness (eg, chemical warfare agents)
3	Heavy metal poisoning (eg, iron, lead)
3	Plant exposures (eg, hemlock, jimson weed, nightshade)

[a]Competency-based tier definitions: 1 = Students receive education and training on this topic to prepare them to provide collaborative, patient-centered care upon graduation and licensure. 2 = Students receive education and training on this topic, but additional knowledge or skills may be required after graduation (eg, residency training or equivalent experience) to prepare them to provide collaborative, direct patient care. 3 = Students and residents may not receive education and training on this topic; rather, they will be expected to obtain the required knowledge and skills to provide collaborative, direct patient care if required by the practice position.

Abbreviations: ACLS, advanced cardiac life support; ADEs, adverse drug events; AIDS, acquired immune deficiency syndrome; BLS, basic life support; BPH, benign prostatic hyperplasia; CNS, central nervous system; COPD, chronic obstructive pulmonary disease; DKA, diabetic ketoacidosis; ECMO, extracorporeal membrane oxygenation; FRIDs, Falls and fall-risk-increasing drugs; HHS, hyperosmolar hyperglycemic state; HIV, human immunodeficiency virus; NSTEMI, non-ST-elevation myocardial infarction; PALS, pediatric advanced life support; PIMs; potentially inappropriate medications; RSV, respiratory syncytial virus; STEMI, ST-elevation myocardial infarction.

from the Doctor of Pharmacy program. The committee based its decisions on tier 1 topics on several factors including the global burden of the condition, pharmacotherapy available for the condition, and the role of pharmacists in optimizing pharmacotherapy. Tier 2 topics are also important and should be included in the pharmacy curriculum either in required pharmacotherapeutic courses or in advanced elective offerings. However, the pharmacotherapy for these conditions is complex and/or limited to specialty practice areas. In order to develop competence in the management of tier 2 conditions, postgraduate training (residency or fellowship) or experience gained from additional clinical practice would be required. The tier 3 topics represent diseases that are of such complexity, specialty focus, or low prevalence that pharmacists may not encounter patients with them despite having 1 or 2 years of postgraduate training or several years of clinical practice experience. Most colleges or schools of pharmacy do not have adequate curricular time or resources to teach all topics. As such, pharmacists are expected to obtain the knowledge and skills necessary to manage tier 3 conditions on their own, as they are encountered in clinical practice.

3 | UPDATES TO THE 2016 TOOLKIT

The 2016 toolkit contained 276 topics: 87 (32%) as tier 1, 133 (48%) as tier 2, and 56 (20%) as tier 3.[1,3] The updated 2019 toolkit contains 302 topics: 94 (31%) as tier 1, 133 (44%) as tier 2, and 75 (25%) as tier 3.

3.1 | Number of disease states

The 2019 toolkit includes an additional 26 topics to the 2016 edition (302 vs 276). Although some tier 1 topics were altered (see discussion below), the overall number of tier 1 topics increased, largely due to the addition of conditions treated with self-care and nonprescription medications. The committee was cognizant of the impact that increasing tier 1 topics would have on curricular requirements. However, 12 of the 14 new tier 1 topics are conditions commonly managed by nonprescription drug products (Appendix). Because self-care pharmacotherapy is a required curricular element,[4] it is likely that schools are already teaching these topics and expecting students to be competent to manage them upon graduation. Thus, these new topics are not expected to substantially increase the teaching burden of the curriculum. Inclusion of disorders managed by self-care and nonprescription drug therapy is consistent with the importance of clinical pharmacy in the community pharmacy setting. The committee did categorize several new conditions that require more complex prescription drug therapy products (eg, prediabetes and certain supportive cancer care topics) as tier 1 because of the importance of the clinical pharmacist's role and expertise in their management.

Although modified, the number of tier 2 topics in the 2019 edition is the same as the 2016 toolkit (133 for both). A total of 11 new medical conditions were added as tier 2 topics, three were moved from tier 1 to tier 2, and two were moved from tier 3 to tier 2 (Appendix). The 11 new topics involve nine of the different organ systems or special populations included in the toolkit. The largest percentage of the toolkit continues to be tier 2 topics (44%), highlighting the importance of postgraduate training for pharmacy graduates wishing to participate in direct patient care.

The number of tier 3 topics increased from 56 to 75 primarily because of the addition of 11 topics to the Oncologic Disorders section (Appendix). By definition, the new tier 3 topics are not likely to be taught in the pharmacy curriculum, and thus will not add to the curricular teaching load.

4 | TIER CLASSIFICATION OF CONDITIONS AND DISEASE STATES

In addition to considering the conditions and disease states to be included in the toolkit, the committee carefully reviewed the expected competence of Doctor of Pharmacy graduates in managing each of them. For both existing and new topics, the distinction between tier 1 and tier 2 classification was a common point of committee discussion that at times required email voting. This is best exemplified by the reclassification of acute coronary syndromes (ACS) from tier 1 to tier 2 and the retention of stroke as a tier 2 classification. Although the committee acknowledges the significant global burden of these diseases and the important role of pharmacists in early recognition and treatment, the committee determined that the complexity of patient assessment and certain pharmacotherapeutic modalities are beyond the expected competencies of graduating pharmacy students (eg, evaluation of indications and contraindications of fibrinolytic therapies, approaches to dual and triple antithrombotic therapies, and use of intravenous $P2Y_{12}$ inhibitors). Both ACS and stroke must be included in required pharmacotherapy courses, but the complexity of these topics and associated pharmacotherapy classify these as a tier 2, indicating that postgraduate training or additional patient care experience is required for pharmacists to obtain competence in their management. Primary and secondary prevention of atherosclerotic cardiovascular disease, however, were kept as tier 1 topics because the committee strongly agreed that all pharmacy graduates should be expected to demonstrate competence in these areas. Similarly, deliberations regarding the supportive care aspects of the Oncologic Disorders section resulted in the creation of two classifications—supportive care I (tier 1) and supportive care II (tier 2)—to distinguish the expected competency of entry-level pharmacists. Curricular planners may determine that certain conditions have some pharmacotherapy treatment components for which they deem tier 1 and more complex components for which they deem tier 2. Faculty discretion should guide the appropriate level of expected competence and subsequent curricular resources in these areas given institution-specific considerations.

5 | FOCUS ON PHARMACOTHERAPY OF CONDITIONS AND DISEASE STATES

Most topics in the 2019 toolkit are medical conditions or disease states for which pharmacotherapy treatment is available. The committee excluded topics related to foundational knowledge that should be considered across all organ systems, medical conditions, and diseases. In lieu of including them under each organ system, the toolkit excludes topics such as medicinal chemistry, pharmacology, adverse drug effects, drug-drug and drug-nutrient interactions, pharmacokinetics, pharmacodynamics, pharmacogenomics/pharmacogenetics, therapeutic drug monitoring, pharmacoeconomics, and complementary/alternative medicine. Similarly, topics related to specific skills and processes of care (eg, antimicrobial stewardship, antimicrobial regimen selection) or patient assessment (eg, evaluation of renal function, nutrition assessment) are not included in the 2019 edition. The committee acknowledges the importance of these topics for pharmacists and expects that they will be included in required courses as relevant for the various conditions and disease states, even though they are not listed in detail in the toolkit. Many of those topics are core elements in the patient care process for pharmacists and are crucial to the education and development of competent pharmacy graduates.[30-32] Pharmacists must be capable of integrating this knowledge across the spectrum of care, as recently articulated in an ACCP PRN Opinion Paper.[33]

There are, however, specific topics remaining in the toolkit the committee chose to include that are not explicitly conditions or disease states, but that represent discrete specialty areas related to pharmacotherapy (eg, drug desensitization, pediatric growth and development, geriatric drug dosing and monitoring, and hemodynamic support in critically ill patients). Rather than skills and processes of care that can be applied globally to many different patient populations, the committee wanted to ensure that these specific aspects of care in these unique patient populations would be brought to the attention of curricular planners.

6 | PRIORITIZATION OF DISEASE STATES WITH NEW PHARMACOTHERAPY

Several of the new drugs approved by the Food and Drug Administration since 2015 offer new strategies for conditions that previously had limited disease-specific pharmacotherapy, thus these conditions became candidates for inclusion in the toolkit (eg, paroxysmal nocturnal hemoglobinuria treated with ravulizumab-cwvz and eculizumab). The committee acknowledges that the continued expansion of specialty pharmacy and orphan drug development may make it impractical to include every disease state with some associated pharmacotherapy in the toolkit. These types of conditions would likely be classified as tier 3. Because tier 3 topics may not be taught in pharmacy school curricula and the intended audience for this toolkit is pharmacy school educators, the committee used its discretion and content expertise to identify which disease states with new pharmacotherapy to add to the toolkit.

7 | LIMITATIONS

Although this toolkit provides a comprehensive list of topics for schools and colleges of pharmacy, some limitations are inherent in processes of this nature. Multiple objective sources were consulted during the process of updating the toolkit, but the subjective opinions of committee members may have influenced the toolkit entries and tier levels assigned. Allotted curricular delivery time and faculty expertise vary among academic institutions, and this toolkit must be adapted as necessary to meet the unique challenges of each pharmacy curriculum. In particular, regional and global perspectives may influence a school or college's topic coverage and prioritization.

8 | CONCLUSIONS

The 2019 ACCP Pharmacotherapy Didactic Curriculum Toolkit continues to endorse competency-based tier definitions for teaching the pharmacotherapy of conditions and disease states within Doctor of Pharmacy curricula. With continued scientific advances in medical care and the evolution of clinical pharmacy practice, it will be necessary to reassess the toolkit and pharmacy curricula on a regular basis in the years ahead. It will be particularly important to distinguish topics that require introductory knowledge and skills from those that demand mastery of knowledge and clinical competency from graduating students.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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