Pharmacotherapy Didactic Curriculum Toolkit 2009

2008 ACCP Educational Affairs Committee B, American College of Clinical Pharmacy

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INTRODUCTION

The 2008 ACCP Educational Affairs Committee B was charged with developing a "pharmacy curriculum toolkit" that could serve as a guide to colleges and schools of pharmacy for didactic pharmacotherapy curricular development. A formal definition of pharmacotherapy is "that area of pharmacy practice that ensures the safe, appropriate, and economical use of medications."[1] Most pharmacotherapy material in the didactic curricula of U.S. colleges and schools of pharmacy is primarily taught in courses named "Pharmacotherapy," "Therapeutics," or "Pharmacotherapeutics." Critical Issue 5 of the 2007 ACCP Strategic Plan focuses on ways in which the College can "increase its contribution to ensuring an appropriately educated and skilled clinical pharmacy workforce."[2] Development of the pharmacotherapy curriculum toolkit was addressed by objective 5.3.1 of the 2007 ACCP Strategic Plan. This toolkit was to provide guidance in the "breadth" of topics and the "depth" to which they should be covered. Furthermore, the toolkit was to be made available to all college of pharmacy curriculum committees. The Educational Affairs Committee was also charged with making suggestions for best disseminating the information.

The committee recognized that there was no "gold standard" curriculum or evidence-based material to guide it with respect to what constitutes the ideal pharmacotherapy curricular material. Neither the Accreditation Council for Pharmacy Education standards nor the American Association of Colleges of Pharmacy Center for the Advancement of Pharmaceutical Education Educational Outcomes provides specific commentary on pharmacotherapy topic content for colleges of pharmacy. The job of determining such content has traditionally fallen on faculty and curriculum committees at individual schools. Typically, most colleges of pharmacy assign pharmacotherapy courses to practice departments where a high level of knowledge and application expertise resides. On occasion, the content of pharmacotherapy courses, both in breadth and depth, may be more related to the expertise within a department or college, and it may be limited when there is a paucity of resources to assist with curriculum development and content areas. Therefore, ACCP believes that producing pharmacists prepared to practice according to the desires of the Joint Commission of Pharmacy Practitioners is more likely to be achieved if the guidance provided by the pharmacotherapy toolkit, together with the approaches used to develop the content, is used by colleges and schools of

pharmacy to enhance the consistency of pharmacotherapy concepts.[3]

The committee operated under the assumption that a core curriculum in pharmacotherapy should not simply be based on the expertise of available faculty. Rather, the curriculum should stress the topics that all students need to learn. Colleges and schools must be sure to have sufficient faculty to deliver the content, whether that consists of full-time or adjunct faculty or guest lecturers. The committee also agreed on the following general principles: pharmacotherapy content should be current, evidence based, guideline oriented, and strong in depth in areas where pharmacists are known to make a positive difference in patient outcomes, such as chronic diseases with high use of medications, high-cost drug therapies, preventable adverse drug reactions, and disease prevention.

DEVELOPMENT OF THE TOOLKIT

The toolkit project began at the 2007 ACCP Annual Meeting in Denver, Colorado. Based on the committee charge and direction from then-ACCP President Dr. Gary Matzke, the Educational Affairs Committee members agreed on the general principles that should guide the development of the toolkit during their initial discussion and brainstorming session. Ultimately, the committee envisioned a tier-structured toolkit that would address the breadth and depth of topics covered in pharmacotherapy segments of the didactic curriculum. Realizing that any process would probably involve some bias and subjectivity, the committee tried to design methodology that would help objectify the process.

Committee members were asked to create lists of key therapeutic topics that should be taught in the didactic coursework of all doctor of pharmacy programs in the United States. In most situations, at least two committee members were assigned to evaluate pharmacotherapy-related textbooks and therapy guidelines to develop a list of topics under a broader clinical disease or organ system category (e.g., cardiovascular, infectious diseases, women's health). In most cases, the assignments matched the clinical interests and knowledge of the assigned committee members. This initial phase was designed to develop the breadth of a curriculum. Two of the committee members who had recently undertaken similar exercises with their respective curriculum committees at their own colleges shared relevant documents with members of this ACCP committee.

After the first extensive list of potential topics was developed, the committee members individually recommended one of three "tiers" of topic content. Tier I represented topics that must be covered by all colleges; tier II, topics that should be covered by most colleges; and tier III, topics that could be covered if time and resources were available. The committee chair collected the rankings and suggestions and created a preliminary summary of tiered rankings. The summary tier value corresponded to the "mode" value on the three-tiered ranking. The summary was also sent to the officers of the ACCP Practice and Research Networks (PRNs) for comments and suggestions regarding additional topics for validation. The committee evaluated the summary value and list of tiered rankings to arrive at a committee consensus.

The final step in evaluating the toolkit topic areas occurred after there was a consensus on the tier categorizations. The group discussed approaches to solving the issue of depth in each topic area and decided to avoid specifying the number of instructional hours that should be committed. Instead, the members believed that the key concepts of disease prevalence, the use of medications in treating the disease, and the pharmacist's ability to affect therapy for patients should govern the depth. This last issue was also tied to whether a large number of pharmacists could make this difference. The committee realized that highly specialized pharmacists can make enormous contributions to their patients' well-being but that most pharmacists cannot

affect those particular patients. Thus, these specialty areas should be covered to a limited extent, recognizing that greater expertise will more likely be developed after graduation in a specialty residency.

The committee decided to classify the tier I topics into two groups according to the following definitions:

IA: The graduate should have received extensive instruction and training in the treatment of the disease state (and any accompanying morbidities) and, by the time of graduation, be proficient in providing care to patients with the disease.

IB: The graduate should have been exposed to the disease state and its treatments so that he or she has a good understanding of the disease processes and treatments. However, the graduate may require additional resources to ensure appropriate treatment outcomes for patients with the disease or should be able to refer the patient to others who can ensure the appropriate treatment outcomes.

Committee members individually submitted an "A" or "B" ranking for each tier I topic to the committee chair, who selected the modal value. The summary rankings were finalized by a committee consensus. Table 1 shows the ranking outcomes of the pharmacotherapy content areas. The committee met again in person at the 2008 ACCP Spring Meeting in Phoenix, Arizona, to finalize the toolkit and make plans for its publication.

USING THE TOOLKIT

The major intent of the toolkit was to provide guidance for coursework related to the principles of pharmacotherapy. Coursework taught primarily by faculty in the basic sciences and courses related to nonprescription medications and pharmacokinetics may not necessarily benefit from these results, though topics in these areas are certainly supportive of the pharmacotherapy topics. In addition, disease states included in the toolkit may fall under one of several possible relevant categories or may appear under two or more different categories.

Because the amount of time devoted to pharmacotherapy differs across campuses, the committee believed that topic content within each category might not necessarily be fully discussed in a pharmacotherapy-related course, but must be addressed in some part of the curriculum. Note that although some therapeutic categories may not be included, they certainly might be deemed important by a curriculum committee determining the content of a pharmacotherapy course. Note, also, that emphasis areas can change over time as pharmacy practice evolves.

CONCLUSION

With considerable input and revision, the 2008 ACCP Educational Affairs Committee B has developed a pharmacotherapy topic toolkit designed to aid faculty at colleges and schools of pharmacy as they examine pharmacotherapy content in their curriculum. The primary value of the toolkit is to ensure that graduates have been well educated in the areas of primary importance to current pharmacy practice. The tier I topics must be covered well in all colleges; the tier II and III topics should be addressed whenever possible.

Colleges and schools should use faculty expertise in subspecialty areas in the teaching of tier II and III topics but must also ensure that faculty are available to teach the tier I material (whether full time, adjunct, or voluntary). The importance of the tier I content areas must not be overlooked.

As the practice of pharmacy evolves with more complex therapies (e.g., increased attention to personalized medicine), the list of tier I topics will surely change. All curriculum committees have the responsibility of routinely evaluating changes in the practice of pharmacy and responding with timely adjustments to the curriculum as necessary. The committee hopes this initial pharmacotherapy toolkit will provide valuable guidance and a reference point for pharmacy school curricula for the next 5 years or so.

REFERENCES

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Table 1. Key Therapeutic Topics and Tier Ratings* for Didactic Curricula in Colleges and Schools of Pharmacy

Cardiology/Vascular

1. Hypertension – Tier IA
2. Heart failure – Tier IA
3. Acute myocardial infarction – Tier IA
4. Cardiac arrhythmias – Tier IA
5. Cerebrovascular disease/stroke/TIA/ICH – Tier IA
6. Ischemic heart diseases – Tier IA
7. Thromboembolic/venoembolic disease – Tier IA
8. Lipid disorders – Tier IA
9. Peripheral arterial/vascular diseases – Tier IB
10. Pulmonary hypertension – Tier II
11. Valvular heart diseases – Tier II
12. Cardiomyopathies – Tier II
13. Aneurysm – Tier III
14. Congenital heart disease – Tier III
15. Constrictive pericarditis – Tier III
16. Cardiac rehabilitation – Tier III
17. Cardiac transplantation – Tier III

Infectious Diseases

1. Microbiology laboratory testing and general infection principles – Tier IA
2. Antimicrobial agents – Tier IA
3. Urinary tract infections – Tier IA
4. Skin, soft tissue, bone, and joint infections – Tier IA
5. Pneumonia (including influenza) – Tier IA
6. Upper respiratory tract infections – Tier IA
7. STDs – Tier IA
8. HIV/AIDS – Tier IA
9. Fungal infections – Tier IA
10. Adult vaccines – Tier IA
11. Intra-abdominal infections – Tier IB
12. Tuberculosis – Tier IB
13. Endocarditis/bacteremia – Tier IB
14. Meningitis – Tier IB
15. Infections in febrile neutropenic patients – Tier IB
16. Viral infections – Tier IB
17. Surgical site infections and prophylaxis – Tier II
18. Sepsis/septic shock – Tier II
19. Parasitic/tickborne infections – Tier II
20. Stem cell and solid organ transplantation – Tier III

Endocrine

1. Diabetes mellitus type 1 – Tier IA
2. Diabetes mellitus type 2 – Tier IA
3. Thyroid disorders – Tier IB
4. Gestational diabetes – Tier II
5. DKA/NKHC – Tier II
6. Adrenal disorders – Tier II

Respiratory

1. Asthma – Tier IA
2. COPD – Tier IA
3. Cystic fibrosis – Tier II
4. Drug-induced pulmonary disease – Tier II

Gastroenterology

1. Gastroesophageal reflux disease – Tier IA
2. Peptic ulcer disease – Tier IA
3. Diarrhea and constipation (including traveler's diarrhea) – Tier IA
4. Drug-induced hepatic disease – Tier IA
5. Nausea and vomiting – Tier IA
    a. Chemotherapy-induced nausea and vomiting
    b. Postoperative nausea and vomiting
6. Hepatic encephalopathy – Tier IB
7. Cirrhosis – Tier IB
8. Portal hypertension, varices, ascites – Tier IB
9. Hepatitis – Tier IB
10. Inflammatory bowel disease: Crohn disease – Tier IB
11. Inflammatory bowel disease: ulcerative colitis – Tier IB
12. Motion sickness – Tier II
13. Stress-related mucosal damage – Tier II
14. Pancreatitis (including drug-induced) – Tier II
15. Irritable bowel syndrome – Tier II

Nutrition

1. Essential nutrients – Tier IA
2. Obesity management – Tier IA
3. Iron deficiency anemia – Tier IA
4. Nutrition assessment (evaluating status and calculating requirements) – Tier IB
5. Parenteral nutrition – Tier IB
6. Enteral nutrition – Tier II
7. Formula intolerance – Tier II

Nephrology/Fluids/Electrolytes

1. Fluid and electrolyte disorders – Tier IA
2. Chronic kidney disease – Tier IA
3. Acute renal failure – Tier IA
4. Acid/base disorders – Tier IA
5. Evaluation of renal function – Tier IA
    a. Laboratory markers
    b. Urinalysis
    c. Calculating and measuring renal function
6. Drug dosing in renal dysfunction – Tier IA
7. Dialysis and renal replacement therapies (including drug dosing) – Tier IB
8. Complications of renal disease – Tier IB
    a. Anemia
    b. Secondary hyperparathyroidism and renal osteodystrophy
9. Glomerulonephritis – Tier II
10. Renal transplantation – Tier III
11. Other complications
    a. Uremic bleeding – Tier III
    b. Pruritus – Tier III
    c. Nutritional considerations (vitamin depletion, food restrictions, etc.) – Tier III

Neurology

1. Epilepsy/seizure disorders – Tier IA
2. Parkinson disease – Tier IA
3. Stroke – Tier IA
4. Migraine/headache – Tier IA
5. Sleep disorders (insomnia/narcolepsy) – Tier IB
6. Multiple sclerosis – Tier II
7. CNS trauma – Tier III
8. Autism spectrum disorders – Tier III

Psychiatry

1. ADD/ADHD – Tier IA
2. Affective disorders (depression, bipolar disorder) – Tier IA
3. Schizophrenia – Tier IA
4. Generalized anxiety disorder – Tier IA
5. Substance abuse disorders – Tier IB
6. Panic disorder – Tier IB
7. Obsessive compulsive disorders – Tier IB
8. Post-traumatic stress disorder – Tier IB
9. Eating disorders – Tier II
10. Phobias – Tier III

Geriatrics

1. Medication use in the elderly – Tier IA
2. Alzheimer disease/dementia – Tier IA
3. Urinary incontinence – Tier IA
4. Osteoporosis – Tier IA
5. Glaucoma – Tier IB

Musculoskeletal/Pain/Connective Tissue Disorders

1. Rheumatoid arthritis – Tier IA
2. Osteoarthritis – Tier IA
3. Pain management – Tier IA
4. Gout – Tier IB
5. Lupus – Tier II

Special Populations

Pregnancy and Lactation

1. Drugs and lactation – Tier IA
2. Teratogenicity – Tier IA
3. Pharmacokinetics and drug dosing in pregnancy – Tier II
4. Prenatal care
    a. Pregnancy testing – IB
    b. Nutrition issues – III
    c. PIH/preeclampsia – III
    d. Nausea and vomiting of pregnancy – IB
5. Perinatal therapeutics – Tier III
    a. Induction of labor
    b. Treatment of preterm labor

Men's Health

1. BPH – Tier IA
2. Erectile dysfunction – Tier IB

Women's Health

1. Contraception and fertility – Tier IA
2. Menstrual disorders – Tier IB
3. Menopause – Tier IB

Gender-Related Differences

1. Pharmacokinetic – Tier II
2. Metabolic – Tier II
3. Drug response – Tier II

Terminally Ill

1. End of life/palliative care – Tier IB

Pediatrics

1. Pediatric immunizations – Tier IA
2. Pediatric-appropriate dosage forms – Tier IA
3. Accidental ingestions – Tier IB
4. Neonates and drug excipients – Tier IB
5. Pediatric dose calculation and therapeutic drug monitoring – Tier IB
6. Infant and toddler formulas – Tier IB
7. Neonatal sepsis/infections – Tier II
8. Dehydration assessment and oral replacement therapy – Tier II
9. Developmental pharmacology – pharmacokinetics/pharmacodynamics – Tier II
10. Congenital heart disease; patent ductus arteriosus – Tier III
11. Pediatric growth and development – Tier III
    - Developmental changes in drug ADME – Tier III
12. Enuresis – Tier III

Immunology

1. Allergies/drug hypersensitivities – Tier IB
    a. Types of reactions (hypersensitivity, anaphylaxis, serum sickness, etc.)
    b. Treatment (including desensitization)
2. Immunosuppressants – Tier II
    - Steroids, cyclosporine, tacrolimus, azathioprine, mycophenolate, sirolimus, others
3. Immunomodulating drugs – Tier II
    a. Immune globulins
    b. Interferons

Hematology/Oncology

1. Hematopoietic disorders – Tier IB
    a. Cancer associated – anemias
    b. Cancer associated – marrow suppression
    c. Drug-induced blood disorders
2. Neoplastic/solid cancer disorders – Tier IB
   (e.g., breast, gastrointestinal, prostate, head and neck, lung, ovarian)
3. Hematologic malignancies – Tier IB
   (e.g., leukemias, lymphomas, plasma cell disorders)
4. Oncologic emergencies – Tier II
    a. Tumor lysis syndrome
    b. Metabolic
    c. Hypercalcemia
    d. Hematologic
    e. Coagulopathies

Critical Care

1. Cardiopulmonary arrest and resuscitation – Tier IA
2. Alcohol withdrawal and toxicology – Tier IB
3. ACLS protocols – Tier II
4. PK/PD considerations in the ICU patient – Tier II
5. ICU sedation and delirium – Tier II
6. Preventive measures for nosocomial infections – Tier II
7. Hemodynamic control in the ICU patient – Tier II
8. Mechanical ventilation – Tier III

Preventive Health/Public Health

1. Smoking cessation – Tier IA
2. Healthy heart program – Tier II
3. Emergency preparedness (bioterrorism, pandemic flu, etc.) – Tier II

Miscellaneous

1. Dermatologic disorders – Tier IA
2. Ophthalmic (nonglaucoma) disorders – Tier II

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