

Issue Brief: Pharmacology education of physicians

Introduction¹

The American Medical Association (AMA) has seen an increase in legislation supported by non-physician groups seeking the authority to prescribe legend drugs and controlled substances. The AMA is concerned that non-physicians may not have the comprehensive education and training required to safely prescribe. Modern pharmaceuticals are more powerful than ever and require substantial expertise to manage potential issues, including chemical dependency, contraindications, drug interactions, and over-prescribing.

The safe and effective prescribing and administration of pharmaceuticals cannot be taught in stand-alone course(s) divorced from comprehensive medical education and clinical training, with in-depth, supervised interactions with real patients. While some pharmacotherapies may be within the scope of certain non-physicians' education and training, prescriptive authority for non-physicians should be authorized by policymakers only after careful consideration of a non-physician's education, training, and clinical experience when entering the workforce. Patient safety demands this level of scrutiny for any proposed legislation that would expand non-physicians' prescriptive authority.

Pharmacology is an integrated component of medical education

Throughout a medical student's education and training, pharmacology is integrated into the comprehensive content of biomedical sciences. The Liaison Committee on Medical Education requires all accredited medical schools to include pharmacologic study as part of disciplines including anatomy, biochemistry, genetics, immunology, microbiology, pathology, physiology, and public health sciences.²

¹ Disclaimer: This issue brief is intended for informational purposes only, may not be used in credentialing decisions of individual practitioners, and does not constitute a limitation or expansion of the lawful scope of practice applicable to practitioners in any state. Information gathered from outside sources does not reflect the official policy of the AMA.

² Liaison Committee on Medical Education, [Functions and Structure of a Medical School](#), Standards for Accreditation of Medical Education Programs Leading to the M.D. Degree, June 2010, (last accessed August 26, 2010).

Medical students must demonstrate mastery of pharmacology throughout their medical education and training

To become licensed physicians, all medical students must take and pass the three-step United States Medical Licensing Exam (USMLE) during and after their medical education. Step 1 of the USMLE³ tests:

- Pharmacodynamic and pharmacokinetic processes, including general principles such as absorption, distribution, metabolism, excretion, dosage intervals, concentration- and dose-effect relationships (e.g., efficacy, potency)
- Drug side effects, overdosage, toxicology
- General principles of autonomic pharmacology
- General properties of antimicrobials, including mechanisms of action and resistance
- General properties of antineoplastic agents and immunosuppressants, including drug effects on rapidly dividing mammalian cells

Step 2 of the USMLE⁴ further emphasizes a medical student's growing pharmacologic knowledge by requiring mastery of the application of pharmacology content across numerous fields of medicine, including:

- Immunologic, cardiovascular, mental, endocrine, metabolic, nutritional and digestive disorders
- Diseases of the blood and blood-forming organs
- Diseases of the nervous system and special senses
- Gynecologic disorders and disorders of pregnancy and childbirth
- Renal, urinary and male reproductive systems
- Disorders of the skin and subcutaneous tissues
- Diseases of the musculoskeletal system and connective tissue

Step 3 of the USMLE⁵, a two-day, 16-hour exam that all physicians must take and pass to be licensed and practice independently, requires medical school graduates to demonstrate comprehensive knowledge of pharmacotherapy, including safety issues, as related to:

- Clinical findings or diagnostic studies to identify the underlying factors of a particular disease or condition
- Factors that may alter the drug requirements for a patient, including modifying treatment within the context of continuing care, including ongoing diagnostic and clinical tests
- Formulating a diagnosis, including correctly interpreting the patient's history and knowing pertinent risk factors

³ United States Medical Licensing Exam, [Step 1 Content Information and General Description](#), (last accessed August 26, 2010).

⁴ United States Medical Licensing Exam, [Step 2 Content Information and General Description](#), (last accessed August 26, 2010).

⁵ United States Medical Licensing Exam, [Step 3 Content Information and General Description](#), (last accessed August 26, 2010).

- The importance of educating patients about effects of drugs and drug-drug interactions as well as how to assess patient adherence with treatment regimen and techniques to increase adherence
- Proper management of the patient's continuing care, including knowing incidence within patient groups at risk, knowing preliminary steps to measure and ensure effectiveness of intended therapy, and selecting appropriate preventive therapeutic agents or techniques.

Pharmacologic education continues throughout a physician's residency years

All residency programs continue to emphasize how pharmacology and pharmacotherapy may play a role in the evaluation, diagnosis and treatment of patients. The Accreditation Council for Graduate Medical Education⁶ requires internal medicine residents, for example, to demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social and behavioral sciences, as well as the application of this knowledge to patient care.

Physician residents must demonstrate competence in how pharmacotherapy interrelates with patients with undiagnosed and undifferentiated presentations; appropriately use and perform diagnostic and therapeutic procedures; and recognize and provide initial management of emergency medical problems, the interpretation of basic clinical tests and images, and more.

Most importantly, resident physicians must demonstrate the ability to apply their knowledge of pharmacology in the care of actual patients, under the supervision of senior physicians, as they gain increasing independence in patient management.

Conclusion

The AMA strongly encourages legislators to compare the education and training in pharmacology of non-physician practitioners with that received by physicians.

- During their four years of medical school, medical students learn how pharmacotherapy integrates into all branches of medicine, and they are tested on this knowledge as part of the medical licensure process.
- After graduation, physicians expand their knowledge and skills with pharmacotherapy through many direct patient care experiences.
- Under supervision by experienced senior physicians, resident physicians learn the complexities related to appropriate prescribing in multiple clinical situations and settings – gaining in-depth knowledge essential to their chosen specialty.

The bottom line is that physicians receive comprehensive education and training in pharmacology and pharmacotherapy that far exceeds that of non-physicians. In today's increasingly complex

⁶ Accreditation Council for Graduate Medical Education, [ACGME Program Requirements for Graduate Medical Education in Internal Medicine](#), (last accessed August 26, 2010).

health care system, patient safety demands extreme caution before expanding non-physicians' scope of practice to include prescriptive authority.