



Education in pathology

Exit competencies in pathology and laboratory medicine for graduating medical students: the Canadian approach[☆]



Jason Ford MD, FRCPC^{a,*}, Chantale Pambrun MD, FRCPC^b

^aDepartment of Pathology, Sidra Medical & Research Center, Doha, Qatar

^bDepartment of Pathology, IWK Children's & Women's Health Centre and Dalhousie University, Halifax, Nova Scotia, Canada, B3K 6R8

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Summary Physicians in every medical and surgical field must be able to use pathology concepts and skills in their practice: for example, they must order and interpret the correct laboratory tests, they must use their understanding of pathogenesis to diagnose and treat, and they must work with the laboratory to care for their patients. These important concepts and skills may be ignored by medical schools and even national/international organizations setting graduation expectations for medical students. There is an evolving international consensus about the importance of exit competencies for medical school graduates, which define the measurable or observable behaviors each graduate must be able to demonstrate. The Canadian Association of Pathologists (CAP) Education Group set out to establish the basic competencies in pathology and laboratory medicine which should be expected of every medical graduate: not competencies for pathologists, but for medical graduates who intend to enter any residency program. We defined 4 targets for pathology and laboratory medicine exit competencies: that they represent only measurable behaviors, that they be clinically focused, that they be generalizable to every medical graduate, and that the final competency document be user-friendly. A set of competencies was developed iteratively and underwent final revision at the 2012 CAP annual meeting. These competencies were subsequently endorsed by the CAP executive and the Canadian Leadership Council on Laboratory Medicine. This clinically focused consensus document provides the first comprehensive list of exit competencies in pathology and laboratory medicine for undergraduate medical education.
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1. Introduction

Pathology and laboratory medicine, unlike such disciplines as surgery or psychiatry, is not considered a “core clerkship” rotation at most Canadian and American medical schools. Most schools do not have any required clinical experiences in pathology for their graduates [1]. Even national and international organizations may pay little attention to pathology learning outcomes for medical

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* Corresponding author: Jason Ford, MD, FRCPC, Division Chief, Hematopathology, Department of Pathology, Sidra Medical and Research Center, PO Box 26999, Doha, Qatar.

E-mail addresses: jaford@sidra.org (J. Ford), chantale.pambrun@iwk.nshealth.ca (C. Pambrun).

students [2]. However, every physician will rely on pathology and laboratory medicine throughout his or her career: for example, irrespective of specialty, physicians must select and interpret the correct tests for their patients; they must use their understanding of etiology and pathogenesis to construct appropriate differential diagnoses; and they must demonstrate specific laboratory-related skills including transfusion medicine practice, infection control, and autopsy consenting. There is, therefore, a “pathology gap” between what the public should expect of medical graduates and what these graduates are actually required to learn.

There is a growing consensus in medical education about the value of formal exit competencies for medical students [3-5]. Exit competencies, as described by Albanese et al [4], are a subtype of educational goals or objectives that meet specific criteria. These include the following:

1. Competencies describe measurable and/or observable behaviors. They represent tasks or achievements which the medical graduate can perform, reflecting “his or her ability to use information and skills in patient care, not to recall information taught in a specific course” [4].
2. Exit competencies represent the expected (minimum) standard required of the medical student at graduation.
3. Competencies are assessed using a standard that does not depend on whether other students pass or fail. Competencies are not scaled or assessed in a comparative (eg, percentile) method.
4. Competencies must be “clear and unambiguous” and will let students and teachers know what is expected of the learners.

Sadofsky et al [6] describe an important effort in the United States to define “a coherent set of learning objectives [which] will assist medical students nationally to gain the basic competencies in pathology necessary for clinical practice.” This work mirrors the efforts in a range of specialties to develop learning milestones for their trainees, from medical school graduation through to advanced practicing physician [7]. Medical graduate competencies have already been published in many of these specialties: for example, in emergency medicine [8,9], neurology [10], internal medicine [11], geriatric medicine [12], and women’s health [13]. These add to the growing list of published residency- or fellowship-level competencies, of which there are several in pathology including anatomical pathology [14], clinical pathology [15], forensic pathology [16], molecular genetic pathology [17], dermatopathology [18], and neuropathology [19].

The Canadian Association of Pathologists–Education Group (CAPEG) recently addressed the issue of medical school graduation competencies in pathology and laboratory medicine. Members of the group met at the 2011 Canadian Association of Pathologists (CAP) annual meeting to define the project and set competency targets (see below) and then communicated by email over the span of a year to build

iteratively a growing list of pathology and laboratory medicine competencies. CAPEG met again at the 2012 CAP meeting to edit and revise the final list of competencies for medical students. The final version of the consensus document was approved by CAP and subsequently endorsed by the Canadian Leadership Council on Laboratory Medicine in 2012.

2. Competency targets

CAPEG established the following targets for the exit competencies in pathology and laboratory medicine:

1. Measurable behaviors. Describe behaviors that medical graduates must be able to demonstrate. Exit competencies will not simply describe knowledge or understanding: they must focus on measurable or observable behaviors.
2. Clinically focused. Describe behaviors that medical graduates can demonstrate while caring for individual patients. They will not describe the medical graduate’s overall approach to medical care or a general understanding of the roles of the laboratory or remembered knowledge about the mechanisms of disease.
3. Generalizable. These behaviors reflect the minimum standard we will accept for medical graduates, irrespective of the specific residency programs that the graduates have chosen. These are not pathology and laboratory medicine competencies for pathologists or pathology residents but for medical graduates who will go on to practice family medicine, surgery, pediatrics, and psychiatry. They are not aspirational or ideal targets for the top students, but rather a minimum graduation requirement for all students.
4. User-friendly. The final competency document will be brief and readable. It will be useful to students, to tell them what they are expected to learn, and to faculty, to tell them what they must teach and assess.

3. Pathology domains

It was necessary to subdivide pathology and laboratory medicine into smaller categories, to create manageable lists of competencies. The project outlined by Sadofsky et al [6] uses 3 categories of knowledge: disease mechanism and process, organ system pathology, and diagnostic medicine. Our approach instead retains a clinical focus. This begins with foundational competencies, which are clinically applicable to all areas of clinical practice, and then divides the remaining competencies along traditional pathology (sub)specialty lines: anatomical pathology (biopsy/cytology), hematopathology, transfusion medicine, medical microbiology/infectious disease, medical biochemistry, genetics, and autopsy pathology. For

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