



Ophthalmology Objectives for Medical Students: Revisiting What Every Graduating Medical Student Should Know

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The burden of eye disorders and impaired vision in the United States is significant. Although ongoing prevalence studies estimating visual impairment in the United States need to be implemented, conservative estimates place direct medical costs at \$5.5 billion, whereas other analyses place the total economic burden at \$139 billion.¹⁻⁴ Ophthalmology-related issues arise in the diagnosis and treatment of inpatients and outpatients on internal medicine, pediatrics, trauma surgery, neurology, endocrinology, neurosurgery, otolaryngology, dermatology, oncology, and rheumatology services.⁵ Prevalence of visual impairment in the United States is estimated at 7.5%, most of which is correctable, treatable, or preventable and is predicted to increase by 70% by 2020.^{6,7} Nevertheless, ophthalmology is a required rotation in only 18% of medical schools.⁸

Most primary care program directors believe fewer than 50% of incoming residents have sufficient ophthalmology skills when entering the internship period of medical education.⁹ Ophthalmoscopy is one of many ophthalmic skills in which there seems to be a gap in the training of medical students.¹⁰ The Fundus photography vs. Ophthalmoscopy Trial Outcomes in the Emergency Department (FOTO-ED) study demonstrated that emergency medicine physicians often do not perform an ophthalmoscopic examination when it is indicated, and when they do, they are unlikely to detect abnormal findings.¹¹ This presents a serious issue, because patients with visual impairments are more likely to be hospitalized, and from 2006 through 2011, there were 12 million eye-related emergency department visits nationwide.^{11,12}

In 2009, Lippa et al¹³ published an Association of University Professors in Ophthalmology (AUPO)-endorsed white paper outlining the ophthalmology competencies in core knowledge and examination skills that all medical students, regardless of their eventual specialty, should achieve before graduation. Since that time, the medical education environment has changed significantly. Medical education has become more

reliant on online interactive tools, flipped classrooms, and just-in-time education. There has been a movement toward a more accurate assessment of students' achievement of learning objectives in an effort to ensure that they can be entrusted with patient care activities before graduation.

There is arguably a decreased need to learn the use of a direct ophthalmoscope as digital retinal photography becomes easier and less expensive to use. As digital photography becomes more prevalent in primary care practices and emergency rooms, the emphasis on skill acquisition in direct ophthalmoscopy may become less of a focus; however, we do believe that it is imperative that students know when it is important to examine the fundus. If they are unable to view or interpret fundus findings with

either an ophthalmoscope or fundus photography, the students must know when it is necessary to refer their patients to an ophthalmologist for further evaluation.

With these considerations in mind, we propose the adoption of a modified list of ophthalmology-related objectives for graduating medical students. These objectives were written by the authors, the members of the AUPO Medical Student Educators Council from 2016 through 2017. The Council began with the 2009 white paper¹³ and earlier recommendations created by the AUPO in 1995.¹⁴ The authors tasked themselves with the goal of updating the objectives for the current medical education environment. We surveyed the literature, reviewed and discussed with medical colleagues outside of our field, and iteratively revised via e-mail and conference calls until consensus was achieved. In particular, the objectives were examined for importance and feasibility. The objectives were reviewed and endorsed without further revision by the Boards of Trustees of the AUPO and the American Academy of Ophthalmology (AAO). These 2018 guidelines are in the form of objectives that we hope medical student educators can use directly in their curricula.

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At the highest level, the objectives are meant to be broad, simple, and familiar. The objectives can and should be used by any medical school, regardless of whether they have a department of ophthalmology. Many, if not all, of these objectives can be incorporated into the curricula of other specialties of medicine (e.g., neurology, family practice, internal medicine, and pediatrics).

The [Appendix](#) (available at www.aaojournal.org) contains a detailed list of objectives that may be used to create an ophthalmology curriculum for any medical school. The [Appendix](#) includes a complete list of concepts that can and should be divided among other medical specialties if necessary. Furthermore, the AUPO and AAO are in the process of creating an online resource that will aid schools with limited resources to achieve these objectives. An individual, preferably an ophthalmologist, should be identified at each medical school who is familiar with these core objectives and resources.

Upon graduation from medical school, the student should be able to (1) describe the anatomy of the eye and the visual system, (2) perform a basic eye examination, (3) evaluate a patient with acute painless vision loss, (4) evaluate a patient with chronic vision loss, (5) evaluate a patient with a red or painful eye, (6) evaluate a patient with eye trauma, (7) evaluate a patient with an eye movement abnormality or diplopia, (8) describe the important causes of vision loss in children, (9) describe the ocular manifestations of systemic disease, (10) list the most important ocular side effects of systemic drugs, (11) list the common ocular medications that can have systemic side effects, and (12) describe when it is necessary to refer a patient urgently to ophthalmology.

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