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# The Columbia Guide to Basic Elements of Eye Care

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Daniel S. Casper • George A. Cioffi  
Editors

# The Columbia Guide to Basic Elements of Eye Care

A Manual for Healthcare  
Professionals

Illustrated by Daniel S. Casper, MD, PhD

 Springer

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*Dedicated to our families, for their love, support and  
forbearance.*

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## Foreword

Perhaps no other medical or surgical specialty is as highly differentiated and poorly understood by other physicians as ophthalmology. Ophthalmology is not a required clinical rotation in many medical schools, and even electives in it are often no longer than 1 or 2 weeks. Ophthalmology patients are rarely admitted to hospitals, and the ophthalmologic equipment used for routine examinations requires expertise that other physicians do not have.

Nonetheless, ophthalmological abnormalities, ranging from the bothersome to the serious, to the sight- and even life-threatening, are among the most common problems faced throughout the world. With the aging of the population, disorders of vision—including glaucoma, cataracts, and macular degeneration—are increasing causes of disability. In the developed world, the epidemic of obesity and type 2 diabetes is already leading to an analogous epidemic of diabetic retinal disease. In the developing world, where hypertension has emerged as a leading cause of death and disability, hypertensive eye disease is a growing concern.

The increasing gap between the rising incidence and prevalence of ophthalmological disease and practicing physician's limited understanding of even the basics of ophthalmology highlights the need for a book such as *The Columbia Guide*. The Columbia Guide emphasizes the common problems that are encountered by non-ophthalmologists, as well as how to diagnose their cause, initiate treatment, and make appropriate referrals to an ophthalmologist. In doing so, *The Columbia Guide* demystifies the lingo, measurements, abbreviations, drawings, and images that often make the reading of an ophthalmic consultation note impenetrable to the non-ophthalmologist.

*The Columbia Guide to Basic Elements of Eye Care: A Manual for Healthcare Professionals* is a straightforward, practical, and easy-to-use aid that will help every non-ophthalmologist healthcare provider who encounters patients with eye complaints or potential eye problems.

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## Preface

Recent decades have seen significant modifications in medical education, reminiscent of the changes brought about in the early twentieth century by the *Flexner Report*. That document introduced groundbreaking changes to physician training, including a national homogenization of curricula and an emphasis on requiring the study of human anatomy, physiology, and biochemistry.

We learned medicine in a structured format that almost universally consisted of 2 years of didactic training in the sciences and pharmacology, followed by 2 years of clinical study, primarily in inpatient hospitals. Ophthalmology residencies were done in eye hospital settings, where surgical patients were typically admitted the night before surgery and often remained as inpatients for a period of days, or even longer, postoperatively.

The changes that have occurred in the practice of, and training in, ophthalmology and all of medicine in the short time since we trained are staggering. Medical school curricula have undergone significant reorganizations, favoring more time devoted to learning clinical arts rather than basic science. In some schools, the result has been the almost complete abandonment of any anatomical training outside of computer-assisted dissection simulations; areas of medicine considered peripheral to primary care or general surgery—ophthalmology, otolaryngology, dermatology, and neurology—have been relegated to elective status. It is possible for a student to finish their medical training with minimal or no exposure to some or all of these disciplines.

Ophthalmology, as well, has undergone dramatic changes. The number of patients currently admitted to hospitals for ophthalmic general care or surgery is vanishingly small, as the field has transitioned almost entirely to an outpatient specialty. In many centers, ophthalmology residents no longer take overnight call in-house, so emergency room staff are required to provide initial care and appropriately triage off-hour cases. Patients admitted to hospital for other medical problems who are followed by interns or hospitalists, and during the course of their hospitalization experience ophthalmic problems, are similarly cared for, initially, by covering non-ophthalmologists. Emergency physicians, pediatricians, family practitioners, internists, hospitalists, neurologists, physician assistants, and nurse practitioners, among others, are routinely asked to evaluate eye pain, visual changes, “pink eye,” and a host of other ocular complaints. This puts the burden of initial diagnosis, and possibly treatment, on healthcare providers who may have had little or no experience dealing with ophthalmic maladies.

This text is designed to provide a foundation of basic eye anatomy and physiology, functional analysis, pathology, and concepts in eye care. It is not designed to be a comprehensive course in ophthalmology. Rather, it presents basic principles of eye health and disease that will guide the non-ophthalmologist in the evaluation of eye complaints. It provides a framework to appreciate normal versus abnormal, which will help determine when and which patients need referral to an eye care specialist, and to identify which conditions are emergent, urgent, or can be routinely followed. It is hoped that students and practitioners who have limited exposure to ophthalmology find this book useful and that it might prompt them to delve further into this fascinating and all-encompassing area of medical care.

New York, NY, USA

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## Acknowledgments

As digital publishing becomes the de facto mode of disseminating information, how refreshing and heartening to find people and institutions dedicated to learning material that is, actually, material.

I thank Springer for encouraging and aiding the creation of real books, the ones that can be grabbed from a shelf, flipped through, bookmarked, annotated, and even savored.

At Springer, editors Rebekah Amos, Caitlin Prim, and Asja Parrish delivered invaluable support and counsel, and throughout a long gestation, Margaret Burns was patient and helpful at every stage.

Ophthalmology is largely a visual specialty, and that is not meant flippantly; patterns of eye disease vary from subtle to severe, and recognizing them is often key to understanding and recognizing abnormalities, which enhance accurate and timely diagnosis. High-quality, representative images are one of the best ways to view, and review, typical phenotypic alterations seen in disease. The photographic staff at the Edward S. Harkness Eye Institute have been tireless in obtaining the best images possible in every case that we have illustrated here, and sincere thanks go to David McMahon, Noelle Pensec, Noelle Vallet, Eileen Frommer, Katherine Broderick, Philip Tang, April Ellis, Lanyi Zhao, Dina Yang, Alex Hannan, and Daniel Jones.

While my opening statement might suggest a blanket aversion to technology, in truth, I am something of a fan. The acquisition and storage of large numbers of high-resolution photographic images and the creation of illustrations required a great deal of sophisticated computer power, all of which was kept alive and behaving by David Wentsler and Thad Mangar, both of whom seemed to be able to materialize in seconds, for any crisis, large or small. Their assistance has been invaluable.

In the early stages of this book, our colleague, Dr. Harry Lodge, author of the *Younger Next Year* books, was extremely generous with his time and offers of assistance. Very sadly, Harry passed away last year, and we gratefully acknowledge his help and deeply miss his incomparable warmth and clinical acumen.

Numerous chapter authors have graciously provided their time and expertise throughout the development of this project, while the Harkness Eye residents have also contributed, particularly Dr. Thalmon Campagnoli.

Sincere appreciation is owed to Gaby Novak and Denisse Bejaran for their assistance throughout and to Valerie Williams-Sanchez and Suzanne Daly,



who were often the involuntary sounding boards for book-related ramblings and rants, which they graciously absorbed and defused.

Finally, we owe an immeasurable debt to patients of the Harkness Eye Institute at Columbia, who have entrusted us with the care and maintenance of their vision and have taught us all so much along the way.

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