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## Preface

Since publishing our first book on teleophthalmology in 2006, we have seen the field expand rapidly to encompass many ophthalmic applications. There has been a significant increase in peer-reviewed studies related to teleophthalmology from around the world. We have noted that more than 40% of such published articles are related to remote diagnosis of retinal diseases such as diabetic retinopathy. Therefore, in an effort to summarize and closely examine current thinking, we focus predominantly in this issue on telemedicine use for retinal imaging of disease, with some attention to glaucoma screening.

In the past several years, telemedicine screening for diabetic retinopathy has been well established in many countries and programs, with much supporting cost benefit analysis, publication of technical details, and demonstration of improved clinical outcomes and patient access. However, there are ongoing limitations related to fee-for-service models, as well as the cost of imaging and medical record technologies, which restricts the expansion of diabetic retinopathy screening. Important conditions such as retinopathy of prematurity, glaucoma and macular degeneration are also being diagnosed with teleophthalmology techniques; however, protocols, validation, and technical standards are less developed.

We have organized this book into two main sections: (1) current state of the art and future trends and (2) telemedicine applications and global experience. The first section includes a review, which examines published work related to teleretinal imaging and its outcomes. Also included are reviews of validation studies on some of the newer applications of retinal imaging such as those for the detection of systemic diseases, including cardiovascular and neurological conditions. Such a volume as ours would not be complete without a discussion of the emerging applications related to automated grading of retinal images. Such computer-aided analysis is expected to greatly assist trained image readers as well as to support more widespread patient screening. The improvement of such automated image analysis may represent a pivotal moment in telemedicine, as there is still a great need for enhanced accurate screening and disease due to dramatic increases in the incidence of diabetes and diseases related to aging. Technological improvements also move relentlessly forward, and there are chapters devoted to examining new retinal imaging techniques with lower cost cameras.

Section two is divided into teleophthalmology studies related to projects involving both adult and pediatric patients. The former section encompasses remote screening imaging for diabetic retinopathy, glaucoma and AMD. The pediatric section examines the use of this technology for the care of those infants at risk for retinopathy of prematurity and those with retinoblastoma. This section also presents studies from around the world which discuss the unique challenges of implementing teleretinal imaging programs. The editors believe that the lessons of such studies will be pertinent to others with similar challenges.

We have attempted to design this book in a way that will benefit health-care providers at all levels, including primary care physicians, ophthalmologists and optometrists, as well as nursing professionals who are planning to use telemedicine for the diagnosis of ocular diseases affecting the retina and optic nerve. Taking care to provide the best telemedicine applications worldwide that we were aware of, we understand that there is always an opportunity in programs for improvement in process, technical ease of use, and patient experience. Comments and feedback from our readers are welcome that may further improve our efforts in the future. Studies related to diagnosing glaucoma remotely (teleglaucoma) as well as age-related macular degeneration (AMD) are in a relatively early stage, and we wish to introduce these topics to a wider audience.

We are greatly indebted to the authors who contributed to this book by sharing their experience with our readers, and we make every effort to keep the information clear and useful. We would like to thank them American Telemedicine Association for allowing us to include their Telehealth Practice Recommendations for Diabetic Retinopathy. This report, which forms the basis of many programs, may be considered as a well-developed guideline for diabetic retinopathy screening, and it has the potential to form the basis for program development and thinking in our readers.

We owe great thanks to Drs. Mark Blumenkranz and Ian Constable, mentors for many of us in the field, and we are grateful for their contributions to the book. Our overriding goal is to see this technology and health-care model educate those who would like to establish and improve teleophthalmology in order to prevent needless blindness around the world. We are proud to play a small role in this effort by bringing the lessons in this volume to a wider audience.

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Digital Teleretinal Screening

Teleophthalmology in Practice

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