Update on General Medicine

Last major revision 2015–2016
The American Academy of Ophthalmology is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The American Academy of Ophthalmology designates this enduring material for a maximum of 10 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

CME expiration date: June 1, 2018. AMA PRA Category 1 Credits™ may be claimed only once between June 1, 2015, and the expiration date.

BCSC® volumes are designed to increase the physician’s ophthalmic knowledge through study and review. Users of this activity are encouraged to read the text and then answer the study questions provided at the back of the book.

To claim AMA PRA Category 1 Credits™ upon completion of this activity, learners must demonstrate appropriate knowledge and participation in the activity by taking the posttest for Section 1 and achieving a score of 80% or higher. For further details, please see the instructions for requesting CME credit at the back of the book.

The Academy provides this material for educational purposes only. It is not intended to represent the only or best method or procedure in every case, nor to replace a physician’s own judgment or give specific advice for case management. Including all indications, contraindications, side effects, and alternative agents for each drug or treatment is beyond the scope of this material. All information and recommendations should be verified, prior to use, with current information included in the manufacturers’ package inserts or other independent sources, and considered in light of the patient’s condition and history. Reference to certain drugs, instruments, and other products in this course is made for illustrative purposes only and is not intended to constitute an endorsement of such. Some material may include information on applications that are not considered community standard, that reflect indications not included in approved FDA labeling, or that are approved for use only in restricted research settings. The FDA has stated that it is the responsibility of the physician to determine the FDA status of each drug or device he or she wishes to use, and to use them with appropriate, informed patient consent in compliance with applicable law. The Academy specifically disclaims any and all liability for injury or other damages of any kind, from negligence or otherwise, for any and all claims that may arise from the use of any recommendations or other information contained herein.

AAO, AAOE, American Academy of Ophthalmology, Basic and Clinical Science Course, BCSC, EyeCare America, EyeNet, EyeSmart, EyeWiki, Focal Points, IRIS, ISRS, OKAP, ONE, Ophthalmic Technology Assessments, Ophthalmology, Preferred Practice Pattern, ProVision, SmartSight, The Ophthalmic News & Education Network, and the AAO logo (shown on cover) and tagline (Protecting Sight. Empowering Lives.) are, among other marks, the registered trademarks and trademarks of the American Academy of Ophthalmology.

Cover image: From BCSC Section 5, Neuro-Ophthalmology. Fundus photograph showing an arteriovenous malformation (racemose angioma) of the retina in a patient with Wyburn-Mason syndrome. (Courtesy of Mark J. Greenwald, MD.)

Copyright © 2017 American Academy of Ophthalmology. All rights reserved. No part of this publication may be reproduced without written permission. Printed in the United States of America.
Basic and Clinical Science Course

Louis B. Cantor, MD, Indianapolis, Indiana, Senior Secretary for Clinical Education
Christopher J. Rapuano, MD, Philadelphia, Pennsylvania, Secretary for Lifelong Learning and Assessment
George A. Cioffi, MD, New York, New York, BCSC Course Chair

Section 1

Faculty

Herbert J. Ingraham, MD, Chair, Danville, Pennsylvania
A. Luisa Di Lorenzo, MD, Troy, Michigan
Maria Jancevski, MD, Birmingham, Michigan
Jaclyn L. Kovach, MD, Naples, Florida
Maria A. Woodward, MD, Ann Arbor, Michigan
A. Jan Berlin, MD, Consultant, Portland, Maine
Steven L. Mansberger, MD, MPH, Consultant, Portland, Oregon

The Academy wishes to acknowledge the following committees for review of this edition:

Vision Rehabilitation Committee: John D. Shepherd, MD, Omaha, Nebraska

Practicing Ophthalmologists Advisory Committee for Education: Steven J. Grosser, MD, Primary Reviewer, Golden Valley, Minnesota; James M. Mitchell, MD, Primary Reviewer, Edina, Minnesota; Edward K. Isbey III, MD, Chair, Asheville, North Carolina; Alice Bashinsky, MD, Asheville, North Carolina; David J. Browning, MD, PhD, Charlotte, North Carolina; Robert G. Fante, MD, Denver, Colorado; Bradley Fouraker, MD, Tampa, Florida; Dasa Gangadhar, MD, Wichita, Kansas; James A. Savage, MD, Memphis, Tennessee

European Board of Ophthalmology: Bahram Bodaghi, MD, PhD, EBO Chair, Paris, France; Christina N. Grupcheva, MD, PhD, FEBO, EBO Liaison, Varna, Bulgaria; Sébastien Abad, MD, PhD, Paris, France; Boris Bienvenu, MD, PhD, Caen, France; Sylvain Choquet, MD, Paris, France; Michel Drancourt, MD, PhD, Marseille, France; Thomas Hanslik, MD, PhD, Brest, France; Pierre Hausfater, MD, PhD, Paris, France; Gerard Helft, MD, PhD, Paris, France; Ina Kötter, MD, PhD, Hamburg, Germany; Frédérique Kutter, MD, Paris, France; Anne Leger, MD, Paris, France; David Saadoun, MD, PhD, Paris, France; Damien Sène, MD, PhD, Paris, France; Pascal Sève, MD, PhD, Lyon, France; Hélène Vallet, MD, Paris, France
Financial Disclosures

Academy staff members who contributed to the development of this product state that within the past 12 months, they have had no financial interest in or other relationship with any entity discussed in this course that produces, markets, resells, or distributes ophthalmic health care goods or services consumed by or used in patients, or with any competing commercial product or service.

The authors and reviewers state that within the past 12 months, they have had the following financial relationships.*

Dr Bienvenu: Crossject (C, L), CSL Behring (C), Genzyme (C), Octapharma (C), Sanofi (C)
Dr Bodaghi: Abbott Medical Optics (C), Allergan (C, S), Bausch + Lomb Surgical (C), Novartis Pharmaceuticals (S), Santen (C), Xoma (C)
Dr Browning: Aerpio (S), Alimera Sciences (C), Diabetic Retinopathy Clinical Research (S), Genentech (S), Novartis Pharmaceuticals (S), Pfizer (S), Regeneron Pharmaceuticals (S)
Dr Choquet: Celgene (L), Janssen (L), Roche France (C)
Dr Fante: Ophthalmic Mutual Insurance Company (C)
Dr Fouraker: Addition Technology (C), Alcon Laboratories (C), Keravision (C), Ophthalmic Mutual Insurance Company (C)
Dr Grosser: Ivantis (O)
Dr Grupcheva: Johnson & Johnson (L), Laboratoires Théa (L)
Dr Helft: Abbott (L), AstraZeneca (L), Bayer (L), Boehringer Ingelheim (C, L)
Dr Isbey: Alcon Laboratories (S), Allscripts (C), Bausch + Lomb (S), Medflow (C)
Dr Jancevski: Aldeyra Therapeutics (C)
Dr Kötter: AbbVie (L), Actelion (L), Bristol-Myers Squibb (L), Chugai (L), Novartis (S), Pfizer (L), Roche (S), UCB (L)
Dr Mansberger: Alcon Laboratories (C), Allergan (C, S), Envisia Therapeutics (C), Mobius (S), National Eye Institute (S), Santen (C)
Dr Savage: Allergan (L)
Dr Sève: Actelion (C), GSK (L), Pfizer (L), Sobi (L)
Dr Woodward: National Eye Institute (S)

*C = consultant fees, paid advisory boards, or fees for attending a meeting; L = lecture fees (honoraria), travel fees, or reimbursements when speaking at the invitation of a commercial sponsor; O = equity ownership/stock options of publicly or privately traded firms (excluding mutual funds) with manufacturers of commercial ophthalmic products or commercial ophthalmic services; P = patents and/or royalties that might be viewed as creating a potential conflict of interest; S = grant support for the past year (all sources) and all sources used for a specific talk or manuscript with no time limitation
The other authors and reviewers state that within the past 12 months, they have had no financial interest in or other relationship with any entity discussed in this course that produces, markets, resells, or distributes ophthalmic health care goods or services consumed by or used in patients, or with any competing commercial product or service.

Recent Past Faculty
James P. Bolling, MD
Anne Louise Coleman, MD, PhD
Eric P. Purdy, MD
Gwen Sterns, MD
Jonathan Walker, MD

In addition, the Academy gratefully acknowledges the contributions of numerous past faculty and advisory committee members who have played an important role in the development of previous editions of the Basic and Clinical Science Course.

American Academy of Ophthalmology Staff
Dale E. Fajardo, Vice President, Education
Beth Wilson, Director, Continuing Professional Development
Ann McGuire, Acquisitions and Development Manager
Stephanie Tanaka, Publications Manager
D. Jean Ray, Production Manager
Kimberly Torgerson, Publications Editor
Beth Collins, Medical Editor
Naomi Ruiz, Editorial Assistant

American Academy of Ophthalmology
655 Beach Street
Box 7424
San Francisco, CA 94120-7424
Contents

General Introduction ........................................... xv

Objectives ....................................................... 1

1 Using Statistics in Clinical Practice ....................... 3
   Researching Answers to Clinical Questions .................. 3
      Crucial Questions in Study Evaluation ...................... 4
   Understanding Study Design ................................ 7
      Case Reports ........................................... 8
      Case Series ........................................... 9
      Case-Control Studies .................................... 9
      Cross-sectional Studies .................................. 11
      Cohort Studies ......................................... 11
      Clinical Trials ......................................... 13
   Systematic Reviews and Meta-analyses of Clinical Trials .... 14
   Interpreting Diagnostic and Screening Tests ................. 14
      The Straightforward Case ................................. 14
      Complicating Features ................................ 16
   Summary ..................................................... 20

Discussing Benefits, Risks, Probabilities, and Expected Outcomes  
   With Patients ............................................. 21

Applying Statistics to Measure and Improve Clinical Practice .... 23
   Issues in Designing a Measurement System .................. 23
   Implementation of a Monitoring System ..................... 25
   Analysis of the Results ................................... 26
   Methods of Presenting Data to Facilitate Continuous 
      Improvement ............................................. 27
   Other Features of Continuous Quality Improvement .......... 30
   Summary ..................................................... 31

2 Endocrine Disorders ........................................... 33
   Recent Developments ....................................... 33
   Diabetes Mellitus .......................................... 33
      Basics of Glucose Metabolism ............................. 33
      Definition, Diagnosis, and Screening ...................... 34
      Classification ........................................... 35
      Clinical Presentation of Diabetes Mellitus ................ 37
      Prevention of Diabetes Mellitus ........................... 37
      Management .............................................. 39
   Complications of Diabetes Mellitus .......................... 47
      Ophthalmic considerations ............................... 49
# Contents

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thyroid Disease</td>
<td>50</td>
</tr>
<tr>
<td>Physiology</td>
<td>50</td>
</tr>
<tr>
<td>Testing for Thyroid Disease</td>
<td>51</td>
</tr>
<tr>
<td>Hyperthyroidism</td>
<td>52</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>54</td>
</tr>
<tr>
<td>Thyroiditis</td>
<td>54</td>
</tr>
<tr>
<td>Thyroid Tumors</td>
<td>55</td>
</tr>
<tr>
<td>Disorders of the Hypothalamic-Pituitary Axis</td>
<td>56</td>
</tr>
<tr>
<td>Pituitary Adenomas</td>
<td>57</td>
</tr>
<tr>
<td>Pituitary Apoplexy</td>
<td>58</td>
</tr>
<tr>
<td>Multiple Endocrine Neoplasia Syndromes</td>
<td>58</td>
</tr>
<tr>
<td><strong>3 Hypertension</strong></td>
<td><strong>61</strong></td>
</tr>
<tr>
<td>Recent Developments</td>
<td>61</td>
</tr>
<tr>
<td>Introduction</td>
<td>61</td>
</tr>
<tr>
<td>Classification of Blood Pressure and Diagnosis of Hypertension</td>
<td>62</td>
</tr>
<tr>
<td>Etiology and Pathogenesis of Hypertension</td>
<td>63</td>
</tr>
<tr>
<td>Evaluation of Patients With Hypertension</td>
<td>65</td>
</tr>
<tr>
<td>Treatment of Hypertension</td>
<td>66</td>
</tr>
<tr>
<td>Lifestyle Modifications</td>
<td>66</td>
</tr>
<tr>
<td>Pharmacologic Treatment</td>
<td>67</td>
</tr>
<tr>
<td>Antihypertensive Drugs</td>
<td>70</td>
</tr>
<tr>
<td>Diuretics</td>
<td>70</td>
</tr>
<tr>
<td>Angiotensin-Converting Enzyme Inhibitors</td>
<td>71</td>
</tr>
<tr>
<td>Angiotensin II Receptor Blockers</td>
<td>71</td>
</tr>
<tr>
<td>Calcium Channel Blockers</td>
<td>72</td>
</tr>
<tr>
<td>β-Blockers</td>
<td>72</td>
</tr>
<tr>
<td>$α_1$-Blockers</td>
<td>73</td>
</tr>
<tr>
<td>Combined $α$-Adrenergic and $β$-Adrenergic Antagonists</td>
<td>73</td>
</tr>
<tr>
<td>Centrally Acting Adrenergic Drugs</td>
<td>73</td>
</tr>
<tr>
<td>Direct Vasodilators</td>
<td>73</td>
</tr>
<tr>
<td>Combination Therapy</td>
<td>73</td>
</tr>
<tr>
<td>Direct Renin Inhibitors</td>
<td>74</td>
</tr>
<tr>
<td>Parenteral Antihypertensive Drugs</td>
<td>74</td>
</tr>
<tr>
<td>Future Treatments and Targets for Hypertension</td>
<td>74</td>
</tr>
<tr>
<td>Special Considerations</td>
<td>75</td>
</tr>
<tr>
<td>Resistant Hypertension</td>
<td>75</td>
</tr>
<tr>
<td>Ischemic Heart Disease</td>
<td>75</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>75</td>
</tr>
<tr>
<td>Diabetes Mellitus and Hypertension</td>
<td>75</td>
</tr>
<tr>
<td>Chronic Renal Disease</td>
<td>76</td>
</tr>
<tr>
<td>Cerebrovascular Disease</td>
<td>76</td>
</tr>
<tr>
<td>Obesity and the Metabolic Syndrome</td>
<td>76</td>
</tr>
<tr>
<td>Obstructive Sleep Apnea Syndrome</td>
<td>76</td>
</tr>
<tr>
<td>Left Ventricular Hypertrophy</td>
<td>76</td>
</tr>
<tr>
<td>Peripheral Arterial Disease</td>
<td>76</td>
</tr>
<tr>
<td>Ophthalmic considerations</td>
<td>77</td>
</tr>
<tr>
<td>Orthostatic Hypotension</td>
<td>77</td>
</tr>
</tbody>
</table>
Hypertension in Older Patients .............................................. 77
Women and Pregnancy ......................................................... 77
Children and Adolescents .................................................... 78
Racial and Ethnic Variations in Hypertension in the United States . . . 78
Withdrawal Syndromes ......................................................... 79
Hypertensive Crisis .............................................................. 79

4 Hypercholesterolemia and Cardiovascular Risk ....................... 81
Recent Developments ........................................................... 81
Introduction ................................................................. 81
Lipoproteins, Cholesterol, and Cardiovascular Disease .............. 82
Risk Assessment ............................................................... 82
Management ................................................................. 84
   The Role of Statins ......................................................... 86
   Metabolic Syndrome ..................................................... 88

5 Acquired Heart Disease ..................................................... 91
Recent Developments .......................................................... 91
Ischemic Heart Disease ....................................................... 91
   Pathophysiology .......................................................... 91
   Risk Factors for Coronary Artery Disease ......................... 92
   Clinical Syndromes ..................................................... 92
   Noninvasive Cardiac Diagnostic Procedures ....................... 95
   Invasive Cardiac Diagnostic Procedures ......................... 98
   Management of Ischemic Heart Disease ......................... 98
   Congestive Heart Failure ............................................. 105
      Symptoms .............................................................. 105
      Clinical Signs ......................................................... 107
      Diagnostic Evaluation .............................................. 107
      Etiology ............................................................... 108
      Pathophysiology and Clinical Course ......................... 108
      Medical and Nonsurgical Management ......................... 109
      Invasive or Surgical Management ............................. 111
     Disorders of Cardiac Rhythm ....................................... 112
        Bradycardias and Conduction Disturbances ............... 112
        Premature Contractions ....................................... 112
        Tachycardias ....................................................... 113

6 Cerebrovascular Disease .................................................. 119
Recent Developments ....................................................... 119
Introduction ................................................................. 119
Cerebral Ischemia ........................................................... 120
   Diagnosis and Management ....................................... 121
Carotid Occlusive Disease ............................................... 124
Intracranial Hemorrhage ................................................... 126
Contents

7 Pulmonary Diseases .................................................. 129
   Recent Developments ............................................. 129
   Introduction ..................................................... 129
   Obstructive Lung Diseases ...................................... 129
   Restrictive Lung Diseases ....................................... 130
   Evaluation ....................................................... 131
   Treatment ........................................................ 131
       Nonpharmacologic Treatment ................................ 132

   Ophthalmic considerations .................................... 132
       Pharmacologic Treatment ................................... 132
       Perioperative Considerations ............................... 134

8 Hematologic Disorders ............................................... 135
   Recent Developments ............................................. 135
   Blood Composition ............................................... 135
   Erythropoiesis .................................................... 135
   Anemia ............................................................ 136
       Iron Deficiency Anemia ...................................... 136
       Inflammatory Anemia ....................................... 137
       The Thalassemias ............................................. 137
       Sideroblastic Anemia ....................................... 137
       Vitamin B12 Deficiency ..................................... 137
       Folic Acid Deficiency ....................................... 138
       Hemolytic Anemias .......................................... 138
   Disorders of Hemostasis ......................................... 140
       Laboratory Evaluation of Hemostasis and Blood Coagulation 141
       Clinical Manifestations of Hemostatic Abnormalities .... 142
       Vascular Disorders ............................................ 142

   Ophthalmic considerations .................................... 143
       Platelet Disorders ........................................... 143
       Disorders of Blood Coagulation ......................... 144
       Primary Hypercoagulable States ......................... 147

   Ophthalmic considerations .................................... 147
       Secondary Hypercoagulable States ...................... 148

9 Rheumatic Disorders .................................................. 151
   Recent Developments ............................................. 151
   Introduction ..................................................... 151
   Rheumatoid Arthritis .......................................... 151
   Spondyloarthropathies ......................................... 153
       Ankylosing Spondylitis ...................................... 153
       Reactive Arthritis ........................................... 154

   Ophthalmic considerations .................................... 154
       Other Spondyloarthropathies .............................. 155
       Juvenile Idiopathic Arthritis ............................. 156
   Systemic Lupus Erythematosus ............................... 156
   Diagnosis ....................................................... 158
Contents

10 Geriatrics ................................................. 177
Physiologic Aging and Pathologic Findings of the Aging Eye .......................... 178
Outpatient Visits ........................................ 179
Elder Abuse ............................................. 179
Perioperative Considerations in the Management of Elderly Patients .............. 180
Psychology of Aging .................................... 181
Normal Aging Changes ................................. 182
Depression .............................................. 182
Alzheimer Disease and Dementia ............................................. 183
Osteoporosis ............................................. 184
Falls ..................................................... 184

11 Behavioral and Neurologic Disorders ................................. 187
Recent Developments ..................................... 187
Introduction ............................................. 187
Behavioral Disorders .................................. 188
Mental Disorders Due to a General Medical Condition ................................. 188
Schizophrenia ............................................ 188
Mood Disorders ........................................ 189
Recent Developments .............................. 190
Substance Abuse Disorders ......................... 192
Ophthalmic considerations ......................... 192
Pharmacologic Treatment of Psychiatric Disorders .............................. 193
Antipsychotic Drugs ................................ 193
Ophthalmic considerations ......................... 194
Antianxiety and Hypnotic Drugs ..................... 194
Ophthalmic considerations ......................... 195
Ophthalmic considerations ......................... 198
Neurologic Disorders ................................ 198
Parkinson Disease .................................. 198
Ophthalmic considerations ......................... 200
Multiple Sclerosis .................................. 200
Epilepsy ............................................. 200
Ophthalmic considerations ......................... 203
Stroke .............................................. 204
Pain Syndromes .................................... 204
Alzheimer Disease and Dementia ...................... 204
Ophthalmic considerations ......................... 206

12 Preventive Medicine ................................ 207
Recent Developments ................................ 207
Screening Procedures ................................. 207
Cardiovascular Diseases .............................. 208
Cancer .............................................. 209
Infectious Diseases ................................ 215
Immunization ........................................ 216
Hepatitis ............................................ 219
Influenza .......................................... 220
Varicella-Zoster ..................................... 220
Measles ............................................. 221
Mumps .............................................. 221
Rubella ............................................. 221
Polio ............................................... 222
Tetanus and Diphtheria ............................... 222
Pneumococcal Pneumonia ......................... 222
Haemophilus influenzae .............................. 223
Meningococcus ..................................... 224
Human Papillomavirus ............................... 224
Travel Immunizations ............................... 224
New and Future Vaccines ......................... 225

13 Cancer ........................................... 227
Recent Developments ................................ 227
Introduction ........................................ 227
Etiology ............................................. 227
Radiation Therapy .................................. 229
14 Infectious Diseases ................................. 239
Recent Developments .............................. 239
General Microbiology .............................. 239
Staphylococcus .................................. 241
Streptococcus .................................. 242
Clostridium difficile ............................ 244
Haemophilus influenzae ......................... 245
Neisseria .................................. 245
Pseudomonas aeruginosa ....................... 247
Treponema pallidum ............................ 248
  Stages .................................. 248
  Diagnosis ................................ 248
  Management ................................ 249
Borrelia burgdorferi .......................... 250
  Stages .................................. 250
  Diagnosis ................................ 251
  Management ................................ 252
Chlamydia trachomatis ......................... 252
Mycoplasma pneumoniae ....................... 253
Mycobacteria ................................ 253
  Tuberculosis ................................ 254
Fungal Infections ............................... 255
Toxoplasma .................................. 256
Herpesvirus .................................. 257
  Herpes Simplex ............................ 257
  Varicella-Zoster ........................... 258
  Cytomegalovirus ......................... 259
Ophthalmic considerations ................... 260
  Epstein-Barr Virus ........................ 260
Influenza ................................... 260
Hepatitis .................................. 260
  Hepatitis A and B ......................... 260
  Hepatitis C and Other Forms of Hepatitis 261
Human Papillomavirus ....................... 262
Acquired Immunodeficiency Syndrome ...... 262
  Etiology and Pathogenesis ................ 263
  Clinical Syndromes ...................... 264
  Diagnosis ................................ 264
  Modes of Transmission .................... 265
  Prognosis and Treatment ................ 265
  Opportunistic Infections ................. 267
## Ophthalmic Considerations
- Update on Antibiotics .................................................. 271
- Antibacterial Agents ..................................................... 272
- New Antibiotic Classes .................................................. 272
- Antifungal Agents .......................................................... 280
- Antiviral Agents ............................................................ 280

## Perioperative Management in Ocular Surgery ............................................. 283
- Recent Developments ....................................................... 283
- Introduction ................................................................. 283
- Preoperative Assessment .................................................. 283
  - Children and Adolescents ............................................. 284
  - Medication Use in the Preoperative Period ....................... 285
  - Diabetes Mellitus ....................................................... 287
  - Respiratory Diseases .................................................. 288
  - Preoperative Fasting ................................................... 288
  - Latex Allergy ............................................................. 288
  - Universal Protocol ..................................................... 289
- Intraoperative Considerations ................................................ 290
  - Systemic Anesthetic Agents ......................................... 290
  - Local Anesthetic Agents ............................................. 291
  - Malignant Hyperthermia ............................................... 292

## Medical Emergencies and Ocular Adverse Effects of Systemic Medications ............... 295
- Recent Developments ....................................................... 295
- Introduction ................................................................. 295
- Cardiopulmonary Arrest .................................................. 295
- Syncope ......................................................................... 300
- Shock .......................................................................... 300
  - Classification ........................................................... 300
  - Assessment ............................................................... 301
  - Treatment ................................................................. 301
  - Anaphylaxis ............................................................... 301
- Seizures and Status Epilepticus ............................................ 303
- Toxic Reactions to Local Anesthetic Agents and Other Drugs ....................... 304
- Ocular Adverse Effects of Systemic Medications .................................... 306

## Index
- Basic Texts ................................................................. 309
- Related Academy Materials .............................................. 311
- Requesting Continuing Medical Education Credit .................................. 313
- Study Questions .......................................................... 315
- Answer Sheet for Section 1 Study Questions ..................................... 321
- Answers ................................................................. 322
- Index ................................................................. 327
General Introduction

The Basic and Clinical Science Course (BCSC) is designed to meet the needs of residents and practitioners for a comprehensive yet concise curriculum of the field of ophthalmology. The BCSC has developed from its original brief outline format, which relied heavily on outside readings, to a more convenient and educationally useful self-contained text. The Academy updates and revises the course annually, with the goals of integrating the basic science and clinical practice of ophthalmology and of keeping ophthalmologists current with new developments in the various subspecialties.

The BCSC incorporates the effort and expertise of more than 90 ophthalmologists, organized into 13 Section faculties, working with Academy editorial staff. In addition, the course continues to benefit from many lasting contributions made by the faculties of previous editions. Members of the Academy Practicing Ophthalmologists Advisory Committee for Education, Committee on Aging, and Vision Rehabilitation Committee review every volume before major revisions. Members of the European Board of Ophthalmology, organized into Section faculties, also review each volume before major revisions, focusing primarily on differences between American and European ophthalmology practice.

Organization of the Course

The Basic and Clinical Science Course comprises 13 volumes, incorporating fundamental ophthalmic knowledge, subspecialty areas, and special topics:

1. Update on General Medicine
2. Fundamentals and Principles of Ophthalmology
3. Clinical Optics
4. Ophthalmic Pathology and Intraocular Tumors
5. Neuro-Ophthalmology
6. Pediatric Ophthalmology and Strabismus
7. Orbit, Eyelids, and Lacrimal System
8. External Disease and Cornea
9. Intraocular Inflammation and Uveitis
10. Glaucoma
11. Lens and Cataract
12. Retina and Vitreous
13. Refractive Surgery

In addition, a comprehensive Master Index allows the reader to easily locate subjects throughout the entire series.

References

Readers who wish to explore specific topics in greater detail may consult the references cited within each chapter and listed in the Basic Texts section at the back of the book.
These references are intended to be selective rather than exhaustive, chosen by the BCSC faculty as being important, current, and readily available to residents and practitioners.

**Study Questions and CME Credit**

Each volume of the BCSC is designed as an independent study activity for ophthalmology residents and practitioners. The learning objectives for this volume are given on page 1. The text, illustrations, and references provide the information necessary to achieve the objectives; the study questions allow readers to test their understanding of the material and their mastery of the objectives. Physicians who wish to claim CME credit for this educational activity may do so online by following the instructions at the end of the book.

**Conclusion**

The Basic and Clinical Science Course has expanded greatly over the years, with the addition of much new text, numerous illustrations, and video content. Recent editions have sought to place greater emphasis on clinical applicability while maintaining a solid foundation in basic science. As with any educational program, it reflects the experience of its authors. As its faculties change and medicine progresses, new viewpoints emerge on controversial subjects and techniques. Not all alternate approaches can be included in this series; as with any educational endeavor, the learner should seek additional sources, including Academy Preferred Practice Pattern Guidelines.

The BCSC faculty and staff continually strive to improve the educational usefulness of the course; you, the reader, can contribute to this ongoing process. If you have any suggestions or questions about the series, please do not hesitate to contact the faculty or the editors.

The authors, editors, and reviewers hope that your study of the BCSC will be of lasting value and that each Section will serve as a practical resource for quality patient care.
Upon completion of BCSC Section 1, Update on General Medicine, the reader should be able to

- describe the various factors to consider in critically reviewing clinical research
- explain the importance of the randomized, controlled clinical study in evaluating the effects of new treatments
- describe the classification, pathophysiology, and presentation of diabetes mellitus, as well as the diagnostic criteria for this disease
- describe the various therapeutic approaches for diabetes mellitus, including new insulins and oral agents
- classify the levels of hypertension by blood pressure measurements
- list the major classes of antihypertensive medications and some of their characteristics and adverse effects
- discuss the indications for dietary and pharmacologic treatment of hypercholesterolemia
- describe the various diagnostic procedures used in the evaluation of patients with coronary artery disease
- state the current treatment options for ischemic heart disease, heart failure, and cardiac arrhythmias
- list the common causes of stroke in patients encountered by ophthalmologists
- distinguish between obstructive and restrictive, reversible and irreversible, pulmonary diseases, and give examples of each type
- discuss the major behavioral disorders and possible therapeutic modalities for these conditions (including the ocular adverse effects of psychoactive medications)
• list some of the factors associated with a patient’s adherence or nonadherence to medical regimens

• explain the rationale for and value of screening programs for various systemic diseases

• discuss the major disease processes affecting most of the adult population, and briefly explain how preventive measures may reduce the morbidity and mortality that these diseases cause

• list the most prevalent types of cancer for men and for women together with the appropriate screening methods for detecting them

• describe current concepts about the etiologies of most malignancies

• describe traditional as well as more novel approaches to the treatment of various types of cancer

• describe the ophthalmic manifestations of the major systemic diseases covered in this volume

• list the most common human pathogens and their manifestations

• discuss the epidemiology, clinical features, and treatment of human immunodeficiency virus infection

• list the newer antiviral, antifungal, and antibacterial agents and their benefits and adverse effects

• describe the early manifestations and treatment of malignant hyperthermia

• describe the current American Heart Association guidelines for performing cardiopulmonary resuscitation