Association of Schools and Colleges of Optometry

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Focus on the President
An interview with ASCO's new president, Leland W. Carr, O.D.

Trends in Optometric Clinical Teaching Methodology: Instructor Usage and Student Perception of Effectiveness
Dorothy Bazzinotti Tolls, O.D., F.A.A.O.
Nancy B. Carlson, O.D., F.A.A.O.
Roger J. Wilson, O.D., F.A.A.O.
Survey data was gathered from preceptors and students to determine which educational activities, both in and out of the exam room, occur at the clinical affiliates of The New England College of Optometry and to determine if a pattern of use exists between program years. The authors also explore the effectiveness of these educational activities on learning from the students' perspective.

Clinical Models Within the Illinois College of Optometry
Geoffrey W. Goodfellow, O.D., F.A.A.O.
Janice Scharre, O.D., M.A., F.A.A.O.
The authors summarize eleven major clinical models and their roles at the Illinois Eye Institute and externships of the Illinois College of Optometry.

Trends in Student Enrollment and Applications
An ASCO Staff Report.

Editorial
Clinical Education - A Look Back and a Look Forward
Lester E. Janoff, O.D., M.S.Ed., F.A.A.O.

ASCOTECH
Is PowerPoint Reaching Your Students?
Dominick M. Maino, O.D., M.Ed., F.A.A.O.
Geoffrey W. Goodfellow, O.D., F.A.A.O.
Co-Editors

Industry News

Calendar

Resources in Review
Ellen Richter Ettinger, O.D., M.S.
Communications Editor

Cover photo courtesy of The Illinois College of Optometry
Recently I celebrated the 50th reunion of my graduating class from Optometry College. On the flight back home I couldn’t help but reflect on how the profession has changed since I graduated. In 1953 we were not permitted to use diagnostic drugs, let alone therapeutics. In fact, we didn’t make a diagnosis about disease, just recognized it as present and referred it. If you would have asked me back then if I thought optometrists would one day be treating Glaucoma, I would have called you crazy. So what in our educational system has changed so dramatically?

My optometric education was a four-year program and even then I had courses in therapeutics, ocular disease and systemic disease. Although I was not required to undergo the more extensive pre-optometry education, the four-year optometry part was intense. I did spend more time in Vision Science lab and lecture and I probably devoted more time to optometric examination techniques and diagnostic systems like graphic analysis.

But I believe the real difference between 1953 and 2003 is in the clinical training that optometric students receive. In 1953 I graduated with one of the highest number of patient encounters in my class of 100 students. I had 30 complete eye exams, half of which were my relatives happy to have the chance to get a free eye exam. I rarely saw an ocular disease and certainly never treated one, although I did have a chance to observe the attending ophthalmologist. I never fit a contact lens on anyone other than a fellow student, and that lens was a scleral lens. Yes I did see patients in our orthoptics clinic, but only a few. The patient care that I did provide was not well supervised and clinical educators were often part-time employees just biding time until a better opportunity came along.

The two articles on clinical education featured in this issue show just how much clinical education has changed. Drs. Goodfellow and Scharre look at the different models of clinical education within the Illinois College of Optometry. They have identified eleven clinical models and their roles. In the other article Drs. Tolls, Carlson, and Wilson survey the educational activities that occur both within and outside the examination room at the clinical affiliates of The New England College of Optometry. They have attempted to identify useful clinical teaching methodologies that could be applied to different practice modalities.

Today our students are exceedingly well trained, our clinical preceptors are acknowledged educators, and the position of clinical instructor has gained status as a desirable occupation. The average graduate now has had numerous more primary care patient encounters than I had at graduation. The curriculum time devoted to clinical training has increased dramatically over the years. The type of settings our students are trained in now includes hospitals, departments of ophthalmology and private ophthalmology practices in addition to a variety of modern optometric care delivery systems. Students experience vast numbers of patient encounters where ocular disease is present and where they are directly involved in treatment. The students also provide care for a huge number of contact lens patients, low vision patients, and those requiring vision therapy. Optometry’s clinical education system is something to be proud of, but let’s not rest on our laurels. Instead, let these articles inspire us with ideas for identifying teaching activities that will further improve the state of clinical education in optometry.
It is clear that Microsoft's PowerPoint is the predominant presentation method in the classroom today. There has been an impetus over the last decade to move from the traditional transparencies, chalkboard, and projector slides to this newer electronic medium. Has this change been beneficial?

A recent study by Frey & Birnbaum (2002) revealed that PowerPoint has had a positive effect on lectures and that most students prefer PowerPoint to the blackboard. However, a hesitation to try something new, inadequate lecture room lighting, and time constraints give many optometric educators an excuse to cling to their carousel of slides and shiny plastic overheads.

There are always new educational technologies around the corner, but PowerPoint doesn't appear to be disappearing anytime soon. Dr. Victoria Manion Fleming, associate director of the Searle Center for Teaching Excellence at Northwestern University, has observed the impact of PowerPoint in the college classroom. "PowerPoint is like any other educational tool. Its value is intimately connected to how it is used. When used appropriately, it can be a vehicle for deep student engagement with the material."

With PowerPoint, complex concepts can be illustrated one piece at a time. Dr. Fleming says, "PowerPoint can facilitate the link between content and context. If material is structured with sensitivity to how students perceive and process information, it will almost always be a beneficial tool."

Some tips for creating effective PowerPoint presentations include:

- **Avoid placing too much text per slide.** The material on your slides should only be your main points and not everything you are going to say.
- **Use a simple background.** Complicated backgrounds detract from your message and take longer for your audience to absorb.
- **Use font sizes appropriate for your viewing audience.** For most lectures in a larger room, font sizes smaller than 36 points should be avoided.
- **Avoid the overuse of clip art.** Too many graphics can detract from the important text. Every figure or picture should serve a purpose.
- **Minimize the use of moving transitions.** Abundant slide movement may distract the audience and focus their attention away from your spoken words.
- **Avoid the use of ALL CAPS.** It is more difficult to read text in all caps.

There are additional advantages to using PowerPoint. These presentations can be placed on the Internet or on a CD so that the student can review the information whenever they have a need to do so. Many schools now have off campus externship programs.

These institutions recognize that didactic education can occur even if the student is not physically located at the school or college of optometry. Using PowerPoint for distributed learning makes this possible.

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### Internet Resources for Using PowerPoint

- **Free PowerPoint Templates**
  - [http://www.soniacoleman.com/templates.htm](http://www.soniacoleman.com/templates.htm)
  - [http://www.graphicsland.com/powerpoint-templates.htm](http://www.graphicsland.com/powerpoint-templates.htm)
  - [http://presentations.animfactory.com/](http://presentations.animfactory.com/)
  - [http://www.brainybetty.com/index1.htm](http://www.brainybetty.com/index1.htm)

- **Presentation Pointers**
  - [http://www_presentersuniversity.com/index.cfm](http://www_presentersuniversity.com/index.cfm)

- **Creating PowerPoint Presentations from Word Outlines**

- **Additional PowerPoint Links**
Leeland W. Carr, O.D., began a one-year term as ASCO’s president on June 18, 2003, when the gavel was passed from ASCO’s previous president, David S. Loshin, O.D., Ph.D. Dr. Carr has been dean of the College of Optometry at Pacific University in Forest Grove, Oregon, since 1997.

Dr. Carr received a B.S. in Medical Technology at Michigan State in 1976. He pursued further education at Ferris State University, receiving an O.D. degree in 1981.

After short stints in contact lens research at Dow-Corning and in private practice in Michigan, Dr. Carr served as tenured faculty at Northeastern State University in Tahlequah, Oklahoma, from 1984-1993.

He has taught numerous courses in primary care, ocular disease and ocular pharmacology. He has authored or coauthored numerous journal articles, five textbook chapters, and is co-editor of a text covering the use of laser technology in primary eye care.

Dr. Carr is a consultant to the Accreditation Council on Optometric Education (ACOE) and has been named a senior residency consultant. He is a member of the Professional Optometric Degree Program Committee of the ACOE. He was named Oregon Optometric Physicians’ Association OD of the Year for 2000. In 2001, he was presented with the Special Service Recognition Award by the Oregon Optometric Physicians Association.

Dr. Carr was interviewed recently by Patricia O’Rourke, managing editor of Optometric Education.

**OPTOMETRIC EDUCATION:** Dr. Carr, you have indicated your desire to expand ASCO’s efforts to work with the American Optometric Association (AOA) and the American Optometric Student Association (AOSA). How do you see these three groups working more closely together?

_Carr:_ It is apparent to me that Optometry is currently faced with a number of challenges and opportunities that can best be addressed through a coordinated, cohesive, and collaborative approach. If there was a positive fallout from the recent A.B.O.P. fiasco, it was an understanding that our vulnerability lies in fragmentation and infighting. Optometry is strong as long as it is unified. To me the “critical cogs” in the workings of the profession are its current practitioners, its future practitioners, and the educational process that joins them. I consider that the interests of the practitioners are broadly and inclusively represented by the AOA, and the interests of the students by the AOSA.

Clearly ASCO is the organization that links and binds the schools and colleges, and that means it represents education, training, mentorship, and role-modeling. Because AOA, AOSA, and ASCO ultimately share many threads of common interest, it makes sense to try and connect their energies and resources for the good of the profession. It has been rewarding to find that the leadership in both AOA and AOSA appears to share my view, and leaders of both organizations have expressed a desire to see more effective communication and more effort spent on linking our strategic initiatives. Ultimately we are all committed to advancing patient care by advancing the profession. Together, we can have more of an impact.
OPTOMETRIC EDUCATION: I know that you are particularly interested in genomics research. Could you describe what you see as ASCO’s role in this area?

Carr: The Human Genome Project and the entire area of genetic medicine will revolutionize the delivery of health care. The way we currently diagnose and treat anomalies categorized as “disease,” “condition,” or “dysfunction,” will all need to be changed. Our entire paradigm on clinical thinking will need to shift. New insight, new science, new technology, and new technique are the only sure things I can say about optometric practice in the years 2005, 2010, 2020, and beyond. Either the profession will continually reeducate and retrain itself, or we will be left in the dust of some other profession that will.

I see ASCO’s immediate role as an awareness builder. We need to get “the word” out to the optometric community through its leadership, its practitioners and its students. Shortly thereafter, I see ASCO facilitating the process that prepares our educators to teach both fundamental and advanced competencies needed to survive in this coming new era. We need a faculty, a curriculum, residency programs, and continuing education programs that support the necessary incorporation of genomics into Optometry.

OPTOMETRIC EDUCATION: What other key issues will you emphasize during your term as ASCO president?

Carr: I think ASCO’s strategic priorities are consistent with what I see as the key issues needing to be addressed in order to move ahead in meeting challenges and in taking advantage of opportunities. We need to work with AOA and AOSA in moving beyond the current emphasis on career promotion to the broader level of promotion of the profession as a whole. We need to be part of a concerted effort to emphasize, restore, and elevate morale and pride for all optometrists. We need to work collaboratively to uphold standards, ethics, responsibility, and open accountability across the profession. This is how Optometry can retain control over its own destiny.

ASCO must work effectively with AOA, AOSA, and other key stakeholders including the Association of Regulatory Boards in Optometry (ARBO), in ensuring competence at the entry, continuing, and advanced competency levels. We need to use our network of affiliated postdoctoral residencies as vehicles for the transmission of the “beyond entry-level training” that ultimately justifies a credential signifying that advanced competence has been attained.

And finally, ASCO must work effectively with AOA and AOSA in making sure that scope of practice and financial issues don’t stand in the way of future optometrists’ right to a meaningful, enjoyable, and rewarding career. 1) We must deliver learning opportunities to master the thinking and performance skills needed for contemporary practice. 2) We must assist passionately in the efforts to advance our legislation and scope of practice appropriately—even as we assist aggressively in all necessary efforts to protect the established and traditional elements of Optometry. In that regard, we must identify and pull out the common elements of our varied curricula, publish that information, and have the courage to call it what it is: the core curriculum in Optometry. 3) We must do something about the cost of education, testing, and licensure in optometry. 4) We must combine our energies and efforts to confront the challenge of educating skilled clinicians who are also able to think, act, and eventually be compensated like outstanding business leaders.

OPTOMETRIC EDUCATION: Who were the people who influenced the development of your educational and administrative ideas?

Carr: You need to understand that my life has been blessed in many ways, and on many levels. Among the blessings I value most are the wonderful people who have connected with me, and who have affected my beliefs, thoughts and actions. Many of those influential people, I’m proud to say, have connected with me through Optometry. Dr. Jack Bennett is one of my greatest heroes; he was a great man, a great clinician, a great dean, and a great role model. And I would have to say that Drs. Lesley Walls, George Foster, Doug Penisten, and Stan Yamane, rank right there with him.

Drs. Larry Clausen, Gerald Lowther, and Jack Richman have also been highly influential, and I can’t leave out thought-provoking collaborations I’ve had with Drs. Linda Casser, Lynn Cyert, Ken Eckland, Nada Lingel, John Smith and Robert Yolton. These colleagues gave me opportunities and they taught me how to both “do” and “love” Optometry. They showed me that humility, humor and the ability to trust bright people to make their own decisions is important. They showed me that being a leader means helping people to get the most from themselves, while making them feel good about the effort they are putting forth. Leadership is not management. You don’t need to tell people what to do in order to get them to do what ultimately is the best thing. Bright people are capable of finding their own way to the endpoint that works. I would also have to add that the wonderful faculties, staff, students, and patients who have chosen to confide in, trust and both support and chastise me, have all had a major impact.
Vision and Commitment

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Vistakon Supports
"The Eyes Have It" Program

Vistakon®, Division of Johnson & Johnson Vision Care, Inc., recently provided ASCO with an educational grant to support "The Eyes Have It" career promotion program for another year. The funding was for the third year of a three-year total grant. The goal of the program is to increase optometry's national application pool to three applicants for each first year position and to develop an applicant pool that reflects the diversity of the U.S. population.

Specific program activities for the third year of the grant include a focus on promoting optometry as a career, a focus on career promotion to underrepresented minority groups, a focus on Web-based career promotion and outreach and a focus on national, state and student optometric leaders.

With funding from previous years of the grant, ASCO developed a career promotion exhibit booth, a CD Rom and a video clip for the ASCO Web site.

Vistakon® pioneered the concept of disposable contact lens wear in 1987 with the introduction of ACUVUE® Brand Contact Lenses. Vistakon®, headquartered in Jacksonville, Florida, provides a family of products to meet vision care needs.

The program currently has close to 1000 optometrists as members; participating optometrists receive materials for interested patients and their parents, tips on how to "reach out" and periodic updates on the applicant pool. Interested optometrists can sign up at ASCO's Web site at www.opted.org/career_corps.cfm

The “Each One, Reach One” campaign utilizes optometrists to help promote and publicize the benefits of optometry as a career to their patients and/or prospective students. A study of incoming students to the schools and colleges of optometry had indicated that the majority of students indicated that their decision to choose optometry as a career was due to the encouragement of a practicing optometrist.

(Continued on page 10)
Industry News
(Continued from page 9)

since the company went public on the NYSE in March 2001.

Volk Optical Exhibits at ESCRS Congress

Volk Optical, the industry leader in aspheric optics, exhibited at the Annual Congress of the European Society of Cataract and Refractive Surgery, September 6-10 at the International Congress Centre in Munich, Germany.

In addition to Volk’s line of diagnostic Slit Lamp Lenses, Gonio Lenses, BIO Lenses and SuperSeries Lenses, there were several recent additions to the company’s lens offerings. The Digital 1.0x slit lamp lens for reduced glare during diagnosis and image capture and the new AutoClaveSterilizable (ACS) clariVit lenses were on display. Also new is the Chalam line of surgical lenses that provide direct images, feature a self-stabilizing vitrectomy (SSV®) design for sutureless, assist-

tant-free surgery and are compatible with steam sterilization. To order or obtain more information about Volk products, visit www.volk.com or phone Volk direct at (800) 345-8655.

Marchon Eyewear Launches Suncenter

Marchon Eyewear announced the launch of Suncenter, the first virtual sunglass chain in the world. Marchon designed the Suncenter program to help optical professionals build a better sunwear business, and to increase growth within the sunglass market.

When accounts join the Marchon Virtual Suncenter chain, they receive the necessary tools to help build their sunwear business. The tool box includes: fashion, luxury, lifestyle and sports brands, point-of-purchase materials, signage and merchandising programs, marketing strategies and promotions, staff training and incentives, and 24-hour access to www.Suncenter.com. Marchon Eyewear, headquartered in Melville, N.Y., is one of the world’s largest privately owned designers, manufacturers, and distributors of fashion and technologically advanced eyewear and sunwear.

Safilo Announces Giorgio Armani Collection

With a formal unveiling at Vision Expo West, Safilo announced the relaunch of the Giorgio Armani Occhiali Collection. According to Safilo, this is a collection of eyewear that reflects the world-renowned designer’s sophisticated, signature style. Combining contemporary design with a classic feel, the product styling is geared to women, 30-45, and men, 30-55, who are urban, affluent, sophisticated and self-confident. The Collection features a predominance of rectangular eye shapes in traditional, soft and shal-

tlow silhouettes. Most styles can accommodate progressive lenses. For more information, contact Safilo at their Web site, www.

ASCO Calendar

• ASCO MINI-SYMPOSIUMS
  "Grant Opportunities in Optometry" - Morning
  "Integrating Ethics & Professionalism" - Afternoon
  October 16
  Hilton Portland & Executive Tower
  Portland, Oregon
  Contact: Mary Eastman*

• ASCO EXECUTIVE COMMITTEE MEETING
  October 16 - Evening
  Hilton Portland & Executive Tower
  Portland, Oregon
  Contact: Marty Wall*

• ASCO BOARD OF DIRECTORS MEETING
  October 17 - 18
  Hilton Portland & Executive Tower
  Portland, Oregon
  Contact: Mary Eastman*

• ASCO MEETINGS at American Academy of Optometry
  Hyatt Regency Dallas
  Dallas, Texas
  Contact: Mary Eastman*

  Friday, December 5
  Residency Educators (7:30 a.m. - 11:00 a.m.)
  Development Directors (8:00 a.m. - 12:30 p.m.)
  Binocular Vision & Perception Educators (7:30 a.m. - 9:00 a.m.)
  Ethics Educators (12:00 p.m. - 2:00 p.m.)

  Saturday, December 6
  Continuing Education Directors (7:00 a.m. - 9:00 a.m.)
  Optometric Informatics (8:00 a.m. - 12:00 p.m.)
  Chief Academic Officers (1:00 p.m. - 3:00 p.m.)
  Vision Science Librarians (1:00 p.m. - 5:00 p.m.)

  Sunday, December 7
  Vision Science Librarians (9 a.m. - 12 p.m.)
Trends in Optometric Clinical Teaching Methodology: Instructor Usage and Student Perception of Effectiveness

Dorothy Bazzinotti Tolls, O.D., F.A.A.O.
Nancy B. Carlson, O.D., F.A.A.O.
Roger J. Wilson, O.D., F.A.A.O.

Abstract

PURPOSE. How does effective clinical education happen in the patient care setting? There is little information available on types of clinical teaching methodology in optometry. This survey was designed to 1) assess which teaching activities are being used and how frequently; 2) determine if the use of specific activities varied from one program year to another; and, 3) examine how students perceived the effectiveness of teaching methods they observed. METHODS: A questionnaire including a checklist of 22 potential teaching activities was distributed to 271 students from the four-year degree program and 129 clinical faculty at all affiliated clinical sites of The New England College of Optometry for Academic Year 1999-2000. Students were also asked which methods were effective for learning. RESULTS: Responses were received from 235 (87%) of students and 87 (67%) of faculty. Ten methods had a consistent predominance of use. A similar pattern of use was reported for all program years. Students and preceptors reported a similar pattern but different magnitude of use, with preceptors reporting higher usage than students. Students found the same four methods most effective for learning that had the highest reported usage by preceptors. Four additional methods were added by both preceptors and students. CONCLUSION: Understanding the application of various teaching activities in the practice setting has potential advantages to faculty development and student learning. This study is important because it formally documents the use of clinical teaching methodologies in optometric education.

Introduction

There is increasing pressure on academic health care delivery systems to promote time efficient and cost-effective care while serving as a venue for the clinical training of future providers. Our understanding of how teaching and learning occur within the patient care setting is vital in reconciling these goals, yet specific teaching activities that occur within ambulatory care settings are rarely delineated in the literature.

The challenges that teaching clinicians encounter are well documented (time constraints, quality of patient care, productivity) as are the educational failures (lack of adequate supervision, lack of observation of students, little time for discussion) and the ethical quandaries (how far the student-clinician should proceed independently, when to step in and/or take over). Balancing diligent patient care while providing clinical education is a daunting task. Despite these challenges, preceptors (teaching clinicians, clinical instructors) are usually among a self-selected group who teach because they want to do so.

It has been widely reported in the health-proessions literature that clinical educators in patient care settings are often untrained in formal teaching skills. Most preceptors are chosen for their professional qualifications rather than their teaching abilities. Considerable learning occurs in the early career of the preceptor and many instructors model their teaching behaviors after those they experienced as students.

A variety of faculty development programs have been proposed to address these issues and enhance the quality of clinical education. Recommended strategies often focus on skills and behaviors such as (but not limited to):

- Creating a positive learning environment
- Assessing the learner's needs
- Asking probing questions and fostering clinical reasoning
- Providing positive reinforcement
- Correcting mistakes
- Assuring time for discussion
- Reflecting on teaching

There are also citations describing the attributes of effective and ineffective teaching behaviors, many of which emphasize the interaction between instructor and learner. "Good" teaching includes, among other things, being accessible, enthusiastic, and friendly, and answering questions clearly, sharing knowledge, and making time for discussion. Poorly rated instructors are caustic, ask questions in an intimidating manner, and humiliate students in front of patients.

"Although enthusiasm, role modeling, general knowledge, and clinical experience are important, they do not represent the entirety of clinical teaching." In addition to personal skills and behaviors, what are the other activities of clinical instruction? The minimal expectations include: facilitating student access to patient care, teaching practical skills, providing assessment and feedback, and role modeling professional behaviors and attitudes.

According to the medical literature, in many patient care settings the generally accepted learning process appears to be:

1. Student sees patients alone and makes an assessment
2. Student presents findings and discusses them with the preceptor
3. Preceptor then sees patients with the student
4. Preceptor coaches student on the management and plan

But how is teaching actually implemented? What techniques, methods, and activities are used in the exam room versus in a conference room, or patient oriented versus didactic?

There is still little formal documentation about the actual process of clinical instruction within the practice setting. Assuming that the preceptor possesses the requisite behaviors and skills of the effective teacher, how does clinical education occur? Are there commonly employed methods and teaching activities? Although references to specific techniques are scattered throughout the health-professions literature, to date there appears to be no definition of widely adopted clinical teaching activities or their practical application.

This study was undertaken to determine which educational activities, both in and out of the exam room, occur at the clinical affiliates of The New England College of Optometry and to determine if a pattern of use exists between program years. The authors also explore the effectiveness of these educational activities on learning from the students' perspective.

Methods

Questionnaires describing 22 possible clinical teaching methods developed by teaching clinicians at the College were sent to 129 clinical preceptors and to 271 students from the four-year degree program at The New England College of Optometry (NEWENCO) for Academic Year 1999-2000. Preceptors included all clinical instructors (faculty, credentialed optometrists, and optometric residents) in all affiliated patient care settings (community health centers, VA clinics, outreach programs, referral centers, and private practices) attended by NEWENCO students. Students included second through fourth year students in the four-year degree tract, denoted OD2, OD3 and OD4 respectively. Although there are other specialized, accelerated degree tracks at NEWENCO, survey data from these students was not considered for two reasons: 1) the number of enrollees is extremely small; and 2) they are from such varied clinical and bio-science backgrounds that much of the teaching, both didactic and clinical, is tailored to individual need. Therefore, statistical comparisons between degree tracts were not practical and we chose to look at the quantitative data from the four-year degree tract exclusively.

The list of teaching methods was hypotetical, not drawn from reference sources or guidelines but suggested by teaching faculty at the College (see Appendix). Thirteen of the 22 teaching methods on the questionnaire were found described in medical and health professions literature.16,17,18 Among these references eleven other techniques not listed on the questionnaire are also cited. These include methods used to increase time efficiency such as having the student do the charting,16-18 having the student present in the exam room in front of the patient,6,18 orienting the student to each patient in advance,6,18 and using prepared curriculum or teaching scripts to apply to specific patient conditions.13-14 Methods suggested to foster clinical reasoning included having the student devise the assessment and management plan independently and preceptor modeling of clinical reasoning and explaining strategies.6,18 Videotaping was occasionally recommended for student assessment, instructor assessment, and teaching practical concepts.5,12,15 The use of simulated patients19 and role playing20 was also suggested. Two other methods, clinic orientation and student self-assessment,2 were also among the additional methods offered by faculty in our survey.

The preceptors were asked to indicate via a checklist whether the listed methods were "routinely used," "occasionally used," or "not used" by them in their clinical setting. Separate questionnaires were required for each class of students they supervised. Input was also requested on any additional methods used. Students in the seven classes received a similar questionnaire and were asked how each method was used in their overall clinical experience during the past year (1999-2000). Students were also asked to indicate whether or not they perceived each technique to be "effective" or "not effective" for student learning (if neither was indicated the response was interpreted as "no answer").

Results

Questionnaires were returned by 87 (67.4%) of the preceptors and 235 (86.7%) of the students solicited. Because many preceptors instruct students in several program years and returned separate surveys for each year, the number of preceptor responses is greater than the number of actual respondents. (See Table 1)

Predominance of Use

Predominance of use by preceptors was examined to determine whether certain methods are more commonly used than others. Fifty percent usage of a method was arbitrarily chosen to define predominance; use for each method was established by averaging the percentage of each frequency of use and identifying which occurred 50% or more of the time. If no predominant frequency of use was evident, the method was categorized as having variable or mixed usage. Table 2 contains the data from this analysis for the three classes in the four-year degree program. The methods with an apparent predominance are as follows:

Routine Use
- Rechecking Health Assessment
- Chart Review/discussion
- Case Presentation
- General Questioning
- Direct Observation of Student
- Patient Education by Preceptor

<table>
<thead>
<tr>
<th>Degree Program</th>
<th>Program Year</th>
<th>Student Responses</th>
<th>Preceptor Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four-Year Degree Tract (Patient care starts in second year)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD2 (n=92)</td>
<td>85 (92%)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>OD3 (n=91)</td>
<td>66 (72%)</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>OD4 (n=88)</td>
<td>84 (95%)</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>Total Responses</td>
<td>235 (87%)</td>
<td>111</td>
<td></td>
</tr>
<tr>
<td>Total Respondents</td>
<td>235</td>
<td>87 (67%)</td>
<td></td>
</tr>
</tbody>
</table>

*Overall preceptor response rate was 67% (n=129); many preceptors supervise multiple student groups and submitted questionnaires for each so response rate was not determined.
Occasional Use
- Rechecking non-Health Findings
- Preceptor Demonstration
- Assigned Reading
- Follow up Questioning
- Not used
- Withholding Patient Records
- Journal Club
- Record Audit
- Patient Education by Student
- Segmented Examination
- Written Assignments

The use of the remaining methods was variable.

Pattern of Routine Use between Program Years
To determine if the methods routinely used by preceptors changed as students acquired more clinical experience, the pattern of use was examined. Figure 1 lists clinical teaching methods routinely used by all affiliated preceptors. The methods are sorted by descending frequency of use according to fourth year preceptors (the largest number of respondents.) Except for four methods, the pattern of use was found to be similar between OD2, OD3 and OD4 students. The exceptions were Follow Up Questioning, Patient Education by Student, and Record Audit, which increased as students progressed from novice to advanced clinicians, while the use of Direct Observation of Students declined as students advanced.

Exam Room vs. Conference Room vs. Didactic Teaching
Of the 22 methods initially listed, ten are likely to occur in the exam room with the patient, five are more likely to be used away from the patient (i.e. in a “conference room”), and seven represent didactic exercises. These classifications were not identified on the questionnaires. They are denoted by the codes E, C, and D respectively on Figure 1. As is evident in this graphic representation, conference room teaching techniques were skewed toward more routine use, didactic exercises were skewed toward less routine use, and exam room techniques were distributed across all levels of routine use.

Comparison of Preceptor and Student Responses
Figure 1 also depicts the responses of students compared to those of the preceptors for each program year in the four-year degree tract. The frequency of use of all methods ranged from 0-100% according to all preceptors and from 0-98% according to all students. The discrepancy between preceptors and student responses ranged from 0-82%, 3-79%, and 1-36% for second, third, and fourth year students respectively—a notable decline in disparity with student advancement. It must be acknowledged that the number of possible preceptors also varies greatly between the second and fourth year making this comparison somewhat less reliable. Students and preceptors reported a similar pattern of routine use. However, for most methods students reported a lower magnitude of use than did preceptors.

Student Perception of Effectiveness
Table 3 contains the student responses about the effectiveness of methods. Students from all three classes (OD2, OD3, OD4) perceived the same five methods as being most effec-

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Table 2a Percentages of Use of Methods Reported by Preceptors for AY 1999 – 2000*

<table>
<thead>
<tr>
<th>PREDOMINANT USE: ROUTINE</th>
<th>PREDOMINANT USE: OCCASIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method Type</strong></td>
<td><strong>Tract /Yr</strong></td>
</tr>
<tr>
<td><strong>Recheck Health</strong></td>
<td><strong>OD2</strong></td>
</tr>
<tr>
<td><strong>Assessment</strong></td>
<td><strong>OD3</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD4</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Avg</strong></td>
</tr>
<tr>
<td><strong>General Questioning</strong></td>
<td><strong>OD2</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD3</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD4</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Avg</strong></td>
</tr>
<tr>
<td><strong>Case Presentation</strong></td>
<td><strong>OD2</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD3</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD4</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Avg</strong></td>
</tr>
<tr>
<td><strong>Chart Review Discussion</strong></td>
<td><strong>OD2</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD3</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD4</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Avg</strong></td>
</tr>
<tr>
<td><strong>Direct Observation of Student</strong></td>
<td><strong>OD2</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD3</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD4</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Avg</strong></td>
</tr>
<tr>
<td><strong>Chair-side Instruction</strong></td>
<td><strong>OD2</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD3</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD4</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Avg</strong></td>
</tr>
<tr>
<td><strong>Patient Education by Preceptor</strong></td>
<td><strong>OD2</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD3</strong></td>
</tr>
<tr>
<td></td>
<td><strong>OD4</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Avg</strong></td>
</tr>
</tbody>
</table>

*Predominance of use for each method based on average use response of 50% or greater.
had higher "effective" than "not effective" ratings. A change analysis shows Patient Education by Preceptor, still Direct Observation of Student and usage was not as consistent, as is evident routine use. Among methods most Demonstration. The first four are independent in Figure 1. Two of these methods, often ranked "not effective," students Health Assessment, Chart Review/ discussion, Case Presentation, General Correspondence with frequency of preceptor Input regarding the use of any additional methods. Methods cited by pre­ preceptors increases dramatically from second through fourth year, making the quantitative data in the fourth year potentially more reliable.

## The Teaching Methods List

The list of possible teaching techniques used in this survey was devised by teaching clinicians affiliated with the College. These methods (described in the Appendix) focus on the hands-on techniques of clinical teaching and do not address individual behaviors or interpersonal interactions between teacher and learner. Some degree of routine use was indicated by all fourth year clinical affiliates for every method, and only four additional teaching methods were added by all participating preceptors. This suggests that the list is likely to be both valid and comprehensive among the affiliates of The New England College of Optometry. However, it is feasible that there are other methods in use since one third of affiliated preceptors did not respond. It is possible that many of the other techniques cited in the literature are also employed within optometry.

### Table 2b Percentages of Use of Methods Reported by Preceptors for AY 1999 – 2000*

<table>
<thead>
<tr>
<th>Method Type</th>
<th>VARTABLE/ MIXED USE</th>
<th>Method Type</th>
<th>VARIABLE/ MIXED USE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tract / Yr</strong></td>
<td><strong>Tract / Yr</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD2</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>OD3</td>
<td>91</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>OD4</td>
<td>76</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>Avg</td>
<td>89</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td><strong>Journal Club</strong></td>
<td><strong>Journal Club</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD2</td>
<td>71</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td>OD3</td>
<td>82</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>OD4</td>
<td>57</td>
<td>26</td>
<td>17</td>
</tr>
<tr>
<td>Avg</td>
<td>70</td>
<td>24</td>
<td>6</td>
</tr>
<tr>
<td><strong>Record Audit</strong></td>
<td><strong>Record Audit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD2</td>
<td>57</td>
<td>43</td>
<td>0</td>
</tr>
<tr>
<td>OD3</td>
<td>73</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td>OD4</td>
<td>56</td>
<td>18</td>
<td>26</td>
</tr>
<tr>
<td>Avg</td>
<td>62</td>
<td>22</td>
<td>16</td>
</tr>
<tr>
<td><strong>Patient Education by Student</strong></td>
<td><strong>Patient Education by Student</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD2</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>OD3</td>
<td>41</td>
<td>45</td>
<td>14</td>
</tr>
<tr>
<td>OD4</td>
<td>30</td>
<td>36</td>
<td>34</td>
</tr>
<tr>
<td>Avg</td>
<td>57</td>
<td>27</td>
<td>16</td>
</tr>
<tr>
<td><strong>Segmented Examination</strong></td>
<td><strong>Segmented Examination</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD2</td>
<td>29</td>
<td>57</td>
<td>14</td>
</tr>
<tr>
<td>OD3</td>
<td>63</td>
<td>32</td>
<td>5</td>
</tr>
<tr>
<td>OD4</td>
<td>67</td>
<td>26</td>
<td>7</td>
</tr>
<tr>
<td>Avg</td>
<td>53</td>
<td>38</td>
<td>9</td>
</tr>
</tbody>
</table>

*Predominance of use for each method based on average use response of 50% or greater.

### Discussion

Providing clinical education in conjunction with quality patient care is an essential part of health professions education. In order to enhance the quality of clinical teaching at The New England College of Optometry, the authors sought to first understand the basic elements of clinical teaching strategies and methodologies.

In our investigation one noteworthy point about our clinical curriculum should be made. During the time of the survey, academic year 1999-2000, the clinical program in the four-year degree tract began in second year. The time spent in patient care as well as the number of clinical venues and possible preceptors increases dramatically from second through fourth year, making the quantitative data in the fourth year potentially more reliable.

### Additional Methods Solicited

The survey also solicited subjective input regarding the use of any additional methods. Methods cited by preceptors as in use and suggested by students are as follows:

<table>
<thead>
<tr>
<th>Preceptors</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>Slide Review</td>
</tr>
<tr>
<td>Quizzes and Examinations</td>
<td>Goal Setting</td>
</tr>
<tr>
<td>Student Self-assessment</td>
<td>Practice on Preceptor</td>
</tr>
<tr>
<td>Peer Teaching</td>
<td>Peer Teaching</td>
</tr>
</tbody>
</table>

For student learning: Rechecking Health Assessment, Chart Review/discussion, Case Presentation, General Questioning, and Preceptor Demonstration. The first four are indicated by preceptors as having the highest routine use. Among methods most often ranked "not effective," students agreed on four. However, the correspondence with frequency of preceptor usage was not as consistent, as is evident in Figure 1. Two of these methods, Direct Observation of Student and Patient Education by Preceptor, still had higher "effective" than "not effective" ratings. A change analysis shows the percent change in methods considered effective between OD2 versus OD4 students.
indicate that “conference room” techniques are skewed toward the most routine use even though fewer teaching options were classified as conference room techniques. This may have a practical base — all of the conference room activities are useful for student evaluation and identification of teaching opportunities and therefore facilitate both formative and summative assessment. However, the same may be said for many of the exam room methods making it difficult to explain the infrequent use of some techniques. Perhaps it is due to inconvenience or time constraints in the clinic.

Predominance and Pattern of Use of Teaching Methods

The preceptors in this survey appeared to use specific methods for routine use, occasional use, or disuse across the overall clinical program. This suggests that there are indeed accepted core methods among various optometric clinical teaching environments. If so, how did this consensus occur? It has been postulated that preceptors use techniques they consider more important more often, and indeed that was an underlying assumption of this survey. It would appear from our results that students and preceptors both feel the four methods used most frequently are the most effective. Is it purely intuitive which methods are more efficacious in the patient care setting?

When looking at the common predominance profile for routine use (Table 2), there is certainly inherent value in the four highly ranked techniques. Rechecking the health assessment findings of an unlicensed student clinician, both to evaluate student skill and to ensure quality of patient care (not to mention protecting the attending optometrist’s license), seems an obvious requirement of education in a patient care setting. Case Presentation has been considered “the pivotal interaction between the teacher and the learner” in clinical education. Case presentation, probing questioning, and case discussion have been commonly described as tools both for assessing students’ knowledge and reasoning skills and for identifying teaching opportunities and direction.

Of the techniques that fell into the “predominantly not used” category, all but one still had reports of occasional and routine use. That exception, Withholding Patient Records from the student until the end of the exam (presumably to foster student independence and accuracy), was rarely done. Moreover, when the results of this study were discussed at the College’s annual preceptor conference in 2001, many preceptors not only considered it educationally ineffective but contraindicated for quality patient care. It might be interesting to know...
why the other methods are so infrequently used as well, especially in the case of the Segmented Examination in which students would perform only portions of the examination while the preceptor completed others. Theoretically, this should help decrease overall patient exam time and thus increase clinic productivity, yet despite time conflicts, most preceptors do not resort to this on a regular basis—at any level of student competence. In the balance between ensuring quality of care and advocating for student experience, one would expect this technique to facilitate both objectives if used in a stepped fashion, i.e., more for the novice student clinician and less for the experienced student clinician.

Finally, the occasionally or variably used techniques are likely to be based on specific factors such as student learning needs (Assigned Reading, Direct Observation), patient or condition related opportunities (Preceptor Demonstration, Patient Education by Student), or site-dependent curriculum (In-house Workshops, Student Group Presentation). Teaching and learning goals should be determined by the practice setting and the timing of clinical experience. Unfortunately, though our study attempted to identify progress-specific trends, it did not distinguish between the types of practice settings involved.

One technique in this category deserves special mention—that of Direct Observation of the Student by the preceptor. Though this would seem the definitive method for assessing a student’s examination technique, patient interaction, and efficiency, it has been widely considered a woefully underutilized tool. Some of the disadvantages of observation by an instructor are that it is time consuming, creates anxiety in the learner, and alters the relationship between the student and patient. In this survey, the use of observation shifted from predominately routine use to predominately occasional use as students progressed, but very few preceptors reported not using this technique.

Comparison Between Preceptor and Student Responses
Comparing student and instructor responses was not an initial goal of this study. However, the disparities between the responses were not always consistent, with some methods showing a greater than expected agreement between the preceptor and student (OD2 vs OD4), while others showed a greater than expected disagreement (OD2 vs OD4 vs OD3). This highlights the need for further investigation into the reasons behind these differences and the implications for teaching practices.
Student Perceptions of Teaching Method Effectiveness

When comparing the responses of the second year students to the fourth year students, there was a marked change (greater than 45%) of opinion about the effectiveness for nine methods. Only one of these, having to perform a segmented or partial examination, was considered less effective for student learning as students progressed. One might expect advanced students who are trying to hone their time efficiency and overall patient management skills to find this activity a nuisance. The methods found more effective as students advanced prompt closer examination.

The eight activities which seemed more valuable to learning as student clinicians progressed were: Assigned Reading, In-House Workshops, Journal Club, Group Discussion, Student Group Presentation, Writing Assignments, Patient Education by the Student, and With-holding Patient Records. Of these, the first six are largely didactic. Perhaps they are more valuable because fourth year students are engaged in patient care nearly full-time and have fewer didactic learning opportunities than the second year students. It is interesting to note that these techniques are skewed toward less routine use by preceptors despite the increased value for advanced students. The last two methods, which pertain directly to patient care, may be more appreciated due to students’ increased clinical confidence. Among the principles of adult learning are the concepts that learners must perceive a need to learn, select their learning experiences, and apply new skills and knowledge immediately. Perhaps as student clinicians are able to apply their own clinical experiences to learning they begin to shift from pedagogic to androglogic learning skills. Irby found that advanced students took more responsibility for their education and wanted more information and feedback. His 1995 report strongly advocates regular programming of didactic activities to augment clinical learning.

In contrast, while other studies have shown that senior student clinicians appreciate the learning effectiveness of observing or shadowing preceptors or other doctors more than did novice clinicians, our findings did not agree. In fact, if anything, students in this survey perceived a marginal decline in learning effectiveness as this activity as they progressed. Given the importance credited to role modeling of professional behaviors and attitudes in the literature, this is a curious contradiction.

Are students’ opinions about teaching effectiveness even valid? It is certainly very compelling that all levels of students found that the most effective methods were the same as those that were most routinely used by preceptors. However, as Table 3 shows, the percentage of students who had no opinion (“no answer given”) about the effectiveness of many methods is significant and does not correspond well to the reported level of use by either students or preceptors. This implies that the perceived effectiveness of teaching is not entirely related to students’ experience with teaching methods.

Indeed, student perceptions about the effectiveness of any instructional technique may be colored by other attributes of teaching, i.e., interpersonal and communication skills. Students fear humiliation. In a survey of third year medical students, the method students considered the greatest hindrance to learning was the presentation of the case history and test results in front of patients due to its potential for embarrassment and loss of authority. While they want feedback and guidance, most student clinicians want it delivered in a non-threatening and respectful manner. Just as numerous reports have endeavored to increase instructors’ awareness of this fact, perhaps briefing students on the types of activities employed on their behalf would help them distinguish between teaching methodology and its delivery and enhance student learning.

Potential Applications and Limits of Study

There is no doubt that clinical instruction in the patient care setting is a multi-faceted task. Effective clinical teaching requires a solid grasp of basic teaching concepts, excellent interpersonal and communication skills, and a working knowledge of available education tools. Even with a defined curriculum and structured environment, teaching clinicians must constantly make extemporaneous instructional decisions based on individual learners’ needs and patient and site-specific opportunities. A body of practical and effective clinical teaching strategies, such as is described in this study, would be a vital tool in supporting realistic education delivery in clinical venues.

As this paper demonstrates, teaching activities fall into routine, occasional, and infrequent use. It is likely that the routinely used strategies are helpful in educating most students in most settings and that the occasionally used and not/infrequently used techniques are dependent on the degree of student/patient/site specificity. How should instructors choose among techniques? Davis’ simple model of the instructional system provides a basic platform to which relevant strategies can be applied:

- Write objectives and describe tasks (orientation to patient/clinic, group presentations...)
- Assess learner’s entry behavior (case presentation, recheck health and non-health findings, general questioning, direct observation of student...)
- Identify needed skills vs. possessed skills
- Design instructional modules (group discussion, in-house workshops, record audit...)
- Implement instruction with feedback and reinforcement (chairside instruction, chart review/discussion, follow-up questioning, patient education by preceptor, preceptor demonstration...)
- Conduct evaluation
- Revise instructional modules (assigned reading, timed examination sequence, student observes/shadow, written assignments...)

An immediate benefit of this tool is for use in the development and implementation of learning plans or contracts to facilitate an active learning
environment as well as to guide the progress of remedial students and to document educational support. A future application of this information would be to identify techniques that are more relevant in different practice modalities.

As an initial exploration of teaching methodologies, this study suffers from several significant limitations. First, it would be extremely helpful to understand the reasons behind the infrequent use of some methods. Are they ineffective or impractical? Second, what bearing does the type of practice setting have on the use of various techniques? Although we tried to differentiate methods used between program years, we did not track the types of clinic venues; i.e. community based health centers, Veterans Affairs medical facilities, surgical referral clinics, private optometric offices, screenings, and outreach/home care. Also, given the learning curve of most new preceptors, does the length of teaching experience influence the use of teaching methodologies? Lastly, without an existing tool to define the practical application of teaching strategies we could not examine outcomes for the success of various techniques that would validate their use or confirm students' perceptions.

While the need for further research and refinement in this area is clear, understanding the application of teaching methodologies will facilitate a mechanism for: 1) the training and development of clinical faculty, 2) the quality assessment of clinical teaching, and 3.) the development of measures linking teaching activities to learning outcomes. The importance of this study is that it formally documents the use of clinical teaching methodologies in optometric education.

Conclusion

In order to ensure quality clinical education in the patient care setting, the College has attempted to identify useful teaching methodologies that can apply to a variety of practice modalities. Surveying both faculty and students has elucidated trends in the clinical instruction of the College’s programs and student perceptions of their clinical experience. The four teaching methods most used by clinical faculty, Rechecking Health Assessment, Case Presentation, Chart Review/Discussion, and General Questioning, were also considered by students to be the most effective for learning. While a body of teaching activities and methodologies would aid both novice and experienced teaching clinicians, it is only one element in a triad of effective clinical instruction. When applied to the other two essentials of education—fundamental teaching and learning concepts and the behavioral attributes of effective instruction—the availability of a clinical teaching activity resource can enhance patient oriented clinical education.

References

## Appendix: Descriptions of Clinical Teaching Methods

**Assigned Reading:** Students are required to read specified texts, articles, or notes.*1,19

**Case Presentation:** Student presents findings to preceptor at end of exam.*2,3,6,18,19

**Chair-side Instruction:** Preceptor instructs student in the exam room with patient, also called Coaching.*9,18

**Chart Review Discussion:** Preceptor reviews case with student after patient has left.*1,20

**Direct Observation:** Preceptor observes student examining patients and/or performing techniques.*4,1,19,20

**Follow Up Questioning:** Preceptor re-questions student about previously recommended study topics.

**General Questioning:** Preceptor questions student about topic related to patient encounter and probes for extent of knowledge base and integration.*4,1,11,19

**Group Discussion:** Regularly scheduled group meetings, grand rounds, or preceptor presentations.*4

**In House Workshops:** Students learn new or site-specific techniques or advanced diagnostic skills or work on projects.

**Journal Club:** Students critique journal articles and present to each other for discussion.

**Patient Education - Preceptor:** Preceptor closes case with or without student present.*6

**Patient Education - Student:** Preceptor allows student to close case independently usually after discussion and review by preceptor.*6,19

**Preceptor Demonstration:** Preceptor demonstrates techniques to students. Also called observation of preceptor.*4,11,18

**Rechecking Findings - Health Assessment:** Preceptor rechecks anterior and posterior segment findings.

**Rechecking Non Health Assessment Findings:** Preceptor rechecks refraction, functional tests, case history, or entrance tests.

**Record Audit:** Students review records with specified guidelines for accuracy.

**Segmented Examination:** Student performs only specified segments of exam while preceptor completes others.*4

**Student Group Presentation:** Student makes a presentation to peers and preceptors. May also be considered peer teaching.*20

**Student Observing/Shadowing:** Student observes another doctor examining patients, either in house or external to clinical site.*2,18

**Timed Exam Sequence:** Student is given time limits for specified exam segment.

**Withholding Patient Records:** Records are withheld until end of exam to foster student accuracy and independence.

**Written Assignments:** Students are required to submit a written homework on an assigned topic.

* References to technique also found in health professions literature.
Clinical Models Within the Illinois College of Optometry

Geoffrey W. Goodfellow, O.D., F.A.A.O.
Janice Scharre, O.D., M.A., F.A.A.O.

Abstract

PURPOSE. Many clinical models are available to optometric educators. It is important to understand the full scope of these models when evaluating current curricula or when developing new clinical programs. Eleven major clinical models and their roles at the Illinois Eye Institute and externships of the Illinois College of Optometry are summarized. Striving to understand the transition from student to doctor benefits students, faculty, and patients.

Key Words: Clinical Models, Patient Care Models

Introduction

Many clinical models are available to optometric educators. It is important to understand the full scope of these models when evaluating current curricula or when developing new clinical programs. In an effort to achieve this understanding at the Illinois College of Optometry, the input of administrators, faculty, and students was assembled. The goal of this collaboration was to identify as many clinical models as possible and organize them into a hierarchical scheme. Little attempt was made to assess the advantages or disadvantages of the various models, although this will surely be the next step in the process of evaluating and modifying the current curriculum.

The Illinois College of Optometry (ICO) is a private optometry school located on the south side of Chicago. About 600 first through fourth year students and 50 faculty members participate in the program. Students complete their didactic coursework within the first three years of the program. First and second year students are exposed to clinic by observation within the Illinois Eye Institute (IEI), the clinical teaching facility of ICO. Formal patient care begins the third professional year in the Primary Eye Care Service. Fourth year is devoted exclusively to patient care in Primary Eye Care and the specialty services both on- and off-campus. On-campus specialty clinics include the Center for Advanced Ophthalmic Care, the Cornea Center for Clinical Excellence, Low Vision Rehabilitation, and Pediatrics/ Binocular Vision. Off-campus opportunities include five Chicago area satellite clinics and approximately 150 externship sites throughout the country.

The summary below identifies 11 major clinical models (Table 1) and their roles at the Illinois Eye Institute and externships of the Illinois College of Optometry.

Clinical Models Summary

The graphical representation of each clinical model often provides the clearest summary. Solid lines show direct or indirect patient care, while dotted lines denote observation. Lightly-shaded boxes represent optional participants.

Direct Patient Care Model

The Direct Patient Care Model (Figure 1) represents the most basic clinical model. A faculty member is providing independent patient care without student participation. Direct care allows IEI to remain profitable during periods of student absence. The model is currently reserved for student vacation weeks and other times when students are unavailable for patient care. This model also represents that brief early period in the curriculum when first year students are primarily focused on Basic Science and have minimal clinical interaction.

Preceptor Model with Single Student Observation

The first level of student participation involves observation. In the Preceptor Model with Single Student Observation (Figure 2), attention is focused on Student-1. This first or second year student has had minimal introduction to patient care; she may have learned some entrance tests or other basic skills. Observing another student performing these tests on an actual patient helps solidify the clinical application of these skills. In addition, Student-1 is introduced to the communication that exists between Student-2 and his precepting faculty member. However, Student-1 has no direct input in the care of the patient. Students are

Dr. Goodfellow is assistant professor of optometry at the Illinois College of Optometry.
Dr. Scharre is professor and dean/vice president for academic affairs at the Illinois College of Optometry.
Table 1: Clinical Model Summary

<table>
<thead>
<tr>
<th>Clinical Model</th>
<th>Student Involvement</th>
<th>Faculty Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Patient Care Model</td>
<td>None</td>
<td>0% Independent Clinician</td>
</tr>
<tr>
<td>Preceptor Model with Single Student Observation</td>
<td>Observation</td>
<td>Preceptor</td>
</tr>
<tr>
<td>Direct Care Model with Multiple Student Observation</td>
<td>Observation</td>
<td>Independent Clinician</td>
</tr>
<tr>
<td>Direct Care Model with Single Student Observation</td>
<td>Observation</td>
<td>Independent Clinician</td>
</tr>
<tr>
<td>Preceptor Model with Student Participation</td>
<td>Technician</td>
<td>Independent Clinician</td>
</tr>
<tr>
<td>Student Care Model with Faculty Participation</td>
<td>Student Clinician</td>
<td>Tutor</td>
</tr>
<tr>
<td>Preceptor Model with Single Student Care</td>
<td>Student Clinician</td>
<td>Preceptor</td>
</tr>
<tr>
<td>Preceptor and Direct Care Combination Model</td>
<td>Student Clinician</td>
<td>Preceptor</td>
</tr>
<tr>
<td>Resident Care with Faculty Observation</td>
<td>Resident Clinician</td>
<td>Observation</td>
</tr>
<tr>
<td>Independent Patient Care</td>
<td>Independent Clinician</td>
<td>None</td>
</tr>
</tbody>
</table>

Figure 2 Preceptor Model with Single Student Observation

Figure 3 Direct Care Model with Multiple Student Observation

Figure 4 Direct Care Model with Single Student Observation

Figure 5 Direct Care Model with Student Participation

exposed to this clinical model throughout the first and second year and are required to observe at least one patient encounter in the Primary Eye Care Service per quarter. Third year students also have the opportunity to observe a vision therapy session in the Pediatrics/Binocular Vision Service.

Direct Care Model with Multiple Student Observation

In this next model, single student observation is enhanced by group observation of the faculty patient relationship. Again, the observing students do not have a direct role in patient care, but they collectively view the patient encounter and are able to discuss ideas and challenges with each other. The Direct Care Model with Multiple Student Observation (Figure 3) is primarily utilized within our Center for Advanced Ophthalmic Care Service in which small groups of fourth year students observe patient management by a faculty member. This model was chosen to allow each student to benefit from the experiences of all the patients in that clinic session. This is more applicable in the Center for Advanced Ophthalmic Care where the prevalence of ocular pathology is higher than in the Primary Eye Care Service. A variation of this model is also used in our Contact Lens course in which groups of 30 third year students evaluate, via television monitors, various lenses being fitted during a live faculty-patient interaction in an adjacent examination room. This application allows each student to observe the same patient and lens fit, a difficult task in the traditional laboratory setting. This model is the first to show student observation of a faculty member.

Direct Care Model with Single Student Observation

Observation by a single student of a faculty member engaged in independent patient care is the pinnacle of the student observation process. The student has now gained a fuller understanding of the general optometric exam; she is now able to perform many of the necessary skills herself. The student may have already begun seeing patients of her own. The sequencing of the Direct Care Model with Single Student Observation (Figure 4) after the other observation models is deliberate. Faculty may take procedural shortcuts or vary from exact classroom teachings. However, at this stage, the student begins to real-
ize that clinical experience also plays a large role in patient care. Only once a student has learned and implemented an exact technique can she appreciate the observed protocol deviation brought about by clinical experience. Faculty members use this model throughout the clinic during the third and fourth professional years whenever they demonstrate exam techniques during patient care. This model is the sole method used with special testing such as electrophysiology, ultrasonography, and ocular photography.

**Direct Care Model with Student Participation**

Although similar, the Direct Care Model with Student Participation (Figure 5) is fundamentally different from the model above. The student now has indirect input into the faculty-patient relationship. The student may be called to perform selected exam procedures or to evaluate some collected data. The management of the patient is still primarily that of the faculty member, but the student may have some input. This model is currently used by third and fourth year clinicians who are paid to work up patients for faculty providing direct care. However, student participation in a Faculty Group Practice type climate could further invoke this scheme and be beneficial to both faculty and student.¹

**Student Care Model with Faculty Participation**

The transition from faculty care to student care can be a subtle one. The Student Care Model with Faculty Participation (Figure 6) demonstrates the first model in which the student is managing the optometric exam as a clinician. He is now choosing which tests to perform and is controlling the examination sequence. A faculty member or clinical tutor (a skilled fourth year student) is present in the exam room to assist the student if difficulties arise. The student is the primary data analyzer and is guided to proper patient management by the faculty member. At ICO, this model is an effective tool of remediation of third and fourth year students and provides needed assistance to weaker student clinicians.

**Preceptor Model with Multiple Student Care**

The first of the preceptor-type models, the Preceptor Model with Multiple Student Care (Figure 7) is occasionally implemented in our Pediatrics/Binocular Vision Service. In this model, two fourth year students work together, under a faculty preceptor, to manage a single patient. The students take turns gathering and analyzing data. They are able to rely on one another if any challenges develop. Both student clinicians present the case together to a single faculty preceptor who confirms or modifies the treatment plan. As with all of the preceptor models, the faculty member rechecks the ocular health and any other pertinent exam findings. This clinical model finds favor only on infrequent days when the schedule yields fewer patients than student clinicians.

**Preceptor Model with Single Student Care**

In the Preceptor Model with Single Student Care (Figure 8), a single faculty member precepts over four or five third or fourth year students who each have their own patient. This is the most common model used within IEI. A 5:1 (within the Primary Eye Care Service) or 4:1 (within the specialty clinics) student-to-faculty ratio appears to be the most efficient use of physical, financial, and educational resources at this time. A larger ratio begins to de-emphasize the educational component while a smaller ratio begins to become financially burdensome.

**Preceptor and Direct Care Combination Model**

This model blends two models from above into a single clinical application. The Preceptor and Direct Care Combination Model (Figure 9) allows a single faculty member to see patients of her own while simultaneously precepting multiple students who each have their own patient. This model, used at some externships, uses teaching ratios between two and three fourth year students. This method is infrequently used on campus secondary to the need for larger student to faculty ratios and is reserved for times when a patient may be too challenging for student care. This tends to be more common when a new group of unseasoned student clinicians begins patient care.

**Resident Care with Faculty Observation**

The Resident Care with Faculty Observation Model (Figure 10) depicts direct patient care by the resident with observation or indirect supervision by a faculty member. This model captures the foundation of the one-year optometric residency. The resident (former student) independently manages the patient care expe-
rience from beginning to end with minimal intervention by attending faculty. Faculty are still available for consult or to offer supplemental assistance. Although residents are still in a learning, student-type role, residents are considered faculty at ICO with the sole exception that residents are not credentialed to examine patients when a supervising faculty member is unavailable.

Independent Patient Care

The final goal of the clinical education process is the production of a proficient doctor capable of total independent patient care. Students/Residents are unable to participate in the Independent Care Model (Figure 11) at IEI until they complete their clinical training and become credentialed practitioners. This independent clinician is no longer a formal student. However, learning must remain ongoing for this clinician even after formal education ceases. This model demonstrates the importance of incorporating self-study methods within the education program.2

Discussion

Administrators, faculty, and students identified eleven clinical models and their roles at the Illinois Eye Institute and the externships of the Illinois College of Optometry. Although the identification process was straightforward, it was clear that participants were not necessarily aware of the different models used throughout the institution. Each participant learned that he would shift unknowingly from one clinical model to another, even within the same clinical session, in order to adapt to any clinical situation. This awareness that faculty and students don’t consciously think about which clinical model is being used in the moment was a beneficial outcome of the process. It is clear that certain clinical models are more applicable in different areas of the clinic. Over time, each service has gravitated towards the clinical models that appear to be the most efficient for them at that particular time.

In 1988, Dr. Selwyn Super presented the concept of the spiral curriculum in which students are engaged in an open-ended interaction of Basic Science, Applied Science, Clinical Science, and Clinical Practice throughout their optometric education. Applied Science and Clinical Science are prevalent in moderate amounts throughout the four-year program. This is in contrast to Basic Science (which is emphasized early and minimized late in the program) and Clinical Practice (which is minimized early and emphasized late in the program). There is a mix of science and clinical practice from the beginning and continuing throughout the spiral curriculum.3

Dr. Super reports that “the philosophy of optometry and optometric education should encompass a willingness and commitment to change so as to adapt to new knowledge, scientific discovery, technologic advances, a change in environment, and changing human needs.”2 This administrative commitment has been an important stimulus in introducing patient care as early as possible in the curriculum. This move is beneficial since direct patient contact plays a critical role in the development of clinical reasoning, communication, professional attitude, and empathy within the student clinician.1 An additional challenge to administrators is the need to incorporate expanding technologies and scope of practices within the curriculum – all while tackling constricting budgets and a four-year limit to the program.4

There are many factors that influence the effectiveness of clinical models including time, patient scheduling, and student-to-faculty teaching ratios. It is important for optometric educators to understand the numerous clinical model options available when evaluating curricula and modifying clinical programs.4 As with all educational changes, it remains critical to develop outcome measures that monitor the proficiency and knowledge of affected students.5 The transition from Direct Patient Care (no student involvement) to Independent Patient Care (total involvement) is a complex journey navigated within all health professional schools. Striving to understand this process from beginning to end will surely benefit student, faculty, and patient.

References
Trends in Student Enrollment and Applications

ASC0's annual student survey generates data that attains greater value when it is viewed in the context of past years so that trends can be identified. One very obvious trend that surveys of the past few years have shown is the decline in applicants to the schools and colleges of optometry. ASC0 responded to this perturbing data in 2001 by initiating an expanded career promotion campaign. Two of ASC0's Corporate Contributors came forward to generously fund the campaign: Vistakon, Division of Johnson & Johnson Vision Care, funded a three year "The Eyes Have It" program and CIBA Vision/Novartis Ophthalmics funded the "Each One, Reach One" program that specifically targets practitioners willing to reach out to their patients and to students with information on optometry as a career. The goals of the campaign are to increase the applicant pool to three applicants for each available seat and to develop an applicant pool that reflects the country's diversity.

Have we noticed any results yet from our efforts? ASC0 is encouraged that the most recent figure for OAT Test Takers (Table 1) does show some increase, and the number of applications did rise this past year, as well as the number of unduplicated applicants.

In this year's report we have put special emphasis on the enrollment of minorities in the schools and colleges since that will be a primary focus of the third year of the Vistakon grant. Specifically, the goal of the career promotion campaign in this area is to "develop an applicant pool that reflects the national diversity of the U.S. population."

OAT Taker, Applications and Unduplicated Applicants

The number of students registered to take the Optometry Admissions Test (OAT) has traditionally been looked at as a bellwether of the strength of the optometry school applicant pool. Table 1 indicates that in 2002-2003, the total number of examinees for both the fall and spring tests was 2999. That number had dropped in each of the prior five years, from its high in 1997-1998 of 4054.

For 2002-2003, the total number of examinees did increase by 296 to 2999 or 10.95%, which the schools found encouraging. However, when compared with the 35% drop that occurred from 1998-2001, the number of test takers has recovered by only one third.

Table Two shows that the total number of applications declined over the past four years from a high of 8509 in 1998-1999 to 5056 in 2002-2003 – a decline of almost 49%.

### Table 1
Number of Candidates for Optometry Admissions Test
(OAT Academic Years 1988-2003)

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Fall</th>
<th>Spring Period</th>
<th>Total Annual</th>
<th>Total Change</th>
<th>Total % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988-1989</td>
<td>1194</td>
<td>695</td>
<td>1889</td>
<td>-345</td>
<td>15.44%</td>
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<td>1061</td>
<td>1030</td>
<td>2091</td>
<td>202</td>
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</tr>
<tr>
<td>1990-1991</td>
<td>1192</td>
<td>1132</td>
<td>2324</td>
<td>233</td>
<td>11.14%</td>
</tr>
<tr>
<td>1991-1992</td>
<td>1332</td>
<td>1219</td>
<td>2551</td>
<td>227</td>
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</tr>
<tr>
<td>1992-1993</td>
<td>1540</td>
<td>1385</td>
<td>2925</td>
<td>374</td>
<td>14.66%</td>
</tr>
<tr>
<td>1993-1994</td>
<td>1847</td>
<td>1509</td>
<td>3356</td>
<td>431</td>
<td>14.74%</td>
</tr>
<tr>
<td>1994-1995</td>
<td>2131</td>
<td>1673</td>
<td>3804</td>
<td>448</td>
<td>13.35%</td>
</tr>
<tr>
<td>1995-1996</td>
<td>2380</td>
<td>1674</td>
<td>4054</td>
<td>250</td>
<td>6.57%</td>
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<tr>
<td>1996-1997</td>
<td>2380</td>
<td>1607</td>
<td>3987</td>
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<tr>
<td>1997-1998</td>
<td>2428</td>
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<td>4052</td>
<td>65</td>
<td>1.63%</td>
</tr>
<tr>
<td>1998-1999</td>
<td>2129</td>
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<tr>
<td>1999-2000</td>
<td>1914</td>
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<tr>
<td>2000-2001</td>
<td>1635</td>
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<td>2775</td>
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<tr>
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<td>1572</td>
<td>1131</td>
<td>2703</td>
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<tr>
<td>2002-2003</td>
<td>1743</td>
<td>1256</td>
<td>2999</td>
<td>296</td>
<td>10.95%</td>
</tr>
</tbody>
</table>
But for the first time in four years, applications rose this past year by 10.48%.

In 1999 ASCO began again the collection of information on unduplicated applicants. No information was collected from 1995-1999 due to legal concerns regarding social security numbers, which were resolved in 1999. The number of unduplicated applicants shows a corresponding decline in the last few years. With 2037 applicants applying for 1353 first year positions in 2002, the number of applicants per position stands at 1.5—still some distance from ASCO’s goal of 3 applicants per position.

The number of unduplicated applicants for 2003-2004, received from the schools just as JOE was going to press, shows a 9.3% increase from last year, an encouraging sign that ASCO’s career promotion efforts are beginning to show results, but a very small step forward in light of the downward trend of the last four years.

**Student Enrollment**

Table 3 shows that total student enrollment for 2002-2003 was 5362, a decrease of 1% since 2001, but a 12.6% increase since 1990. (The opening of a new school in 1989 effected much of this increase.)

The total male enrollment in 1990 was 52.3% but dropped to 41.4% by 2002. The total number of female students increased from 47.7% to 58.6% in 2002.

Table 4 shows the minority enrollment for all U.S.-accredited optometry schools from 1994-2002. Minority enrollment accounted for 39.9% in 2002 compared to 29.5% in 1994. However, most of that increase is due to the increase in the number of Asian American students, who are not classified as “underrepresented minorities” by the federal government. Asian American students increased from 15.7% of the total optometry enrollment in 1994 to 23.4% in 2002. Most of this increase has been for Asian females who increased from 567 in 1994 to 919 in 2002, a 17% increase.

Other minority groups have either decreased (Hispanic Americans, from 6.1% to 5.5%) or shown a very small increase (African Americans from 2.7% in 1994 to 3.0% in 2002.

Table 5 looks at gender and ethnic identification in 2002-2003 by individual school and shows a wide range in ethnic diversity in spite of efforts by many schools in this area.

Although other professions have shown similar problems attracting minorities, Table 6 shows that optometry schools are behind other health professions in attracting African-Americans. Optometry’s percentage of Hispanic students is higher than a number of the other health professions, but the figure is directly affected by InterAmerican University of Puerto Rico’s 55.3% Hispanic American enrollment.

When compared with the figures for the U.S. Census, the disparity becomes even more dramatic and shows just how wide the gap is between ASCO’s goals and the current enrollment of minorities in optometry school.

**Note:** Copies of the most current student survey may be purchased through the ASCO office for $100. (Add $10 for postage outside the U.S.) The price for faculty is $50. A 20% discount is offered to ASCO corporate contributor companies and affiliate members. A survey of faculty is also available for $25. (Add $6 for postage outside the U.S.) Send request to ASCO, Publications, 6110 Executive Blvd., Suite 510, Rockville, Maryland 20852.

Credit: The information contained in this article was prepared by ASCO staff including Enid-Mai Jones, director, career promotion and student affairs; Linda Reynolds, associate, career promotion and student affairs; Joanne Zuckerman, data manager; and Patricia Coe O’Rourke, managing editor.

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**Table 2** — Trends in Numbers of Applicants and Applications for Admission to the O.D. Program AY 1992-1993 through AY 2002-2003

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Unduplicated Applicants</th>
<th>Applications</th>
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<tr>
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<td>1993-1994</td>
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<td>166</td>
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<td>1994-1995</td>
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<tr>
<td>1998-1999</td>
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<td>no data</td>
</tr>
<tr>
<td>1999-2000</td>
<td>2671</td>
<td>n/a</td>
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<td>2000-2001</td>
<td>2628</td>
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<tr>
<td>2001-2002</td>
<td>2339</td>
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<td>2002-2003</td>
<td>2037</td>
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<tr>
<td>2003-2004</td>
<td>2226</td>
<td>189</td>
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</table>
Table 3 — Total Student Enrollment in Schools of Optometry by Gender
Academic Years 1990-1991 to 2002-2003

<table>
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<tr>
<th>Academic Year</th>
<th>Male</th>
<th>Annual % Change - Male</th>
<th>Female</th>
<th>Annual % Change - Female</th>
<th>Total</th>
<th>Annual % Change - Total</th>
<th>Percent Male</th>
<th>Percent Female</th>
</tr>
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<tbody>
<tr>
<td>1990-91</td>
<td>2491</td>
<td>-4.0%</td>
<td>2271</td>
<td>6.8%</td>
<td>4762</td>
<td>0.8%</td>
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<td>1991-92</td>
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<td>4864</td>
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<td>2602</td>
<td>7.7%</td>
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<td>2.8%</td>
<td>47.9%</td>
<td>52.1%</td>
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<td>1993-94*</td>
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<td>53.6%</td>
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<td>2.8%</td>
<td>2829</td>
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<td>5312</td>
<td>2.0%</td>
<td>46.7%</td>
<td>53.3%</td>
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<td>2760</td>
<td>-2.4%</td>
<td>5214</td>
<td>-1.8%</td>
<td>47.1%</td>
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<td>1997-98</td>
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<td>2822</td>
<td>2.2%</td>
<td>5319</td>
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<td>46.9%</td>
<td>53.1%</td>
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<td>1998-99</td>
<td>2454</td>
<td>-1.7%</td>
<td>2815</td>
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<td>5269</td>
<td>-0.9%</td>
<td>46.6%</td>
<td>53.4%</td>
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<td>2495</td>
<td>1.7%</td>
<td>2969</td>
<td>5.5%</td>
<td>5464</td>
<td>3.7%</td>
<td>45.7%</td>
<td>54.3%</td>
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<td>2418</td>
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<td>3010</td>
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<td>5428</td>
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<td>55.5%</td>
</tr>
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<td>2001-2002</td>
<td>2309</td>
<td>-4.5%</td>
<td>3105</td>
<td>3.2%</td>
<td>5414</td>
<td>-0.3%</td>
<td>42.6%</td>
<td>57.4%</td>
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<td>2002-2003</td>
<td>2221</td>
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<td>3141</td>
<td>1.2%</td>
<td>5362</td>
<td>-1.0%</td>
<td>41.4%</td>
<td>58.6%</td>
</tr>
<tr>
<td>% Change AY 1990-1991 to 2002-2003</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-10.8%</td>
<td>38.3%</td>
<td>12.6%</td>
</tr>
</tbody>
</table>

*No data available for this year

ASCO Appoints Diversity Task Force

ASCO's president, Dr. Lee Carr, has also appointed a Diversity Task Force to address these concerns. The task force is charged with examining the issues of diversity at member schools with special emphasis on racial/ethnic diversity as it relates to student population, outreach activities and national demographics. Serving on the task force will be Dr. Arol R. Augsburger, president, Illinois College of Optometry; Dr. Hector Santiago, dean, Inter American University of Puerto Rico; Dr. Roger Boykins, University of Houston College of Optometry; Dr. Cynthia H. Green, The Ohio State University College of Optometry; and Dr. Edwin C. Marshall, associate dean for academic affairs and student administration at Indiana University School of Optometry. Enid-Mai Jones, director of student affairs and career promotion, is ASCO's liaison to the Diversity Task Force.
Table 4
Total Student Enrollment in Schools of Optometry by Ethnic Identification
Academic Years 1994-95, 1998-99 and 2002-03

<table>
<thead>
<tr>
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<tr>
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<tr>
<td>Female</td>
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<tr>
<td>Total</td>
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<tr>
<td><strong>Asian American</strong></td>
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<td>251</td>
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<td>567</td>
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<td>Total</td>
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<td></td>
<td></td>
<td></td>
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<td>3</td>
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</tr>
<tr>
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<td>8</td>
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</tr>
<tr>
<td>Total</td>
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<td>*</td>
<td>*</td>
<td>11</td>
<td>0.2%</td>
</tr>
<tr>
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</tr>
<tr>
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<td>70.6%</td>
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<td>1538</td>
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</tr>
<tr>
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<td>1805</td>
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<td>70.1%</td>
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<td>3354</td>
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<td>60.1%</td>
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<tr>
<td><strong>Foreign National</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
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<td>*</td>
<td>*</td>
<td>134</td>
<td>2.5%</td>
</tr>
<tr>
<td>Female</td>
<td>108</td>
<td>3.5%</td>
<td>*</td>
<td>*</td>
<td>188</td>
<td>3.5%</td>
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<tr>
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<td></td>
<td></td>
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<tr>
<td>Male</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Female</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Total</td>
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<td>*</td>
<td>*</td>
<td>*</td>
<td>0</td>
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</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>5201</td>
<td>100.0%</td>
<td>5313</td>
<td>100.0%</td>
<td>5362</td>
<td>100.0%</td>
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</table>

* No data available for these categories.
### Table 5

Percentage of Total Full-Time Students by School in OD Programs by Gender and Ethnic Identification AY 2002-2003

<table>
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<th>School</th>
<th>Male</th>
<th>Female</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>13.8%</td>
<td>2.4%</td>
<td>11.4%</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Native American</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>White American</td>
<td>13.8%</td>
<td>4.5%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Foreign National</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Unknown</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>
### Table 6 — Health Professions Education Enrollment Data

#### U.S. Student Total Enrollment by Race and Ethnicity in Selected Health Professions Schools

<table>
<thead>
<tr>
<th></th>
<th>African American</th>
<th>Hispanic American</th>
<th>Asian American</th>
<th>White American</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Census</td>
<td>12.1%</td>
<td>12.5%</td>
<td>3.6%</td>
<td>69.1%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Optometry Schools</td>
<td>2.8%</td>
<td>5.6%</td>
<td>26.7%</td>
<td>64.3%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Medical Schools</td>
<td>7.4%</td>
<td>6.4%</td>
<td>20.1%</td>
<td>63.8%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Nursing Schools</td>
<td>10.7%</td>
<td>4.9%</td>
<td>4.5%</td>
<td>74.7%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Osteopathic Schools</td>
<td>3.7%</td>
<td>3.5%</td>
<td>16.0%</td>
<td>73.4%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Pharmacy Schools</td>
<td>9.8%</td>
<td>3.8%</td>
<td>21.5%</td>
<td>60.5%</td>
<td>4.4%</td>
</tr>
<tr>
<td>Public Health Schools</td>
<td>10.5%</td>
<td>9.2%</td>
<td>12.5%</td>
<td>63.0%</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

Sources: U.S. Census; Association of American Medical Colleges, Minority Students in Medical Education Facts and Figures XII, 2002; American Association of Colleges of Nursing, Enrollment and Graduations in Baccalaureate and Graduate Programs in Nursing: 2001-2002; Association of Schools and Colleges of Optometry, Annual Student Data Report: Academic Year 2001-2002; American Association of Colleges of Osteopathic Medicine, 2001 Annual Report on Osteopathic Medical Education; American Association of Colleges of Pharmacy, Profile of Pharmacy Students, 2002; Association of Schools of Public Health, 2001 Annual Data Report.

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#### Health Professionals for Diversity Plan Collaborative Activities

Concerned about creating successful efforts to increase the numbers of under-represented minorities in the schools and colleges of optometry, ASCO has joined the efforts of other health professions in a Health Professionals for Diversity Coalition. An organizational meeting, called by the Association of American Medical Colleges' Division of Community and Minority Programs, was attended by ASCO's Director of Career Promotion and Student Affairs, Ms Enid-Mai-Jones.

Health professionals present at the meeting agreed that there is a need for increased collaborative activities among the health professions. Activities that were discussed included public education and advocacy campaigns, best practice and information sharing, developing collaborative legislative agendas, developing joint research agendas, and creating collaborative pipeline education programs. A planning meeting will be held in fall 2003 to establish a formal infrastructure for the HPD Coalition.
Clinic Director, United Cerebral Palsy of NYC Visiting Professor, New York University Medical School New York, NY

I have frequently been impressed by the large number of resources on general ophthalmic disorders and problems; when I have consulted one, I have sometimes wondered if there is more information in others. Similarly, I have sometimes read book reviews, and wondered how the book being reviewed compares to other available books. When a book is reviewed in isolation, the reader is usually told that the book is divided into chapters on particular topics, has a certain number of pages, and has color or black and white photographs, good illustrations, etc. While you learn about the book, you don’t know how one particular book compares to others. Do other comparable sources have color photographs, black and white illustrations, or no illustrations? Are other alternatives more user-friendly? Are other books longer, with more details on research and clinical studies? If you want to carry a book in your clinic coat pocket, is there a choice that is light and compact compared to others?

This review is designed to help provide answers to some of the questions mentioned above, and to give an overview of the features and formats of these nine books on eye care (see Fig. 1).

In general, all of the books had individual sections (or chapters) on ocular examination techniques, eyelids/orbit, conjunctiva, sclera, cornea, anterior segment, lens and cataract, pupil, glaucoma, fundus, neuroophthalmology and visual pathway, ocular injuries and trauma. I was impressed with the broad inclusion of topics across the books. Even the smaller books had considerable detail on topics, albeit less than in the more extensive editions.

Essential Medical Ophthalmology: A Problem Oriented Approach by Ferris did cover retina, lid disorders, visual field problems, and ocular problems associated with systemic disease, but there was very little on glaucoma (only two pages), and I couldn’t even find important areas like iris/iritis, uvea/uveitis, lens, cataract, conjunctiva or conjunctivitis listed in either the Table of Contents or in the index. However, I found the section on systemic medical problems associated with ocular problems more complete than in some other sources on ophthalmic disorders. This book is written in a question-and-answer format, with the reader asked to describe clinical photographs or scenarios, and answer related diagnostic/therapeutic questions about the case. I think this is an excellent learning resource, and it is successful in motivating the reader to think actively; however, I would find it less “user-friendly” for answering a particular diagnostic or therapeutic question quickly in the clinic.

I found the books by Friedman, Pineda & Kaiser, Rhee & Pyfer, and Roberts most conveniently organized to help the clinician quickly access diagnostic and therapeutic information. All three have formats in which the section for each condition is presented in a similar order: symptoms, clinical signs, diagnostic information, and therapeutic recommendations. These simple-to-use and predictable formats make it easy to search for whatever component(s) you need, on any particular condition. The preface to the first edition of the book currently edited by Rhee and Pyfer indicated that while previously, diagnostic and therapeutic information had to be collected from “unwieldy textbooks” and “inaccessible journals,” they hoped to present details in a concise book that would be “everything you wanted to know and nothing more.” I agree about the benefits of a compact, manageable source. While the books by Rhee & Pyfer, and Roberts do not contain photographs and plentiful illustrations like some of the other books, their value as helpful diagnostic and therapeutic resources that are concise and easily accessible outweighs the lack of pictures.

The book by Kanski & Bolton is comprised almost entirely of photographs, with color illustrations, tables, figures, and written phrases to describe the photographs. There are no long sentences and paragraphs. Imagine a collection of almost 400 pages of photographs dedicated to eye care, with just enough writing to explain the pictures, and you can tell that this is a valuable visual resource. A CD-ROM accompanies the book, with additional explanatory information. I find the brevity of writing makes this book most helpful from the perspective of visually-guided diagnosis, and least helpful for therapeutic assistance.

The book edited by Tasman and Jaeger is a large, colossal reference and atlas, with extensive written details. In addition to pictures, information on research and diagnostic studies are included to assist the clinician. The CD-ROM contains the full text and set of images from the book, in addition to additional slides and videos, including...
<table>
<thead>
<tr>
<th>Title/Author</th>
<th># pages</th>
<th>Photos/ Illustrations</th>
<th>User friendly?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential Medical Ophthalmology: A Problem Oriented Approach</td>
<td>293 pp.</td>
<td>color photos, b/w illustrations</td>
<td>Yes, but</td>
<td>very strong sections on systemic medical problems related to eye care; soft-covered</td>
</tr>
<tr>
<td>J Ferris</td>
<td></td>
<td></td>
<td>question-answer format</td>
<td></td>
</tr>
<tr>
<td>Butterworth-Heinemann</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>The Massachusetts Eye &amp; Ear Infirmary Illustrated Manual of Ophthalmology</td>
<td>432 pp.</td>
<td>color and b/w photos, no illustrations</td>
<td>Yes</td>
<td>very easy to find diagnostic and therapeutic information; soft-covered</td>
</tr>
<tr>
<td>N Friedman, R Pineda, &amp;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P Kaiser</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>WB Saunders</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lecture Notes on Ophthalmology (8th Edition)</td>
<td>206 pp.</td>
<td>color photos, color illustrations</td>
<td>Yes</td>
<td>very compact and light; soft-covered</td>
</tr>
<tr>
<td>B James, C. Chew &amp; A Bron</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Blackwell Science</td>
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<td></td>
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</tr>
<tr>
<td>Illustrated Tutorials in Clinical Ophthalmology (with CD-ROM)</td>
<td>402 pp.</td>
<td>color photos, color illustrations</td>
<td>Yes</td>
<td>hard-covered; heavier than others, but very durable; CD-ROM comes with book</td>
</tr>
<tr>
<td>J Kanski &amp; A Bolton</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butterworth-Heinemann</td>
<td></td>
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</tr>
<tr>
<td>Manual of Ocular Diagnosis and Therapy (5th Edition)</td>
<td>528 pp.</td>
<td>color photos (but only on 4 pages at beginning of book), b/w illustrations within the book</td>
<td>Yes</td>
<td>very compact and light; soft-covered</td>
</tr>
<tr>
<td>D Pavan-Langston (ed.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lippincott Williams &amp; Wilkins</td>
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</tr>
<tr>
<td>The Wills Eye Manual: Office and Emergency Room Diagnosis and Treatment of Eye Disease (3rd Edition)</td>
<td>563 pp.</td>
<td>no photos, limited b/w illustrations</td>
<td>Yes</td>
<td>very easy to find diagnostic and therapeutic information; soft-covered</td>
</tr>
<tr>
<td>D Rhee &amp; M Pyfer (ed.)</td>
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<td></td>
<td></td>
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<tr>
<td>Lippincott Williams &amp; Wilkins</td>
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<tr>
<td>Quick Consult to Diagnosing and Treating Ocular Disease</td>
<td>271 pp.</td>
<td>no photos, no illustrations; excellent use of tables.</td>
<td>Yes</td>
<td>very easy to find diagnostic and therapeutic information; soft-covered</td>
</tr>
<tr>
<td>C Roberts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butterworth-Heinemann</td>
<td></td>
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<tr>
<td>New England Eye Center Handbook of Eye Emergencies</td>
<td>123 pp.</td>
<td>color photos, b/w illustrations</td>
<td>Yes</td>
<td>very compact and light; spiral-bound</td>
</tr>
<tr>
<td>B Shingleton &amp; M Mead</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slack Incorporated</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>The Wills Eye Hospital Atlas of Clinical Ophthalmology</td>
<td>486 pp.</td>
<td>color and b/w photos, color and b/w illustrations</td>
<td>Yes</td>
<td>hard-covered; heavier than others, but very durable; CD-ROM comes with book</td>
</tr>
<tr>
<td>W Tasman &amp; E Jaeger (ed.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lippincott Williams &amp; Wilkins</td>
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</tbody>
</table>

Lectures on video. The extent of ocular images presented in this book/CD-ROM is truly impressive.

There are many excellent choices within these contributions to the ophthalmic literature. Some books had strengths in one area, or were written for a particular purpose. If I wanted to recommend books that would be easy to carry around in someone's clinic coat pocket for quick reference, I would suggest those by Shingleton & Mead, James, Chew & Bron, and Pavan-Langston as the lightest and smallest. Each time I look back at these, I am impressed with how much information is present in a compact source.

If I wanted to recommend books that I found most “user-friendly” for more comprehensive details on diagnosis and therapy details across ophthalmic conditions, I would advise the books by Friedman, Pineda & Kaiser, Rhee & Pyfer, and Roberts. If a colleague were interested in an “atlas” type of reference for photographs, and as a visual guide to recognizing ocular conditions, I would suggest the books by Tasman & Jaeger, and Kanski & Bolton as being most extensive, although the color photographs in the other books (even the three small, light ones) were very good.
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