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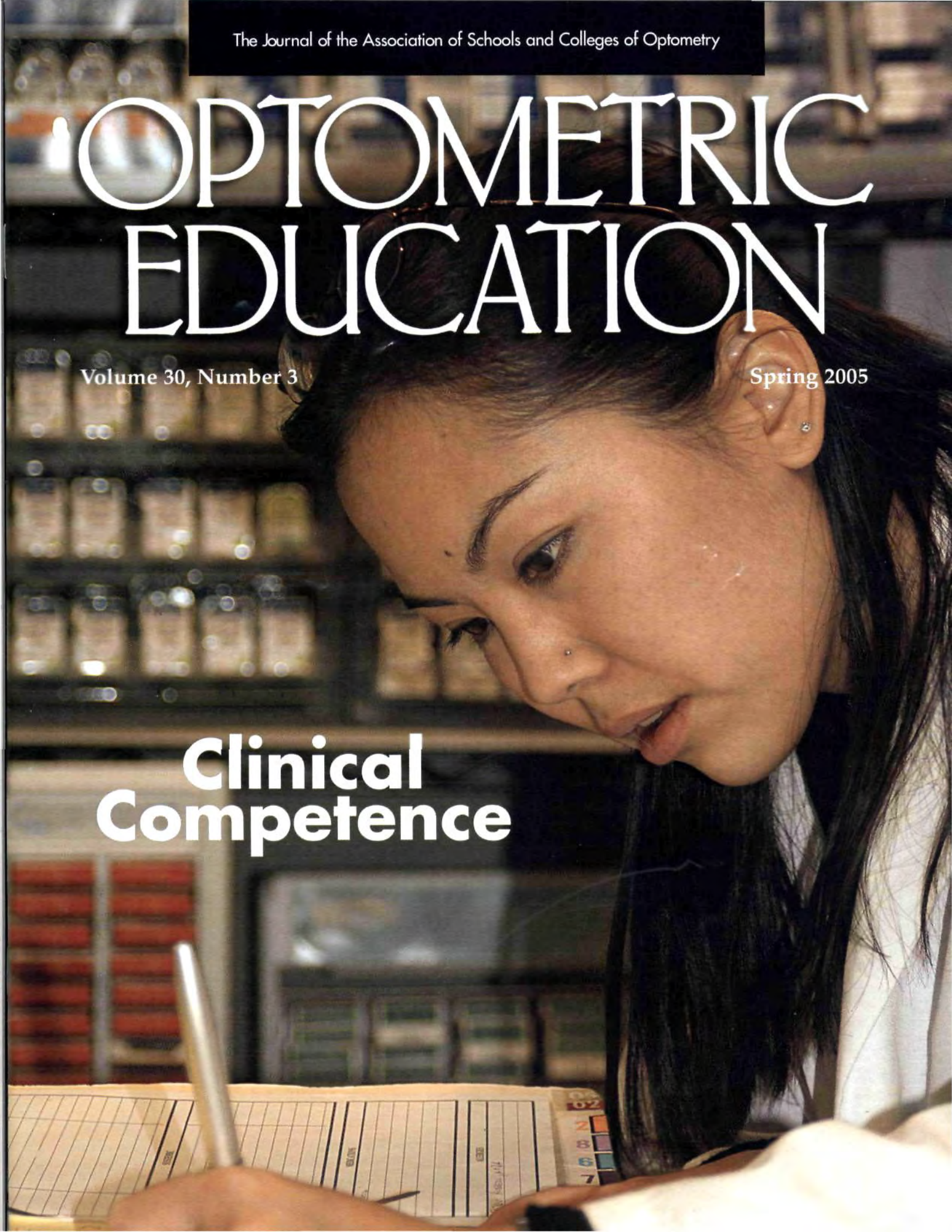

Clinical Competence

OPTOMETRIC EDUCATION

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CONTENTS

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DEPARTMENTS

Cover photo courtesy of the Illinois College of Optometry, Al Pouch, director, media production

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Association of Schools and Colleges of Optometry

The Association of Schools and Colleges of Optometry (ASCO) represents the professional programs of optometric education in the United States. ASCO is a non-profit, tax-exempt professional educational association with national headquarters in Rockville, MD.

EDITORIAL

Ensuring Clinical Competence

Lester E. Janoff, O.D., M.S.Ed., F.A.A.O.

The mission of every school and college of optometry is to graduate competent optometric practitioners. But how do we define competence, and more importantly, how do we accurately and precisely measure it once we have defined it? Herein lies the challenge that faces all health profession educators. In this issue of *Optometric Education* two articles address the issue of evaluating clinical competence.

Reeder and colleagues describe how the contact lens faculty at the Illinois College of Optometry developed criteria for the knowledge and skills required by students for successful completion of their program. Student patient encounters were used to develop these criteria, and successful demonstration of the knowledge and skills listed would indicate the necessary contact lens abilities for entry level into the profession. But stating the elements of competency, especially in the knowledge domain, is the easier part of the task. How we measure these abilities is the more difficult aspect, especially when one considers that the validity and reliability of the instruments must be established.

Hrynchak and colleagues have written about the issue of the reliability of rating scales used to evaluate student patient encounters in their primary care clinic. Their evaluation tool used global rating scales along with written feedback to measure six behaviorally specific skills important to the practice of optometry. Case analysis and professionalism constituted two of these six skills and are worthy of special consideration. Their investigation concluded that the reliability of this evaluation instrument in assessing student competence was inadequate for the task and was beyond repair. They found that the instrument measured instructor performance more than student performance. The problem stemmed largely from the use of global scales that tend to be insensitive to performance deficits as well as an inability to provide good inter-rater reliability.

These two articles bring me to two points that I feel are important when discussing clinical competence. Ethical behavior and professionalism are two critical attributes of competent practitioners, but since they fall in the affective (attitudinal) domain they are definitely not easy to measure. In order to ensure that our evaluation tools in this area are effective, consultation with and review by expert educational psychologists is necessary. Optometrists without special training are not likely to create valid and reliable evaluation tools on their own.

The other important aspect of competence that needs more consideration is the evaluation of the ability called "case analysis." How capable is the student in analyzing the data and providing the appropriate diagnosis and treatment plan? This leads me to one of my favorite subjects called "Clinical Reasoning." How do expert clinicians solve the diagnostic challenges they face, and what are the implications for us, the clinical educators? What strategies should we employ to determine if our students have developed the required competencies in this area (diagnosis and treatment)? Medical education with all its resources has struggled for years trying to answer some of these questions. Optometry is in its infancy in looking at these matters, but we do have one advantage. When a patient presents to a primary care physician with shortness of breath, nausea, a sore throat, and sinus congestion, the diagnostic hypotheses are extensive — they range from life threatening to mere discomfort status — and tests, for which days are needed to get results, may need to be ordered. Optometrists face far fewer complex presentations; data collection usually can be done quickly, and results are immediate.

What can optometric educators do to address this matter of ensuring clinical competence? We can teach using examples of clinical cases. The earlier that students begin to think like clinicians and accumulate a database of clinical presentations, the sooner they are likely to develop intuitive analysis to supplement their deductive skills. Understanding the basic biomedical mechanism of a condition helps generate accurate hypotheses. And, as noted at the end of Hrynchak's article, there is a need for multiple measures of competence since it is unlikely that one instrument will be effective. Medicine has developed a variety of useful techniques for teaching and evaluating case analysis skills. The Patient Management Problem (PMP) and Objective Structured Clinical Evaluation (OSCE), to name just a few, have proved beneficial and should be considered by optometric educators. But above all, optometric institutions have to employ measures to test the validity and reliability of their evaluation tools so that we meet our mission of graduating competent optometric practitioners.

INDUSTRY NEWS

The following companies support ASCO's Corporate Contributors Program that benefits all 17 schools and colleges of optometry in the U.S. and Puerto Rico:

Visionaries ($100,000+)

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Ciba Vision Corporation/Novartis Ophthalmics

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Hoya Vision Care, North America
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Friends — $10,000 – $14,999
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Bausch & Lomb
Compulink Business Systems
Coopervision
The Spectacle Lens Group
Volk Optical, Inc.

Contributors — $5,000 – $9,999
Marchon Eyewear
Safilo Group

Allergan and Compulink Join Corporate Contributors Program

Allergan, Inc., and Compulink Business Systems became the newest participants in ASCO's Corporate Contributors Program.

Allergan, Inc., with headquarters in Irvine, California, is a global specialty pharmaceutical company that develops and commercializes innovative products for the eye care, neuromodulator, skin care and other specialty markets. In addition to its discovery-to-development research programs, Allergan has global marketing and sales capabilities in over 100 countries that deliver value to its customers, satisfy unmet medical needs and improve people's lives.

Driven by technology and innovation, Allergan addresses the needs of consumers with over 5,000 employees worldwide, four world-class research and development facilities and three state-of-the-art manufacturing plants. Allergan's manager of strategic communications, Kate McCann Kline, will be its liaison to ASCO. Allergan is also sponsoring the September 29 - October 2, 2005 meeting of ASCO's Clinic Directors/Administrators Special Interest Group. Visit Allergan at their Web site, http://www.allergan.com

Compulink is an all in one paperless solution for Ophthalmic specific Practice Management, Optical, & EHR. Compulink was established in 1985 and is a market-leading developer in windows based practice management medical software that "provides leadership through innovation, experience and strategic alliances with other complimentary industry leaders. The result is an ever-evolving state-of-the-art program, rich in features and designed with industry integration for a solid, streamlined approach to practice management."

Compulink proudly supports the following Schools and Colleges of Optometry: Ferris State, ICO, Northeastern, Pacific, UC Berkeley, University of Houston and the University of MO at St. Louis. Compulink hosts an annual continuing education meeting specific to the needs of the university environment. The meeting is an opportunity to exchange ideas, problem solve and focus on future needs and development. This year's meeting will be held April 27-29th.

Compulink, based in Westlake Village, CA, will be represented by Rachel Mandac, marketing alliance coordinator. Compulink is also sponsoring the September 29 - October 2, 2005 meeting of ASCO's Clinic Directors/Administrators Special Interest Group. Visit Compulink at their Web site http://www.compulink-software.com

CIBA Sponsors Practice Management at AOA Meeting

A generous grant given by **Ciba Vision, a Novartis Company**, will cover course fees for the New Practitioner Practice Management Program at Optometry's Meeting 2005 in Dallas. The full day program will take place Saturday, June 25. New practitioners, including 2005 graduates and those in practice up to five years qualify to register for the program. The format for this year's program is the same as last year's and will be based on the "speed dating" concept. A panel of speakers (in both morning and afternoon sessions) will briefly present their topic highlights. After all speakers have made a five-seven minute presentation, each speaker will spend time rotating from table to table, in order for attendees to ask questions and learn information in a small group setting. Attendees can register at www.optometrysmeeting.org for course #0310. For additional information, contact Linda Smith at LDSmith@aoa.org or 1-800-365-2219, extension 151.

Transitions Launches School Outreach Program

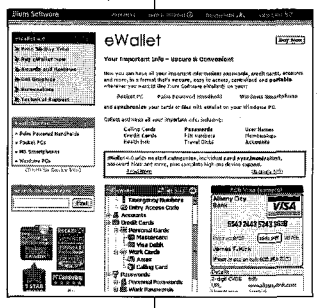
Transitions Optical, Inc., launched a new school outreach program to arm eyecare professionals and educators with tools to educate middle school children about healthy vision. The multi-faceted program will help bring all the excitement of Transitions' *Eye Didn't Know That*! science center exhibit

(Continued on page 95)

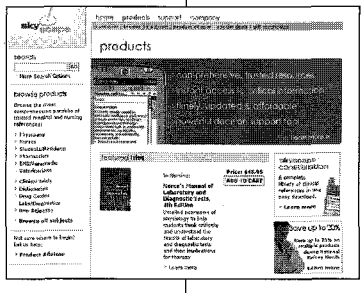
PDA: "Pretty Darn Accessible"

Dominick M. Maino, O.D., M.Ed., F.A.A.O.
Geoffrey Goodfellow. O.D., F.A.A.O.

When I (DM) was just an optometric twinkle in ICO's eye, PDA meant "Public Displays of Affection," which were frowned upon (at least until the 1960's and 70's). But now PDA means "Personal Data Assistant" or more to the point, "Pretty Darn Accessible." Geoffrey and I are never without our PDAs as we navigate the day at the Illinois College of Optometry. I'm currently using the TREO 600. This wonderful device has stopped me from lugging around a phone, pager, paper calendar/address book and stand alone PDA. Now all I have on hand is my Treo. My staff (in the Pediatrics/Binocular Vision Service at the Illinois Eye Institute or in my private practice) no longer page me; they just call if they or one of my patients needs something. I then determine how best to meet these needs and respond appropriately.



Since I work with many special needs patients who typically take multiple drugs for systemic, psychological, and behavioral problems, my Treo PDA/phone also has a pharmaceutical database (Epocrates). This database allows me instant access to the side affects frequently encountered while taking various medications, so I can provide better care for all my patients. My PDA also reminds me what I must accomplish each day (like writing this column), gives me the address and phone number of my home construction remodeling company (let's not go there!), and even sends and receives email and webpages.



Geoffrey certainly doesn't miss searching through the ICD-9 book by hand while looking for a less frequently encountered diagnostic code. With a digital ICD-9 program by Skyscape installed on his PDA, he can enter a key word and find just the code needed even while still in the examination room.

Have you ever visited the AOA web site and forgot your ID and password? No longer! The eWallet program by Ilium keeps track of the hundreds of IDs and passwords needed for life's business. Every time Geoffrey needs yet another ICO copier machine password, is prompted to change his voicemail password, or is asked to create a new user ID online, he enters this information into eWallet so it is always accessible.

While using his HP iPAQ during the train ride home, Geoffrey reads through the stack of email that he didn't have an opportunity to open while at the office. He also finds Pocket MS Office helpful for toting along essential Word Documents and Excel spreadsheets. He no longer has to run back to his office, boot up the computer, and then search for a clinic or faculty schedule because it's always available.

Geoffrey and I were curious about just how many students and faculty at ICO use their PDAs, so we sent out an informal survey via email. Approximately 96 students and 42 faculty responded. Here's what we discovered: Almost 50% of all respondents used a PDA (slightly more students than faculty). Of those who have PDAs, most utilized devices that have the Palm OS (the MS Windows compatible PDA was a far second). All used the database and calendar function on their PDA. The most frequently mentioned programs were Epocrates (a pharmaceutical database) and the Wills Eye Manual. (I should also note that various "games" were mentioned several times as being used as well.) While this was an informal assessment, it was obvious that the Personal Digital Assistant is making a wide variety of information "pretty darn accessible" for more and more faculty and students. For more information on PDAs, please go to:

Skyscape:
http://www.skyscape.com
Find that ICDM-9 code you need

eWallet:
http://www.iliumsoft.com/site/ew/ewallet.htm
Store all your important stuff here securely

Epocartes:
http://www.epocrates.com

PDA Health Care Portal:
http://frontpage.auburn.edu/pharmacy/pcs/pda/
Research that tells you how your PDA program stacks up against what others think about it.

Diagnosauris: A free differential diagnostic tool for medicine.
http://books.mcgraw-hill.com/medical/diagnosaurus/index.html

Health care PDA website links:
http://www.ohsu.edu/etc/support/pda-health.shtml

More links and "How to articles":
http://pharmacy.dal.ca/druginfo/pda.html

PDAs for Healthcare providers:
http://educ.ahsl.arizona.edu/pda/index.htm

Letters to the Editor

A Curriculum Comparison of U.S. Optometry Schools: What Should We Compare?

We read with great interest your editorial and the study reported by Maier, et. al., "A Curriculum Comparison of U.S. Optometry Schools: Looking Back Over the Decade," which was published in the winter 2005 (Vol. 30, No.2) issue of *Optometric Education*.

Studies of this kind can be of great value for academic planning, student recruitment, and legislative action. For that reason, it is essential that the information be factual. In order to verify the total number of hours dedicated to Clinical Experience (CE) in the Berkeley curriculum, we performed a calculation using the same criteria reported by Maier, et. al. Our calculations for CE hours were in stark disagreement with their published findings. Maier reported a total of 1,768 hours of CE. Our total using the same criteria in this study was 2,778 hours of CE. This discrepancy of over 1,000 hours represents a 57% difference. We would like to thank the authors for their study — it prompted us to do an in-depth analysis of the CE exposure our students receive. We found that in some instances our catalogue did not accurately reflect the number of CE hours. An accurate estimation revealed that the total CE in our curriculum is 3,509 hours, about twice the number reported by Maier, et. al. We have now changed our Web catalogue to more accurately reflect this number of CE hours.

When studies are conducted comparing curricula that are based solely on hours of instruction, it is imperative that the data accurately reflect the actual time. Failure to accurately report the true values invalidates the study and reduces the value. Accurate data are also essential since many different entities will rely on published reports to draw conclusions in general about optometric education and in specific about a particular institution. These entities include ASCO, legislative groups, alumni, and applicants to optometry. One way to obtain accurate information is to have each school certify the accuracy of the relevant data, thus avoiding the need to make assumptions about numbers of actual hours spent.

Finally, we are in agreement with the sentiment expressed in Janoff's editorial, "...Is the number of hours assigned to different subjects the correct metric to consider in curriculum planning?". Other measures may be a more valid indication of a curricular success. For didactic training the NBEO scores and passing rates might be the metric of choice. With respect to CE, a more meaningful metric might be not the hours spent in clinic but the number of actual patient encounters. We would welcome a comparison on either of these criteria.

Robert B. DiMartino, O.D., M.S.
Chair of the Faculty
Dennis Levi, O.D., Ph.D.
Dean
Gunilla Hægerström-Portnoy, O.D., Ph.D.
Associate Dean for Clinical Sciences
Richard C. Van Sluyters, O.D., Ph.D.
Associate Dean for Student Affairs

Authors' Response

We wish to express our gratitude to our colleagues at UC Berkeley for investing the time to carefully read our study. Their review of the UCB curriculum was one of our goals in conducting the research, and we hope that other institutions will follow their lead. In light of their inquiry concerning the accuracy of our data regarding Clinical Experience (CE) hours, we carefully reviewed our database and, using our published protocol[1], compared our results once again with the curriculum expressed in the 2001-2003 UCB School of Optometry Catalog. We conclude that our published results are accurate.

We pointed out in our paper that the curricula at the schools and colleges are very dynamic, and it appears that the current UCB curriculum related to CE has increased relative to the 2001-2003 published catalog. This increase is consistent with the dominant trend that we reported in our study.

We also agree with our colleagues' concern about accuracy of the reported data in light of potential ramifications to each institution's interest groups. As stated in our paper, we contacted several institutions to clarify confusing information regarding curricular hours. The suggestion "...to have each school certify the accuracy of the relevant data..." is an ideal that is perhaps unreachable if one's desire includes completion of the study within the authors' lifetimes. As an example, in the early stages of developing our comparison protocol, we surveyed administrators to learn the ratio each school used to convert credit hours to clock hours for clinical courses. In two instances, we received replies from two different administrators at the same institution who reported different conversion ratios. Because of this, we developed a standardized conversion method that disregarded credit hours and was based exclusively on calculated clock hours taking into account the length of the academic period and any holidays or breaks during that period.

Finally, we heartily agree with our colleagues' and Dr. Janoff's concern[2] that calculation of clock hours may not be the most meaningful metric to use for comparison of clinical curricula. It is, however, an available metric. Since NBEO data are not currently available to the public, this desirable comparison method cannot be used. A comparison study of actual patient encounters at each school would be an excellent addition to the literature, and we encourage a motivated researcher to pursue it. The term "patient encounter," however, may have a variety of definitions within the different programs.

Bradley Coffey, O.D., F.A.A.O.
Professor of Optometry
Pacific University

References

1. Maier H, Smith A, Coffey B. A curriculum comparison of U.S. optometry schools: Looking back over the decade. Opt Education 2005,30 (2):39-55.
2. Janoff LE. Comparing curricula - looking back, looking forward. Opt Education 2005,30 (2):37.

Developing and Meeting Entry-to-Practice Criteria for a Contact Lens Rotation

Renée E. Reeder, O.D., F.A.A.O.
Neil R. Hodur, O.D.
Joan Sears, O.D., F.A.A.O.

Abstract

In the fall of 2000, the faculty of the Cornea Center for Clinical Excellence (CCCE) at the Illinois Eye Institute was charged with the task of developing "Entry-to-Practice" criteria for graduating students. The goal was to develop a list of patient encounters, material usage, and clinical analysis that a new graduate should master before entering the practice of optometry. The authors faced two challenges. The first was to define and develop a definition of entry to practice in contact lens and cornea, and then to develop a tool to document the standards defined. The authors discuss how these standards are currently applied at the Illinois Eye Institute Cornea Center for Clinical Excellence and the next step in applying the standards to all affiliated clinical sites.

Keywords: *contact lens, entry to practice, curriculum*

Dr. Reeder is an associate professor at the Illinois College of Optometry and chief of ICO's Cornea Center for Clinical Excellence. Dr. Hodur is a professor at the Illinois College of Optometry with teaching responsibility in the areas of theoretical optics and contact lens practice. Dr. Sears is an associate professor and director of community based education at the Illinois College of Optometry.

Introduction

In October 1998, ASCO began working on the determination of "Attributes of Students Graduating from Schools and Colleges of Optometry."[1] In May 2000, their final report was issued. This document charged the *faculty of each institution (with) the responsibility to develop curriculum and to assess and verify that each graduate has demonstrated the attributes described.* This documented stated that *the goal of optometric education was to prepare students to enter the general practice of optometry.* It stated that students *must demonstrate knowledge of optics of the eye and ophthalmic lens systems (including ... contact lenses) used to compensate for refractive error and other vision disorders.* It also required that *graduates must be skillful in the diagnosis, triage, management, and/ or treatment of common visual conditions and ocular diseases including or resulting from refractive anomalies, ocular disease, trauma, and prior surgery...* It also stated that they *must be able to order and interpret appropriate procedures, synthesize data and develop management plans, prescribe and or use ophthalmic materials including contact lenses to treat/ manage common vision disorders and disease.* In August 2000, we were charged by the Dean to address these issues as they pertained to the contact lens didactic education and clinical rotation.

Background

We evaluated previous student encounter data available from the CCCE to ascertain initial experiences within our on-campus rotation, and began reviewing the didactic curriculum. The first half of our document was developed in fall 2000-01, which encompassed academic and laboratory preparation. We then began reviewing student clinical logs to evaluate current experiences. Review revealed that while there were only 14-20 students in the CCCE and greater than 80 rigid gas permeable contact lens patients and greater than 90 keratoconus patients, two to three students each quarter had seen nothing but soft contact lenses. Therefore, in winter 2000-01, we added minimum experiences to the working document and included this document in student orientation to the department. It established a minimum of 18 patient encounters for all contact lens and cornea activities and required students to appropriately fit and assess a simple spherical soft and rigid contact lens as well as dispense and provide the appropriate follow-up care. Immediate improvements were noted in the variety of patients seen by the students. In spring 2000-01, we began developing a criterion or skills list requiring faculty verification via signature of each skill for each student.

Materials and Methods

In addressing the student's demonstration of knowledge, the Cornea and Contact Lens Faculty of the Illinois College of Optometry/Illinois Eye Institute established the following criteria.

In the understanding of the theory and practice of cornea and contact lenses, the following entry-to-practice guidelines have been implemented.

Theoretical Skills

Theoretical skills are learned in a lecture format during the transition between the second and third professional year. The basic contact lens course is taught to prepare students for basic contact lens care for clinical patients during the third professional year clinical rotation in the Illinois Eye Institute Clinic. Advanced contact lens information is presented during the third professional year in didactic and

interactive laboratory. This "total" educational experience prepares each student for entry-to-practice clinical challenges. Table 1 is a list of the theoretical skills learned.

Laboratory Mechanical Skills

Each student is required to attend 32 hours of laboratory in clinical contact lenses. Table 2 is a list of skills demonstrated to successfully complete the clinical laboratory.

Applied Knowledge

In addressing skillfulness and applied

Table 1: Working Document for Theoretical Skills

Basic mathematical relationships

- Vertex conversion
- Tear layer power
- Vertex power of contact lenses
- Keratometry - refractive error relationship

Physiology

- Corneal metabolism
- Corneal anatomy
- Theory of oxygen deprivation and corneal signs
- Limbal blood supply
- Tear film anatomy and physiology
- Theory of bacterial infection
- Theory of viral infection
- Theory of fungal infection
- Anatomy and physiology of the eyelids
- Theory of auto-immune effects on the lids
- Theory of allergic response - immediate and delayed

Basic Clinical Contact Lenses

- Corneal contour and shape - topography
- Theory of hydrophilic lens - spherical
- Theory of rigid lens - spherical
- Theory of hydrophilic lens - toric
- Insertion and removal of rigid and hydrophilic lenses
- Theory of care products for rigid and hydrophilic contact lenses
- Patient identification for contact lenses
- Physiological attributes to promote contact lens wear
- Modification to existing rigid contact lenses
  - Proper edge design
  - Surface polish
  - Addition of surface power, both positive and negative
- Basic concepts of contact lens delivery to patient
- Information and tests necessary to ensure the successful wear of contact lenses - the progress evaluation and follow-up
- Problem solving for hydrophilic and rigid contact lenses - critical thinking

Advanced Clinical Contact Lenses

- Theory of rigid lenses - toric
- Keratoconus - recognition and contact lens therapy
- Post-surgical use of contact lenses - corneal transplantation and refractive surgery
- Cosmetic contact lenses, rigid and hydrophilic
- Theory of prosthetic eye application
- Recognition and management of corneal complications from contact lens use
- Identification and management of corneal distress from contact lens use
- Bifocal contact lens application and fitting, rigid and hydrophilic
- Managing the dry eye patient with contact lenses - strategies
- Continuous wear of contact lenses, rigid and hydrophilic
- Theory and clinical application of corneal topography in patient management
- Introduction of corneal molding to augment correction
- Surgical options for refractive correction

Each student will be educated in all the above from a theoretical-classroom perspective. This is an assurance to each student.

Table 2: Working Document for Laboratory Skills

Basic data collection

- Case history
- Entrance tests necessary to measure and evaluate the cornea
  - Keratometry
  - Tear break-up assessment
- Slit lamp biomicroscopic evaluation of the anterior segment
- Basic subjective refraction - distance and near
- Global assessment of the visual system

Basic hydrophilic lens selection - selecting a lens based on data collection

- Water content
- Base curve parameters
- Lens power
- Wearing or replacement schedule

Basic hydrophilic lens evaluation

- Movement
- Centration
- Physiologic response
- Over-refraction for power assessment

Basic hydrophilic lens insertion and removal

Ability to instruct a fellow student in the insertion, removal, and care of a hydrophilic lens

Basic tenants of toric hydrophilic lenses

- Selection of lens
- Evaluation of lens on eye

Basic use of cosmetic hydrophilic lenses

Basic rigid lens selection

- Base curve
- Optic zone
- Over-all diameter
- Fitting and peripheral curves
- Lens power
- Center thickness
- Material

Basic rigid lens evaluation

- Movement
- Centration
- Fluorescein evaluation
- Physiological response to lens
- Over-refraction

Basic rigid lens insertion and removal

Centration of a decentered rigid lens

Ability to instruct a fellow student in the insertion, removal and care of a rigid contact lens

Advanced Demonstration Laboratory - In the Advanced Laboratory, students have the ability to interact with patients and instructors through closed-circuit television assessment of the patient. This provides opportunities in lens design, selection, and on-eye assessment.

- Interactive rigid lens bifocal assessment
- Interactive rigid lens keratoconic assessment
- Interactive post-surgical assessment - rigid and hydrophilic
- Interactive high-cylinder assessment - rigid and hydrophilic

Table 3: Working Document on Applied Knowledge

Clinically, each student will be able to perform the following:

Complete a contact lens screening including all theoretical skills and ocular evaluations.

Complete a contact lens fitting for:

- Basic spherical hydrophilic contact lens
- Basic spherical rigid contact lens
- Complete a dispensing of materials, including instructions on lens handling and care

Complete a progress evaluation on:

- Basic hydrophilic contact lens patient
- Basic spherical rigid contact lens patient

Evaluate a minimum of 5 hydrophilic contact lens patients and 2 rigid contact lens patients through screening and/or fitting and/or dispensing and/or progress evaluation.

- A minimum of 18 contact lens patient encounters is necessary to complete the rotation in Cornea and Contact Lenses.
- The patients are recruited from the Illinois Eye Institute and from outside sources.
- Historically, the number of patient encounters expected has been supplied from the patient population.

Table 4: Expansion of Applied Knowledge Guidelines

Clinically, each student will be able to perform the following:

Complete a contact lens screening including all theoretical skills and ocular evaluations

Complete a contact lens fitting for:

- Basic spherical hydrophilic contact lenses
- Basic spherical rigid contact lens patient

Complete a dispensing of materials including instructions on lens handling and care

Complete a progress evaluation on a:

- Basic hydrophilic contact lens patient
- Basic spherical rigid contact lens patient

Complete criteria sign-off sheet

Evaluate through screening, fitting, dispensing or progress report a minimum of:

- 10 hydrophilic contact lens patients
- 4 rigid contact lens patients
- 2 keratoconus patients

A minimum of 25 contact lens patient encounters is necessary for successful completion of a full rotation in cornea and contact lens.

- Once again, this number is generated based upon historical patient visits to the CCCE.

Conferences will be provided on the following topics, at minimum:

- Complications
- Presbyopic lens options
- Toric lens options
- Keratoconus
- Basic RGP troubleshooting

knowledge, further criteria were required as outlined in Table 3.

After the first year of implementation, it was felt that the criteria were insufficient and the adaptations in Table 4 were recommended.

A skill sheet was implemented to certify criteria and verify skillfulness. In summer 2001-02, we began including this skill sheet with the orientation packet as a pilot. The initial sheet required the evaluation of a patient wearing soft bifocals. The patient population supported less than 50% of the students meeting this criterion so it was removed but the applied knowledge remained. Over the 2001-02 academic year, skill completion steadily improved until it reached 100 percent in spring 2001-02. For academic year 2002-03, the criteria and skill sheet were added to the syllabus and required for completion of an eight-credit hour rotation. Failure to achieve skill completion would result in an "incomplete" grade for the rotation requiring remediation. Table 5 is

Table 5: Entry-to-Practice Tool

Criteria	Faculty	Date
Soft sphere/asphere contact lenses		
• Successfully fits soft spheres		
• Demonstrates working knowledge of SCL options		
• Appropriately and accurately evaluates soft lenses		
• Provides appropriate follow-up on SCLs		
• Properly instructs a patient on insertion, care and removal of SCLs		
Soft toric contact lenses		
• Demonstrates working knowledge of toric options		
• Appropriately and accurately evaluates toric lenses		
• Demonstrates understanding of appropriate toric rotation and impact upon CL Rx		
Soft bifocal contact lenses		
• Demonstrates working knowledge of soft bifocal options		
• Appropriately determines the power and add of soft bifocals		
Rigid sphere/asphere contact lenses		
• Demonstrates working knowledge of RGP options		
• Appropriately selects RGP parameters: OAD, OZ, BC		
• Appropriately and accurately evaluates RGPs		
• Provides appropriate follow-up on RGPs		
• Demonstrates proficiency in RGP verification		
• Demonstrates proficiency in polishing RGPs		
• Properly instructs patients on insertion, care, and removal of RGPs		
Keratoconus		
• Appropriately and accurately evaluates the signs of keratoconus		
• Appropriately and accurately evaluates the fit of keratoconic lenses		
• Demonstrates working knowledge of keratoconic lens designs		
• Appropriately and accurately evaluates corneal topography		
Specialty RGPs		
• Demonstrates understanding of uses of toric RGP designs and selection		
• Demonstrates understanding of uses of bifocal RGP designs and selection		

the current tool in use within the CCCE.

Results

During the development of the entry-to-practice competency, trends in patient encounters in the CCCE have shown a steady upward trend. (Figure 1) In addition, our externship program has continued to grow and now includes several sites that offer contact lens experience to our students. This has reduced the number of students on campus for their contact lens rotations. In the winter quarter 2001-2002, an eight-credit hour rotation was increased from two four-hour sessions to four four-hour sessions in the service. Coupled with our increase in patient census, the total number of contact lens patient encounters for students completing a contact lens rotation at the Illinois Eye Institute increased from just fewer than 30 to over 60. (Figure 2) Therefore, for the 2003-04 academic year a minimum of 50 patient encounters is required for a four four-hour session rotation. Also for 2003-04, the credit hour distribution was modified to 10 credits for the four sessions and five credits for the two sessions. Figure 3 shows the trends in greater patient diversity and so the student experiences were apparently impacted by the addition of the competency criteria. It appears that when this list of competencies was made mandatory for completion of the rotation in summer 01-02, all students had experience with the more complex patients. In addition, with advancement in accelerated ortho-k, refractive surgery and silicone hydrogels, a conference topic of 24h vision options was added to the curriculum.

Discussion

Criteria were intended to establish preparedness for general practice including educated and appropriate referral where appropriate.[2] It was also the intention of the faculty to provide new practitioners with the skills to appropriately order laboratory designed preliminary lenses. Therefore verification of successful skill completion required attention to certain details. Typically students wait until the second half of the quarter so that they have a baseline of clinical experience and can demonstrate skill mastery. Knowledge and skill must be demonstrated through discussion and recommendations in patient care.[3]

To properly complete the sections addressing soft lenses, soft torics, and gas permeable lens designs, the following procedure has been instituted. Initially, students make more general-

ized recommendations on contact lens cases. As the quarter progresses, students are asked to recommend specific lenses. They are asked to consider water content, materials, wetting, replacement schedule, toric stabilization, etc. Students must also be proficient at insertion and removal of both rigid and soft lenses. They must be able to properly assess lens fit. They are required to properly verify lens parameters and polish lenses. While graduates may choose not to actively fit RGPs, they must be able to provide primary care for those who are already wearing such designs.[2,4]

The soft bifocal category required a change since we did not have enough patients to evaluate student lens assessment. However, we felt that, with the recent advances in soft bifocals, an understanding of patient selection, near versus distance center designs, and choosing an initial lens are part of "general practice." It is our understanding that in all modes of optometric practice, patients may enter asking for these items. Students should at least theoretically be able to order/ choose a diagnostic lens appropriate for a patient's ocular physiology, visual needs, and refractive status.

Similarly for RGP torics and bifocals we felt it important that graduates be comfortable with basic designs when they are appropriate. We ask students to define a patient who might be a good candidate for a toric RGP, the difference between back, front, and bitorics and which is more appropriate for patients with corneal cylinder less than, equal to, or greater than refractive cylinder. Our understanding is that graduates may need to order a lens from a laboratory for diagnostic purposes or in other cases they may choose to make an educated referral.

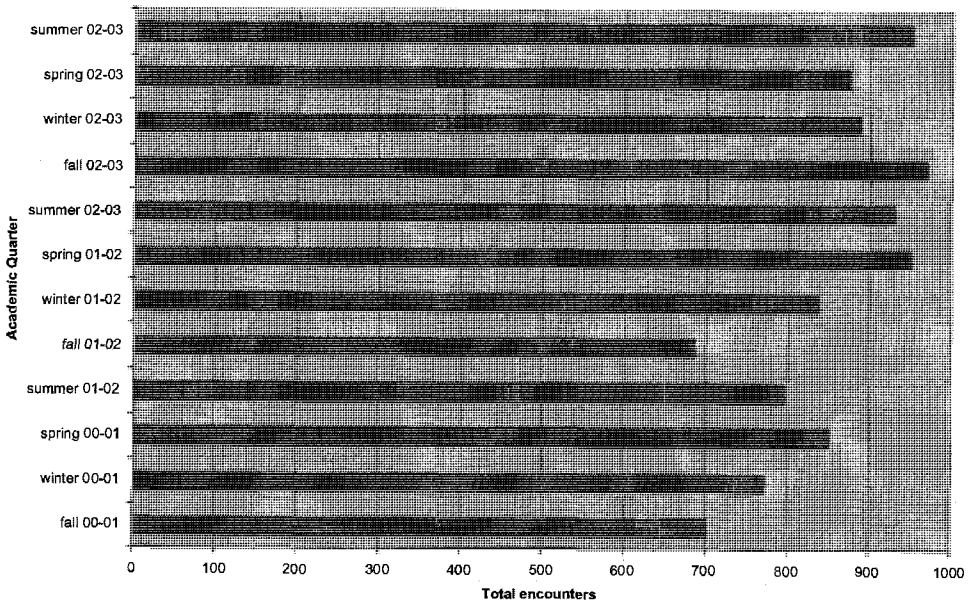
For bifocal RGPS, a similar approach is used. Students are asked about designs: simultaneous and translating and basic principles of fit including centration, steep versus flat, and movement. Consideration of visual needs, patient expectations, and critical vision demands is also stressed. The intention is to prepare the students to order a preliminary lens and properly evaluate it or to properly educate patients on their options while making an appropriate referral.

The final category is keratoconus. The criteria require students to view and name the signs of keratoconus: Vogt's striae, steepening, thinning, Fleischer ring, Charlot's sign, and Munson's sign. It requires the evaluation of corneal topography: toric cornea versus keratoconus, type of kone, and knowledge of normal and abnormal corneal thickness. Students must also be able to evaluate a keratoconic patient's lenses and determine whether a fit is acceptable or not, so they may attempt refit or refer. They are further expected to know the difference between an aspheric and a multicurve design and their benefits so they may make an order.

Some may consider the specialty lens criteria above entry level. However, optometrists continue to be the primary eyecare givers in many rural settings. Thus, it may be necessary for new O.D.s to work with a laboratory to design preliminary lenses. At minimum, it is our assertion that new graduates should be able to evaluate patterns and to make intelligent referrals. It is also important to note that Canadian boards still require judgment of fluorescein patterns to enter practice.

Over the past 20 years, medicine has faced similar challenges to its educational programs. Optometry has begun focusing on these challenges in the last ten years. Medicine has encouraged the establishment of objectives-based teaching, in addition to traditional lectures and problem-based learning.[5,3] The challenge issued by ASCO further upholds this thinking.[1] In the process of developing these objectives, our quarterly conferences had to be evaluated. In so doing, it became apparent that the confer-

Figure 1: Patient Census



*Note that an encounter is a patient visit to the CCCE Clinic. This visit may be for screening, fitting, dispensing, progress evaluation, or for information to patient reasons.

Figure 2: Trends in Student Patient Encounters

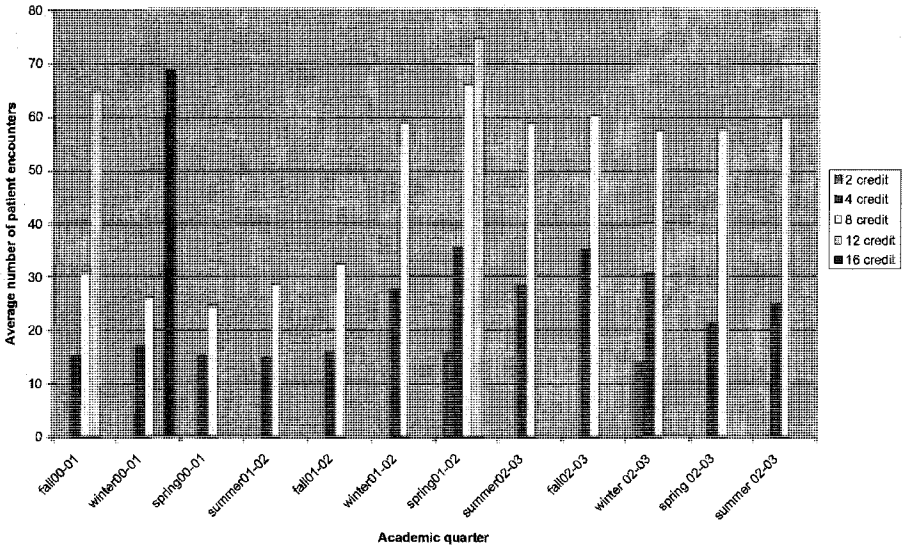
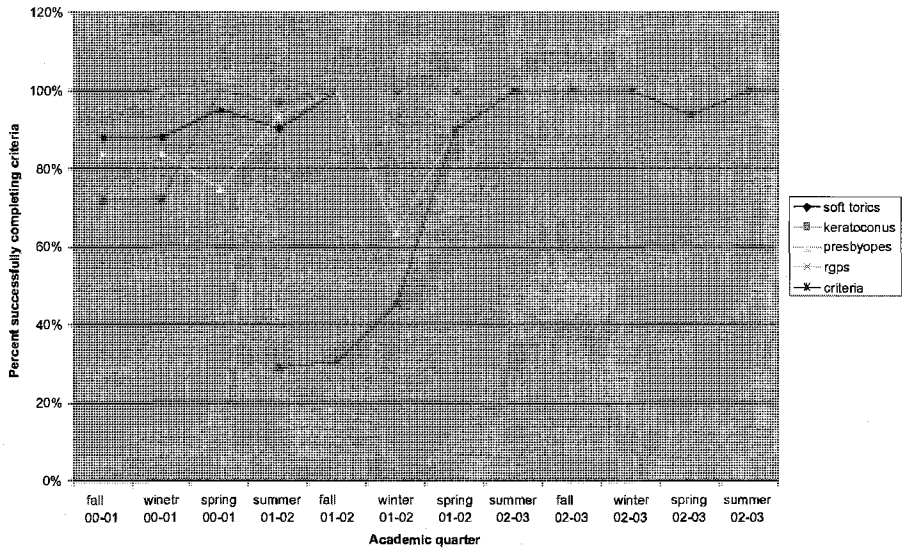


Figure 3: Tracking Successful Completion of Entry-to-Practice Criteria



ences needed to parallel our objectives and be consistent across all quarters. Therefore, the same six topics are presented every quarter. Certain topics are presented in a case based fashion, some are given in a game show type of format, and others are more discussion or lecture style. At times when patient care opportunities are limited, we review many of the categories established as entry to practice. We utilize cases as well as interactive computer materials and our white board to facilitate discussions. It is important to note that student evaluations of the CCCE faculty are at an all time high and are among the highest in the Eye Institute. One of the most satisfying outcomes was a statement from a student, "It's nice to know that your goals are the same as mine."

To further evaluate student impressions of their rotations and the impact of these changes, a survey could be developed for graduates over the last four years querying them on how comfortable they were with contact lenses upon graduation and their preparedness for private practice.

Conclusions

ASCO has challenged the faculty of each optometric institution to establish criteria necessary for entry into general practice optometry. The contact lens faculty at the Illinois College of Optometry has developed a tool to aid them in certifying their graduates as competent in contact lenses. Since the development of this tool, students see a greater variety and a greater number of contact lens patients. Faculty evaluations are at an all time high as is the number of patient encounters. It is for the faculty of the other colleges and the other members of the Association of Optometric Contact Lens Educators to determine the appropriateness of similar criteria at their institutions.

Implementing these competency-based criteria across our externship sites that offer contact lens rotations will be the next challenge for ICO. Currently, these criteria are not required at external sites. Some students may not have the same experiences on external rotation as they do on campus. A level of consistency for the 10-credit hour rotations needs to be obtained.[6] This may lead to a variety of different outcomes including more students returning to campus for the contact lens rotations. It may also lead to a need for an increased number of private offices that specialize in contact lenses to serve as externship sites. To facilitate this implementation, an objectives list for off-campus providers will need to be created.

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Factors Affecting the Reliability of Ratings of Optometry Students' Clinical Skills

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Abstract

The sources of variance and their impact on reliability were measured for a new global rating scale used to grade student performance. Using generalizability theory, the sources of variation in the evaluation tool (instructor, student, item) were isolated and measured using analysis of variance. The variance components were then used in a decision study to redesign the evaluation tool to improve reliability. The majority of the variability was attributable to the evaluator rather than the student or the items on the scale. While the reliability increased with the use of additional raters and items, it was not possible to obtain reasonable reliability using this tool.

Key Words: *optometry, education, generalizability theory, reliability, clinical training, evaluation*

Introduction

The rating of clinical competence in a training institution is the process and result of capturing the clinical instructor's subjective assessment concerning the knowledge, skill and judgment of a student on a quantifiable scale for the purpose of evaluation.[1] Global rating scales used in the context of patient care are a frequently used tool for this purpose.[2,3] These scales generally consist of a series of descriptors, each of which can be evaluated along a continuum from very poor to excellent performance.[4]

Global rating scales have been used frequently in the assessment of clinical performance.[1,2,3,5] The results of these assessments are used both to provide students with feedback (formative assessment) and to make pass-fail decisions (summative assessment). Students can use the numeric grade and the written comments to help guide them in their development, especially to address areas of weakness. This is important as self-assessment and external assessment by experts often correlate poorly.[6] The assessments are also used to calculate the student's grade for the purpose of determining if a minimum level of competency has been reached. This information is used independently or in combination with other methods of assessment for pass-fail decisions.

Using global rating scales to evaluate performance in a clinical setting has a number of advantages. The main advantages of global rating scales are: (1) various aspects of performance, including interpersonal skills, can be evaluated; (2) test costs can be kept lower than for multiple choice questions, patient management problems or videotaped performance evaluation; (3) test obtrusiveness can be kept lower than with other techniques so the measurement has less effect on the performance; (4) rapid formative feedback is achievable; and (5) clinical instructors are familiar with this test strategy.[4,7] In addition, it is possible to provide multiple assessments over a given clinical rotation using these scales, a feature that is not possible using other examination formats.

The validity and reliability of these tools, however, has been questioned.[8] Factors affecting the reliability and validity of the rating scales include the rating format (type of scale, anchoring of the scale, number of items), the setting in which the rating is conducted (university or field-based assessment), rater characteristics (inter-rater reliability, interests, relationship to the student and training), the rating process (external and internal factors affecting the raters, expectations about the level of performance throughout the academic year, and patient profile (e.g., severity of illness).[1,2,3,7]

In the late 1990s a new tool for evaluating student performance in the Primary Care Clinic was developed and implemented. It incorporated global rating scales and written feedback. Using generalizability theory[9], we looked at the sources and relative magnitudes of errors in the rating process. In this paper, we address two specific questions: 1) What are the magnitudes of the evaluation tool's sources of variance? and 2) What effects would varying the numbers of raters and items have on the reliability of this evaluation tool?

Methods

In 1999-2000 the University of Waterloo, School of Optometry, introduced a standardized clinical evalua-

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Figure 1: Standardized Primary Care Clinic Student Evaluation Form.

University of Waterloo
Eye Care Centre
Primary Care Intern Evaluation

Intern: _____ No. of patients seen: _____ Date: _____

Indicate the intern's level of performance by placing an "X" anywhere on the rating scale for each area to be evaluated. Please see the reverse of the form for behavioural descriptors that define the levels of performance.

Case History, Counselling and Record Keeping:

1 2 3 4 5 6 7

Technical Ability:

1 2 3 4 5 6 7

Analysis:

1 2 3 4 5 6 7

Efficiency:

1 2 3 4 5 6 7

Professionalism:

1 2 3 4 5 6 7

Infection Control and Cleanliness:

1 2 3 4 5 6 7

Ethical/Legal Violation: ☐ No ☐ Yes (if yes, explain)

Comments:

Supervising Doctor's Name: _____ OPT. MAY 89 5154-1

Table 1: Examples of Behaviors at Levels 1, 4 and 7 on the Technical Ability Scale.

Level	Descriptors*
1 (bottom)	• missed retinal detachment on BIO • denuded epithelium with the tonometer probe • subjective refraction incorrect by more than +.50 or -.75 sphere or cyl • failed to identify a 20pd constant esotropia
4 (midpoint)	• cover test measurement within 4pd • add determination within 0.25D • subjective refraction within +0.25 and –0.50 sphere • described the C/D ratio within .2
7 (top)	• taught doctor a new clinical technique • found retinal lesion using scleral indentation • retinal lesions documented properly with photography

* These descriptors along with ones for each of the other scales were printed on the back of the Primary Care Student Evaluation Form shown in Figure 1.

tion form for use in the Primary Care Clinic (one of nine clinical areas in the on-site clinic). The items on the clinical evaluation form were designed to measure six behaviorally specific skills important to the practice of optometry (case history, counseling & record keeping; technical ability; analysis; efficiency; professionalism; and infection control & cleanliness). Figure 1 shows the evaluation form used. A seven-point scale with a range of one to seven was used for each item. The top (seven), bottom (one) and midpoint (four) of the scales were weighted with behavioral descriptors appropriate to that ranking. As an example, the descriptors for the technical ability scale are given in Table 1.

Optometry students in the final year of the four-year program were evaluated daily during their Primary Care (PC) Rotation. This PC rotation involved a five-week period of assignment to the PC clinic for four days per week plus a variable number of additional PC days were also assessed (on average, seven).

Full-time faculty members, part-time faculty members from community practice and residents filled out an evaluation for every full or part day of contact with a student. A non-compensatory approach was used such that the defining behavior determined the grade. That is, if the behavior was notably poor or excellent on an item, that behavior was graded rather than averaged into the overall performance. While the evaluation encompassed performance across several patient encounters, the evaluations did not average across those encounters. All PC instructors were optometrists. There were 57 students evaluated by a total of 32 different instructors. Over the course of the year a total of 1,532 clinical evaluation forms were completed.

Ethics clearance for the study was obtained from the Office of Research Ethics, University of Waterloo. All students and evaluators were identified by a number for analysis. The key identifying the students and clinical instructors was known to only one of the researchers and kept in a secure location. The University of Waterloo, Office of Research Ethics, adheres to the tenets of the Declaration of Helsinki.

Measures commonly used to compute inter-observer reliability, such as the intra-class correlation, can only look at the contribution of the one

source of variation in the ratings obtained at a time. Correct interpretation of data is possible only if all other sources of error do not contribute in a significant way to the observed variation between ratings. In data such as ours there are multiple sources of variation affecting the outcome. In generalizability theory, different sources of variation can be isolated in the measurement and the magnitude of each source of variation can be estimated using an analysis of variance.[10] Once this analysis is completed, a generalizability coefficient is produced that is analogous to classical test theory's reliability coefficient. The generalizability coefficient is the extent to which the sample of scores that are obtained for an individual are generalizable to the universe of possible observations for that individual.[9]

The generalizability coefficients were calculated using the following equation:

$$G^2 = \frac{\sigma^2(p)}{\sigma^2(p) + [\sigma^2(r{:}p)/k] + [\sigma^2(pi)/m] + [\sigma^2(ri{:}p)/km]}$$

Where "g" is the generalizability coefficient, "σ^2" is the estimate of the variance (variability) for each of the component terms, "p" is the student, "i" is the item, "r" is the evaluator or rater, "k" is the number of raters for the decision study and "m" is the number of items for the decision study. The rater-nested-within-person component is "r:p" (not every person was evaluated by the same set of raters) and the rater-nested-within-person-by-item interaction is "ri:p" represents the residual variability or error. The term pi represents the interaction of the person and the item.

The variance components that are estimated by the analysis of variance can be used to redesign the measurement to obtain improved generalizability. This process is referred to as a decision study. It is important to know if the decisions to be made in the assessment process are to rank-order individuals (norm-referenced) or to determine if the individual achieved a certain standard (criterion-referenced). Our study was a norm-referenced design.

The number of evaluations completed for individual students varied in the PC rotation. There were between 19 and 42 evaluations per student and 27 different clinical instructors. An average of 12 clinical instructors evaluated each student. As such, this was an unbalanced design. The urGENOVA software by Brennan[11] was used to generate the variance statistics because of its ability to deal with the unbalanced design.

Results

Each student was evaluated by an average of 12 different clinical instructors on an average of 27 occasions. Seventeen evaluations were missing one of the grades on the evaluation form and were eliminated from the data set. Each evaluator completed an average of 48 evaluations with a standard deviation of 52 (range 1 to 193).

Table 2 shows the relative magnitudes for each of the five sources of variance evaluated in this study. The variance component and the percentage of the variance contributed by each of the variables are indicated.

In this analysis the rater (r) is the clinical evaluator, the person (p) is the student and the item (i) is the scale. Differences between students did not contribute greatly towards the outcome of the evaluation as the variance attributable to the person was only 3%. The clinical evaluators did not differentiate between the different scales when evaluating the students as indicated by an item score of only 4%. The second largest component was the rater-nested-within-person component (r:p), which contributed 29% of the variability to a single score. This suggests that the student's item score was instructor dependent. That is, the evaluation result was largely dependent upon the individual clinical evaluator. The largest variance component was the rater-nested-within-person-by-item interaction (ri:p), which contributed 60% of the variability. This is the residual effect consisting of a combination of the person, rater and item as well as unmeasured variables and/or random events. Therefore, a large amount of the variation was due to these confounded sources of variation.

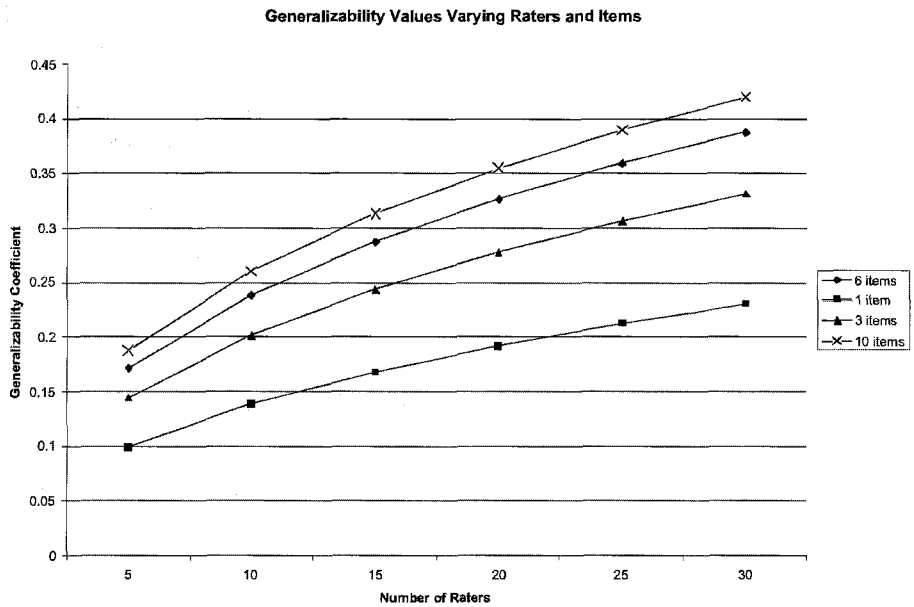
In the decision study, the number of raters (clinical evaluators doing the evaluations) and items were varied to estimate the generalizability coefficient (reliability). The intent was to determine the minimum number of raters and items that would be needed to achieve a reasonably reliable evaluation of the student. The number of raters was varied from five to 30 and the number of items was varied from one to 10 items. Figure 2 shows that reliability increased with the use of additional raters and items in the evaluation process. However, it was not possible to obtain reasonable reliability using this tool even when there were 30 evaluations performed by different evaluators using a 10-item scale. In this best case scenario, the G coefficient was .42 suggesting that only 42% of the variability could be accounted for by the performance of the student. Carline[7] suggests that reasonable reliability lies between 0.7 and 0.8. Therefore, it was not possible to use the data to redesign the tool to improve the reliability of the ratings.

Table 2: Generalizability Study Variance Component Estimates for (r:p) X i design.

Source of Error	Variance component	Percentage %
person (p)	.025	3
Rater:person (r:p)	.248	29
Items (i)	.038	4
pi	.027	3
ri:p	.509	60

Persons (p) are the 4th year optometry students, raters (r) are the clinical evaluators doing the evaluations and items (i) are the individual scales, (r:p) is the rater-nested-within-person effect, (pi) is the interaction between persons and items and (ri:p) is the residual component.

Figure 2: Generalizability Coefficients for the Primary Care Clinic Rotation. The G Coefficients Are Estimated for 5 to 30 Raters and for 1, 3, 6 and 10 Items.



Discussion

The results of this study show that a significant portion of the variability in the 1999-2000 PC Clinic student evaluations was due to the variability among the PC clinical instructors. This effect has been shown by other researchers studying student evaluations using generalizability theory.[7,12,13]

Increasing the reliability would involve addressing a number of the sources of variability. Improvement in the variation among the instructors could be achieved with instructor training to improve consistency in rating similar performance. Greater consistency can be achieved by implementing frame-of-reference training, where new instructors discuss their rating with experienced instructors, and by providing long-term feedback on consistency of rating behavior compared to the group.[1] Involving the instructors in defining the expectations for performance is also helpful.[1] With a large number of raters, this form of training becomes logistically difficult as well as expensive.

Reliability and validity of the ratings could also be improved by using raters with similar backgrounds and level of experience. While novice raters as a group can make reliable ratings, they provide different measures of performance and use different criterion to evaluate the students than those that the expert raters use.[7,14] Taylor[15] showed that years of teaching experience is an important factor in the ability of the rater to assess cognitive levels in students. In our study, this would translate into the rater's ability to judge the cognitive factors on the rating scale, such as analysis.

More direct observation of clinical skills can also improve rater reliability. Many of the student's clinical skills are often not directly observed by the raters, who simultaneously supervise up to four students, and thus ratings tend to reflect the skills used in case presentation and case management.[16] Reducing the variability in the amount of time each instructor spends observing the student and standardizing the expectations for checking findings can also reduce the variability of assessment, especially in history taking, and technical skill assessment.

Another source of variability is the individual rater's willingness to identify deficient performance. At the University of Waterloo, students receive copies of their PC intern evaluations prior to completing clinical teaching evaluation on their instructors. Thus, clinical teaching evaluations by the students are potentially influenced by their prior knowledge of the clinical evaluation. This realization provides disincentive to some instructors to strictly adhere to the rating protocol for fear of student retribution. As teaching evaluations by students are one source used to assign merit scores and salary increments to instructors, the fear of retribution can be compelling. There is concern that assigning low ratings will affect the interpersonal relationship with the student and affect the instructor's ability to act as a teacher as well as an assessor.[1] Also, there is a reluctance to give failing grades in part due to the lengthy appeal process available to students.[17] This social context of evaluation needs examination in future studies.

This study found that little of the variation in the clinical grades was attributable to the items on the evaluation form. This finding is consistent with a "halo effect" in which all ratings are characterized in a positive or negative way by a single characteristic and has been found consistently with the use of global rating scales.[1,16,17] It is possible that the instructors found it too time consuming to consider each item individually when grading the student. Instead of making individual judgments on each of the global rating scales, the instructor formed an overall impression of the performance and did not distinguish between attributes or skills.

The decision study analysis showed that increasing the number of instructors evaluating each student would improve the reliability of the measure but not sufficiently to deem it a reliable tool. The resultant generalizability with a 10-item scale and 30 assessments was .42, which did not reach an acceptable reliability of between .7 and .8.[7,18] The average number of assessments obtained by each student was 27. It would be difficult to obtain a consistently greater number of evaluations within the typical PC rotation due to competing educational objectives necessitating other clinical assignments; thus achieving a reliable measure based on the necessary number of evaluations is not realistic. Feeley came to a similar conclusion when validating an assessment tool used in medicine.[14]

While improvement in the reliability of the evaluation tool may be obtained with rater training and attention to the social context of the evaluations, it is likely that additional methods of evaluation are required to adequately assess clinical competence. This suggestion has been supported by other researchers.[1,16,17,18] The

global rating scales are useful to maintain because they provide timely formative feedback to the student and program director; they provide a measure of interpersonal skills, attitudes and professionalism; they are easy to use and time friendly for the rater;[16] and they provide a written set of expectations for performance. As this study shows, the problems with these scales are their lack of inter-rater reliability, their insensitivity to performance deficits[15] and their inability to make differentiated judgments.[1,15,17]

The objective structured clinical evaluation (OSCE) is a form of performance assessment that has gained popularity in recent years.[16] With an OSCE, candidates rotate through a series of stations based on pre-determined competencies.[19] The stations allow sampling of a broad spectrum of clinical skills including data interpretation, communication, and physical examination. Reliability is attained, in part, by the use of standardized patients (someone other than a health care professional who is trained to portray a patient in a standardized and reproducible fashion). The OSCE is a primarily summative assessment tool that can be used at the end of the clinical training to supplement the use of the global rating scales for the final pass-fail decision.

In summary, the global rating scale used in our optometry teaching clinic to evaluate student performance in the PC Clinic was found to measure instructor rather than student performance. Adjusting the number of items on the scale and the number of evaluations did not have sufficient power to produce a reliable measure. Although the tool offers some benefits, it needs to be coupled with an additional reliable measure of clinical performance (e.g., an OSCE) to provide an appropriate measure of clinical competence. In fact, the UW School of Optometry is in the process of developing an OSCE.

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Medical Observations In Optometric Education

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Abstract

Traditionally, optometry students have gained insight into the doctor/patient relationship by observing experienced optometrists. In addition to optometric observations, first year students at the New England College of Optometry have been assigned to observe non-ophthalmic medical providers. The purpose of this study is to evaluate and define the role of medical observations in optometric education. ***Methods.*** *Eighty-three students were each assigned to two medical observations. At the end of the school year, the students were surveyed about the value and role of the medical observations.* ***Conclusion.*** *Data generated from this study indicate that students regard medical observations as a good learning experience. The data also indicate that a significant role of medical observations in optometric education is to provide a role model for doctor/patient interaction and for obtaining and discussing sensitive information. An unanticipated benefit of the program is the opportunity to educate providers about optometric education.*

Key Words: *Optometry, education, communication, observations*

Introduction

Effective communication between doctor and patient has long been recognized as an important component of providing high level patient care.[1] Communication is defined by the Association of American Medical Colleges as a "transactional process in which messages are filtered through the perceptions, emotions and experiences of those involved."[2] Frymoyer defines communication in the clinical setting as the process of influencing patient behavior producing changes in knowledge, attitude and skills required to maintain and improve health.[3]

Good physician-patient communication has been associated with improvements in: patient and physician satisfaction,[1,3,5] patient compliance,[3,4,6,7,8,9] better and more appropriate medical decisions[3] and a decrease in litigation.[9,10] In 1997, it was estimated that rates of non-compliance with physician's instructions reached 80% and the cost to individuals, businesses and society reached more than 137 billion dollars per year.[4] Levinson notes that "primary care physicians who communicate effectively with their patients have fewer medical malpractice claims brought against them than those who communicate poorly."[9]

Furthermore, Garrison states that "trust and satisfaction in the physician-patient relationship is the cornerstone of quality health care."[11] Communication is the tool used to establish and nurture the physician-patient relationship. A clinician's interpersonal communication skills are not innate and solely a function of the clinician's personality.[8] It is also well established that the interpersonal skills of a clinician can be taught and improved.[12]

Recent curriculum revisions at the New England College of Optometry (NEWENCO) addressed strategies for teaching communication skills. Clinical observations, a commonly used teaching method in optometry schools, was one strategy utilized for the teaching of communication.[13] Traditionally, optometry students gain insight into the doctor/patient relationship by observing experienced optometrists and/or upper class students. In addition to observing experienced optometrists in practice, first year students at NEWENCO were assigned to observe non-ophthalmic medical providers (medical doctors, certified nurse practitioners, physician's assistants, registered nurses and podiatrists). The goal of the observation program was the development of student skills in communication through observation of an experienced practitioner and his/her patients during an examination.

The hypotheses that led to the initiation of the medical observation program were twofold: medical observations provide a good learning experience with a unique perspective in the teaching of communication, and students are more focused on communication in a medical setting versus an optometric setting because they aren't focused on the examination process. The purpose of this study is to evaluate and define the role of medical observations in optometric education.

Methods

Eighty-three students from the class of 2006 were each assigned to two medical observations with the same provider. The variety of practice

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settings included: health maintenance organizations, private practices, community health centers and college health centers. A number of specialties were represented: internal medicine, pediatrics, endocrinology, family practice and podiatry. Students and providers were apprised of the goals and objectives of the observation program. To support the observation experience, all students were required to write a journal entry that related the concepts learned in the reading assignments and lectures to the communication issues that were observed. At the end of the school year, the students were surveyed twice. The first survey was a general survey, consisting of 9 questions rated on a 5 point Likert scale (1= strongly agree, 5 = strongly disagree) and an opportunity to comment on the program. The second survey, also rated on a 5 point Likert scale, compared specific aspects of the medical and optometric observations. All the surveys were anonymous; neither the provider nor the students' names were listed. The results from the first survey were tabulated for response frequencies and the results from the second survey were analyzed using the Chi Square tests.

Results

The first survey (Table 1) was returned by 75 students for a response rate of 90%. The second survey (Table 2) had a response rate of 83% (69 of 83 students). Results from the first survey showed that 89% of the students agreed that medical observations provided an opportunity to observe communications skills. Fifty-four percent of the students felt medical observations were a good learning experience and 60% felt they observed communication skills that would be useful in their practice of optometry. Fifty-two percent of the students did not agree that they were more focused on communication at the medical observations compared to the optometric observations, 28% agreed with the statement, and 20% had no opinion. Seventy-eight percent of the students in the first survey felt medical observations gave them an opportunity to observe a provider's style in obtaining and discussing sensitive information. The second survey repeated this question using specific examples.

Table 1

Questions for Survey 1	strongly agree (%)	agree (%)	no opinion (%)	disagree (%)	strongly disagree (%)
The medical observations provided an opportunity to observe communication skills.	36.0	53.3	4.0	5.3	1.3
The medical observations were a good learning experience.	21.3	32.9	25.3	14.7	5.3
During the medical observations, I observed communication skills that will be useful to me in my practice of optometry.	25.3	34.7	22.7	9.3	8.0
In comparison to the optometric observations, during the medical observations, I was better able to focus on the doctor/patient interaction since I was less interested in the medical procedures or techniques.	9.3	18.7	20.0	38.7	13.3
The medical observations gave me an opportunity to observe a provider's style in obtaining and discussing sensitive information.	24.0	54.0	11.0	9.3	2.0
During the medical observations the provider asked me questions about the field of optometry.	12.0	21.0	6.7	30.7	22.7
During the medical observation I learned about the delivery of health care to a specific community.	15.0	39.0	20.0	18.0	8.0
During the medical observations I learned more about the medical provider's scope of practice.	13.3	32.0	30.7	21.3	2.7
During the medical observations the patients asked me questions about the field of optometry.	8.0	17.3	10.7	26.7	37.3

Table 2:
Comparison Between Optometric and Medical Observations

Questions for Survey 2	strongly agree (%)	agree (%)	no opinion (%)	disagree (%)	strongly disagree (%)	p value p<.05 is significant
The optometric observation gave me the opportunity to observe a provider's style in obtaining and discussing sensitive information (for example: alcohol use, drug use, sexual history, etc).	14.5	40.6	17.4	18.8	8.7	p=.0377
The medical observation gave me the opportunity to observe a provider's style in obtaining and discussing sensitive information (for example: alcohol use, drug use, sexual history, etc).	37.7	30.4	20.3	4.3	7.2	
The optometric observations gave me an opportunity to observe a provider's style in providing patient education and strategies for compliance (for example: medication regimens, lifestyle changes, the importance of follow up care, etc.).	31.9	59.4	5.8	1.4	1.4	p=.0391
The medical observations gave me an opportunity to observe a provider's style in providing patient education and strategies for compliance (for example: medication regimens, lifestyle changes, the importance of follow up care, etc.).	24.6	43.5	23.2	8.7	0	
The optometric observations gave me an opportunity to observe a provider's methods for efficient communication (for example: being able to obtain a case history quickly and accurately, efficient delivery of information, etc.).	42.0	49.3	8.7	0	0	p=.0684
The medical observations gave me an opportunity to observe a provider's methods for efficient communication (for example: being able to obtain a case history quickly and accurately, efficient delivery of information, etc.).	29.0	36.2	20.3	11.6	2.9	
The optometric observation gave me the opportunity to observe efficient clinical and critical thinking skills.	23.2	56.5	18.8	1.4	0	p=0.0000
The medical observation gave me the opportunity to observe efficient clinical and critical thinking skills.	20.3	37.7	23.2	13	5.8	
The optometric observation gave me a role model for problem-specific versus routine care.	18.8	46.4	23.2	11.6	0	p=0.0000
The medical observation gave me a role model for problem-specific versus routine care.	26.1	30.4	21.7	13	8.7	

Table 3: Positive Student Comments

I enjoyed the observations. It is nice watching other practitioners; it helped to learn how I want to interact with my future patients.
Good opportunity to observe patient-doctor interaction. Both of mine were with nurses.
Medical observations were by far the best observation experience. Dr. S is an amazing GP and I looked forward to being there again spring semester. Setting up the observation was difficult in the spring though.
I thought it was a great experience because all optometry all the time isn't necessarily the best thing. I like the diversity in what I saw and I did learn a lot about communication.
Some may feel that medical observations are not necessary because we're here to learn to become optometrists. But I feel that you can get out a lot from medical observations because it allows you to know that health problems can be linked to the eye as well.
The experience was a great asset to my education. The pediatrician I observed was a great communicator, a great person overall, and I was honored to observe him.
My experience was helpful in learning about different kinds of communication. This was because the doctors I observed were good at it and understood the importance of my observation. I learned better communication skills at my medical observations than my optometric ones.
One important thing I learned was about communication styles not to use. This is of great help because you always keep them in mind.
My experience was helpful in learning about different kinds of co mmunication. This was because the doctors I observed were good at it and understood the importance of my observation.
I did like the medical observations quit a bit and found them to be especially good examples of how to handle sensitive information
My observation at the community health center was much more informative than any observation at a podiatrist. At the health center, I was able to observe the discussion of sensitive information, which I did not observe during my optometric observations. This was very valuable
My medical observations were both unique experiences. I found that watching the doctors in situations that would never present to an OD helped me to get a better grasp at the feeling of being a doctor of any type.
My experiences at a neighborhood health center were very helpful in letting me see how the specific needs of Latino and working class patients were addressed. The doctors were very welcoming to me, and I observed a lot of useful communication techniques. Most of the exams I observed were comprised almost entirely of interviews, with very little physical testing. It was a good opportunity.
The medical observations I went on gave me a different view of how health care offices can be seen. The overall organization and patient care and respect portrayed really offered great insight into how any health care office could be established and run.
Some of the observations were helpful in regards to different communication between doctors and patients of a specific ethnicity.

Statistically significant differences were found between medical and optometric observations in four areas: obtaining and discussing sensitive information, patient education and strategies for compliance, clinical thought process and problem specific examinations. The results from the second survey showed that 68% agreed that the medical observations gave them an opportunity to observe a provider's style in obtaining and discussing sensitive information whereas only 55% of the students agreed with the statement when in the optometric setting (Chi-square; p=0.0377). The majority of students felt that the optometric observation gave them a better opportunity to observe efficient communication and clinical thinking than did the medical observations. (Chi-square; p=0.0000). Ninety-one percent of the students agreed that the optometric observations provided an opportunity to observe a provider's style in providing patient education and strategies for compliance com-

Table 4:
Negative Student Comments

I think that the program was good, but two observations at the same place were too much. If the program is still going to include two observations, I think that they should be at different sites and specialties
I felt unwanted at one of the medical observations; however the other one was wonderful. I know it was luck of the draw on location assignments, so I don't feel negatively due to the uncomfortable feeling at the one observation. Therefore, I would definitely recommend doing this again!
I thought that these observations were good experiences, but my second visit was really just a repeat of the first encounter. I think it might be a good idea to observe two different medical providers.
It was a great learning experience. The medical observations helped me realize how similar patient-doctor communications are in the health field. The doctor should have a better idea why we are there. Sometimes I was treated as an intern. My doctor kept asking me questions regarding medicine. He didn't realize that I was there to observe communication.
I thought the program was okay. Sometimes it created a problem because the MD did not really know why we were there. Very difficult to get hold of person if some type of conflict occurred.
Medical observations would be a lot more valuable if the health care provider we are observing had more interest in the reasons for why we are there, i.e., communication, interaction, scope of health care, etc.
Doctor and patients were often confused why an optometry student was sitting in on a Pap smear exam (that's mostly what I saw). On my second observation the doctor started introducing me as a medical student to make things easier!
I believe the medical observations are not as useful as the optometric observations. Personally, I had more interest in watching the doctor-patient relationship during optometric observations because I pictured myself in the doctor's position. I had knowledge of what they were discussing so it made it easier to follow the conversations. The medical observations did provide experience, but not as interesting as the optometric ones.
The observations were good first semester, but by May they had become redundant.

pared to 68% of the students who were in agreement with the statement when it referred to the medical observations (Chi-square; p=0.03). Additionally, more students felt that the optometric experience provided an opportunity to observe a role model for problem specific examinations; none of the students chose "Strongly disagree" in this category. (Chi-square; p=0.0000).

Discussion

Teaching communication skills is a multidimensional task. The curriculum at NEWENCO utilizes lectures, video presentations, reading assignments, role playing and clinical observations as part of the communication program. Optometric education continually explores new ways to integrate classroom knowledge with clinical experience. Clinical observations are one way to integrate this information. Winters and Frantz define clinical observations as "experiential learning,"[13] a process by which concrete experiences and reflection upon those experiences cause modification or further definition of concepts.[13] Clinical observations outside the discipline of optometry are an innovative addition to the optometric curriculum.

Overall, most students' comments indicate that the medical observations were a positive experience. (Table 3) The majority of students felt the medical observations provided an opportunity to observe communication skills. A significant number of students also felt that the observations provided a good learning experience and that they observed communication skills that they could apply to their practice of optometry. Many of the medical practitioners were accustomed to teaching and dealing with students. Most of the providers were well educated on the goals and objectives of the observation program. Having a clear understanding of why optometry students were observing out of their field may also have contributed to the positive experience. Lack of provider education in a few cases contributed to a negative environment.

Communication skills are universally required in all health care disciplines. It is not surprising that the medical offices provided a rich opportunity for observing communication between a provider and patients. Our question was determining the value added by having students observe encounters outside the traditional optometric exam.

The unique perspective gained by the medical observations compared to the optometric was in the area of discussing sensitive information. Sensitive information was defined as any information that made the patient or doctor feel uncomfortable such as alcohol use, drug use, sexual history, etc. Although most optometrists do not have to deal with an abundance of sensitive information, the ability to handle this type of information is important to the doctor/patient relationship. Many students commented

that the opportunity to observe the exchange of sensitive information was more prevalent during the medical observations than in optometric observations.

Our initial hypothesis was that students would be more focused on communication skills during the medical observation because they were less interested in medical techniques and systemic pathology. Only 28% of the students supported this statement. The medical procedures may have been a distraction. Apparently the unknown proved to be intriguing and interesting.

In the area of efficiency of communication (i.e., speed of gathering information and applying it to the examination process), the optometric observations were preferred. The optometric observations were also preferred in patient education and ensuring patient compliance. This was a surprising result since most of the medical settings saw patients at a quicker pace than the optometric practices and a substantial number of medical encounters dealt with chronic illness that required significant patient education regarding compliance. The students' perception may have been influenced by students wanting a glimpse of their future and their familiarity with optometric terminology, diagnoses and procedures.

The students preferred the optometric observations, in providing a role model for problem-specific examinations versus routine care. Once again, this was a surprising result given that most of the medical providers provided more problem specific care than routine care. The students' understanding of the term "problem-specific exam" versus "routine exam" may not have been clear to the first year students. This is a concept dealt with at a later point in the curriculum.

Although most students had positive comments about the medical observation program, a few negative comments were generated. (Table 4) The negative comments seemed to focus on: poor provider education, redundancy of the experience, students wanting a glimpse of their future rather than another profession, focus on the medical techniques because the techniques were unknown to the students and diversity among the settings. Many of these issues were easily remediated for future observations.

The implementation of the medical observations is a time consuming and difficult task. Most providers will take time to nurture and educate those who are in their own discipline even if their time is limited. However, adding non-optometric programs requires locating available providers as well as educating them. The opportunity to educate medical providers about the education of optometrists is an unexpected benefit of the program and very worthwhile. Many providers who asked about the curriculum were surprised at the content and quality of optometric education. Despite the difficulty in implementation, the students' positive comments, the unique insight of the medical observations and the opportunity to educate other disciplines provided a distinctive role for the medical observations.

Conclusion

Teaching a student to communicate with a patient involves the understanding that a patient is not just a pair of eyes with a specific refractive error or pathology, but a person who may have medical, social or economic issues that may affect the doctor-patient relationship and the ability to provide effective patient care. Connecting the eyes to the rest of the body involves effective communication skills.

Optometric and medical observations were utilized as a learning tool in the communications curriculum at the New England College of Optometry. Data generated from this study indicate that students regarded medical observations as a good learning experience. The data also indicate that the role of medical observations in optometric education is to provide a role model for doctor/patient interaction and for obtaining and discussing sensitive information. An unanticipated benefit of the program was the opportunity to educate providers about optometric education.

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A New Paradigm in Continuing Professional Education: Implications For Optometry

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Abstract

Optometrists and other health care professionals have historically depended upon continuing professional education (CPE) courses and programs to keep current and improve their clinical knowledge base. The majority of these educational activities—such as attending lectures or workshops, or submitting answers to test questions posed by professional journals or by online CPE—emphasize the acquisition of facts and/or certain procedure skills. This paper describes recent changes, as well as anticipated trends, in the design and presentation of CPE, including programs that are optometry-inclusive. It also reviews the concepts of interdisciplinary education and evidence-based medicine (EBM), and describes their potential roles in shaping the future of continuing optometric education.

Key Words: *evidence-based medicine, interdisciplinary education, continuing professional education, clinical practice guidelines, outcomes assessment*

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Introduction

Optometrists, like other primary health care providers, have a responsibility to engage in activities designed to improve the quality of health care. At present, virtually every state in the United States of America mandates that optometrists acquire a certain number of continuing education credit hours for relicensure. In most cases, optometrists attain these credit hours by attending lecture courses, whose contents may (or may not) be tested. Whitcomb pointed out that the results of research studies show rather convincingly that acquiring facts in this way does not affect physicians' practice behaviors.[1]

Optometry is a dynamic profession that continues to broaden its scope with respect to the management of ocular and oculosystemic disease. Now, more than ever, practicing optometrists must work diligently to keep abreast of new diagnostic tests, advanced ophthalmic procedures, sophisticated instrumentation, and novel interpretation tools. In addition, optometrists need to keep current with new knowledge and the best current research evidence in order to make informed decisions regarding patient care.

Since its evolution into a true primary health care profession, optometry has benefited from an increased impact on the public health care landscape. As the patient population ages, optometrists must be able to effectively care for people with multiple health problems. Therefore, contemporary eye care demands that optometrists work in collaboration with health care professionals from various other disciplines.

The purpose of this paper is to describe recent changes, as well as anticipated trends, in the design and presentation of continuing professional education (CPE). The paper also seeks to provide optometric educators with information about the basic principles of evidence-based medicine (EBM) and interdisciplinary education and to describe their potential roles in shaping the future of continuing education for optometric physicians.

Attributes of Effective Continuing Professional Education

Optometry, and, in particular, continuing optometric education, face multiple challenges when one considers today's broad spectrum of health care. In order to understand these challenges, let us examine the main attributes of effective CPE, as outlined by Ratnapalan and others.[2] First, CPE must have relevance to clinical practice. New knowledge and updated patient care guidelines that are disseminated at CPE programs should be readily applicable to patient care. Second, CPE should result in clinicians changing their practice patterns or behaviors in ways that improve the overall quality of health care. This enhanced delivery of care should include cost containment as well as a reduction of variations in clinical practice from well-accepted standards of care. Finally, effective CPE is based upon the best current scientific evidence. Sound clinical research that is generally accepted within the field of study should be the basis for CPE course content and clinical care recommendations that are presented in an educational program.

As the academic arm of the profession, schools and colleges of optometry are in a unique position to assist practicing optometrists in the lifelong learning process. The provision of high-quality, effective continuing optometric education is integral to practitioners staying current with new developments and cultivating advanced diagnostic and manage-

ment skills. Only forward-thinking programs of continuing optometric education will provide tomorrow's optometrists with the tools to deliver exceptional care within a changing, integrated health care scheme.

The Potential Role of Interdisciplinary Education

The American Optometric Association Web site describes doctors of optometry as primary health care providers who examine, diagnose, and manage disorders of the visual system as well as related systemic conditions.[3] As integral members of the health care team, optometrists often diagnose systemic diseases (such as hypertension and diabetes) and co-manage these patients with other health care disciplines. The broad scope of practice afforded today's optometrists requires that they be trained as generalists who are adept at caring for patients with multiple health concerns. The ultimate goal of efficient, quality patient care requires that optometrists now work in "partnership" with other health care professionals.

Interdisciplinary education is an educational approach that brings together two or more disciplines to collaborate in the learning process. The goal of interdisciplinary education is to develop professional interactions that enhance the clinical practice of each participating discipline. The desired result is improved, more comprehensive patient care. In a position statement on this topic, the American Association of Colleges of Nursing accurately notes that interdisciplinary education of health professionals is part of a global movement to maximize efficiency of health care delivery by considering costs and moving from an environment of competition to one of collaboration.[4] The National Institutes of Health, as well as many major foundations (such as Robert Wood Johnson and Kellogg), is allocating significant resources for patient care partnerships among professions.

The multifaceted health care needs of our society exceed the capability of any single health care discipline. This has resulted in an increased need for collaboration among various health care professionals. Mechanic and others have recognized this need for more than a decade.[5] The broad scope of contemporary health care mandates that caregivers interact effectively and work as members of an integrated medical team. The increased complexity of patient care, combined with the specialization and sub-specialization of providers, make interdependency an essential element of optimal health care delivery.

These challenges support the development and implementation of an interdisciplinary approach to health professionals' education. Larsen observed that very few schools for health professionals include any interdisciplinary experiences, in either classroom or clinic, as part of their curriculum.[6] Therefore, the skills needed for collaboration (such as negotiation, joint problem-solving, and teamwork) need to be developed in postgraduate education (for example, residency programs in a multidisciplinary setting), and in subsequent, "on-the-job" clinical practice. In addition to these two methods, interdisciplinary CPE programs can contribute appreciably to the promotion of a more global, integrated system of patient care.

The Potential Role of Evidence-based Medicine

Dell noted that the impetus behind the new paradigm of clinical practice known as EBM lies in the advances in clinical research over the past three decades.[7] Of special note are numerous randomized clinical trials designed to evaluate the efficacy of both diagnostic criteria and treatment protocols. Most busy clinicians, however, do not have the luxury of ample time to devote to very extensive journal reading and literature review. Therefore, optometrists (like other health professionals) continue to rely on traditional methods of CPE to stay current, improve their clinical knowledge base, and refine their skills.

EBM is the integration of the most current and best research evidence with clinical expertise and patient values. The overall goal of EBM is to help clinicians to make informed diagnostic decisions and therapeutic recommendations to their patients. Evidence-based CPE presents key practice recommendations that are supported by evidence that is systematically reviewed by an approved source. In this way, quality control is provided and maintained. Like interdisciplinary education, the desired result of evidence-based CPE is superior-quality, state-of-the-art patient care.

While interdisciplinary education is an educational philosophy or approach to clinical learning, EBM is a practice mode that implements diagnostic procedures and treatment modalities that are evidence-based. However, the two concepts of interdisciplinary education and EBM are not mutually exclusive. I submit that if the two are used together in the design and presentation of CPE, it may enhance the ability of providers to realize the common goal of serving the patient in the most effective manner.

Evidence-based CPE significantly raises the standard in its criteria for clinical content, in comparison with more traditional methods of educational planning. The American Academy of Family Physicians (AAFP), Division of Continuing Medical Education, established these new criteria in response to concerns about complementary and alternative medicine topics in CPE, as well as the current trend toward evidence-based practice to improve medical care and patient outcomes.[8] Some of the key criteria are as follows:

1. The providers of evidence-based CPE are expected to verify the content by reference to ensure validity and scientific integrity.
2. Patient care recommendations should be based upon sound scientific evidence that is well accepted within the profession as justification.
3. Evidence should drive the content of CPE courses, using such sources as referenced clinical practice guidelines (CPGs), peer-reviewed published research, well-accepted textbooks and expert consensus statements.
4. The AAFP has identified and approved several sources of quality control. Clinical content of CPE programs should be supported by systematic identification, appraisal, and summary of all trials and scientific research that is germane to the field of study.
5. An educational program that is evidence-based should make written disclosure to learners in the form of handouts, slides, copies of journal articles, and CPGs. The approved sources of evidence should be disclosed, as should literature citations of supporting data.

Discussion

As stated by Whitcomb, the Association of American Medical Colleges (AAMC) in 1990 issued a position statement that set forth how

continuing medical education (CME) should be conducted in order to be effective in changing the way physicians practice.[1] In this statement, the AAMC concluded that CME programs should provide learning experiences that enable physicians to address quality-of-care issues in their individual practices. As a result, the objective of CME underwent a paradigm shift from physicians merely acquiring facts to physicians learning how they can improve the care they provide. This new paradigm emphasizes putting in place mechanisms for translating that learning into improved practice behaviors.

The potential benefits of interdisciplinary CPE are numerous. Such programs promote teamwork and foster positive interprofessional contact and integrated patient care. The ability of primary health care providers to collaborate is clearly vital when the complexity of patient care and multitude of health care disciplines are considered. Potential barriers to fruitful interdisciplinary CPE may be organizational (scheduling and availability differences), practical (turnaround time for each discipline to obtain CPE approval), philosophical (differences in primary focus and philosophy of care), academic (mentoring of speakers, faculty development), professional (overlap of practice scope between disciplines), or sociological (gender and class differences between professions).

Studies on interdisciplinary clinical education of health professions students seem to validate that quality of care, patient outcomes, and patient and provider satisfaction are improved in a collaborative practice model.[9, 10] However, very little data is available about the impact of interdisciplinary CPE on health-related patient outcomes or costs of care. Studies on these outcomes have been few in number and narrow in scope. Outcomes of interdisciplinary CPE must be obtained, measured, and assessed. Critical assessment of the interdisciplinary approach is essential in order to evaluate whether collaboration is enhanced, costs are reduced, and patient outcomes are improved. Such feedback will ultimately determine how to maximize the educational benefit of interdisciplinary CPE.

Health professionals who attend CPE expect the course contents to be based on current best scientific evidence that will help them make informed clinical decisions. In this way, effective CPE results in improved quality of care. Exemplary continuing education activities are evaluated consistently for effectiveness in meeting identified educational needs, goals, and learning objectives. The ideal measure of effectiveness is the assessment of pre- and post-conference practice application and patient health status improvement.

In his spring 2000 ASCOTECH column, Dell asked: "Does evidence-based practice improve patient outcomes?"[7] For the purposes of this communication, the query can be modified so that I instead ask the following two-part question: "Does evidence-based CPE increase the use of evidence-based principles in clinical practice?" and, if so, "Does the increased use of evidence-based constructs improve patient care outcomes?" Dell noted that there are no long-term randomized trials of evidence-based education, although a few studies indicate that it may help clinicians stay up to date.[7] In a discussion on the post-implementation evaluation of CPGs, Mozlin suggested that the evaluation process focus on both producing a change in provider behavior and effecting positive changes in health outcomes[11]. She also noted that while implementing evidence-based CPGs may alter the process of care, these changes will be deemed successful only if there are substantial improvements in measured patient outcomes.[11]

In a recent study, Ross reported that administering a structured EBM curriculum increased family practice residents' knowledge and use of EBM principles during patient care.[12] The methods used in the study included tape-recorded resident-preceptor interactions in clinic both prior to and after the workshop. These recordings were analyzed for interactions that contained key EBM phrases. In addition, a multiple-choice examination was administered before and after the workshop.

Ross' study, however, did not demonstrate whether the increased use of EBM translated into improved health outcomes. To achieve such clinical outcome measurements, a very complex study (or series of studies) would have to be undertaken. Such studies could potentially gain valuable insights into the most effective ways of transferring evidence-based education into useful clinical practice tools.

The model of EBM has been adopted by both optometry and ophthalmology, to some degree. Indeed, both the American Optometric Association (AOA) and the American Academy of Ophthalmology have developed their own sets of CPGs. The AOA has disseminated well-regarded CPGs for approximately twenty conditions of the eye and visual system, using the principles of EBM.[11] These guidelines are well-defined statements that aid optometrists in making choices in clinical care. They are reviewed and updated periodically, based upon new knowledge and research evidence.

The Council on Optometric Practitioner Education, or COPE, is a national clearinghouse for continuing optometric education that was established in 1995 as a service of the Association of Regulatory Boards of Optometry (ARBO)[13]. In an effort to encourage high-quality education, COPE created a uniform method of recording, categorizing, and approving ACOE courses. This has created more uniform program standards and course criteria, thereby helping to streamline the ACOE approval process.

The COPE course approval process includes peer review of content. COPE's criteria for course qualification include requirements that are reminiscent of evidence-based CPE such as:

1. Educational needs assessment: a course must reflect the educational needs of optometrists.
2. Scientific and educational integrity: it must contain generally accepted optometric and medical practices.
3. The course must have a clearly stated purpose and course objectives.[13]

The list of COPE-approved continuing optometric education program formats includes panel discussion and symposia, two methods that readily lend themselves to interdisciplinary education. Successful inter-professional collaboration in education and practice emanates from a mutual understanding and respect for the roles of each discipline and the contributions that each one brings to the process. CPE that is truly interdisciplinary occurs when a variety of health professions cooperate with each other through joint planning, goal setting, and decision-making. As a primary care profession, optometry could play a vital role in establishing interdisciplinary continuing education programs.

Conclusions

There are several challenges to be addressed in order to ensure the success of CPE endeavors. The educational activity has to be relevant, applicable to clinical practice, and bring about a positive change in practice patterns. Clinicians are time-constrained due to high patient volume, extended hours, administrative duties, and on-call responsibilities. Therefore, the process of continuing education must be efficient in order to be effective.

Traditional CPE activities are unlikely to result in a change in clinicians' practice patterns. In order to effect this type of positive change, novel approaches to CPE have been developed and implemented. These educational changes include the incorporation of interactive learning formats such as panel discussion and symposia. CPE continues to become more self-directed, with learning resources selected specifically for improving the knowledge, skills, attitudes, and values that clinicians need in everyday practice.

The development and implementation of evidence-based CPE is an imperfect, still-evolving process. In some areas of study, there may not be a sufficient amount of systematically reviewed evidence. For other topics in health care, there may be equivocal or even conflicting evidence. Unanswered questions remain on how evidence-based CPE should address complementary and alternative medicine-based clinical studies and patient care recommendations.

According to McBrien, optometry, like medicine, is an evidence-based clinical discipline.[14] Therefore, it must be recognized that the optimal practice thereof requires scientific validation of new instrumentation, diagnostic criteria, and practice philosophies. Optometry schools and other organizations that provide, deliver, and accredit ACOE have a responsibility to present education that is evidence-based. This includes research to evaluate outcomes, particularly those that are directly related to patient health.

The past seven years have seen an increased utilization of COPE (and its guidelines) by a large number of states.[13] In this way, optometry has taken an initial, proactive step and positioned itself to develop and participate in interdisciplinary CPE that uses the best scientific evidence to educate and inform practitioners.

In conclusion, interdisciplinary education and evidence-based medicine are progressive approaches that have the potential to re-shape the future of CPE in general and continuing optometric education in particular. Meaningful and conclusive studies are warranted to demonstrate whether these novel educational designs and resulting clinical practice interventions will alter patient outcomes and bring about improved health care. These two concepts share the common goal of serving patients in the most effective manner.

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(Continued from page 70)

into classrooms across North America, while providing the opportunity for eyecare professionals to gain visibility within their local communities.

"Eyecare professionals know how important it is to educate children and their parents about the best options to protect their vision long-term, but there is still an awareness gap among the general public - after all, parents are actually more likely to protect their kids' skin than their eyes," said Carole Bratteig, manager, optical services and training, **Transitions Optical, Inc**. The program will put healthy vision lesson plans that are tied to national education standards in the hands of teachers and school administrators. The lessons cover the anatomy of the eye, the need for eye protection and the dangers of UV radiation. They were developed by Transitions in conjunction with the Carnegie Science Center, based in Pittsburgh, PA., with a team of eyecare professionals and science and education experts. For more information on the *Eye Didn't Know That!* exhibit, visit the Transitions Web site at eyedidntknowthat.info or contact Transitions at (800) 848-1506.

AMO Announces New Refractive Lens

Advanced Medical Optics, Inc. (AMO), a global leader in ophthalmic surgical devices and eye care products, added to its market-leading portfolio of refractive intraocular lenses (IOLs) with the announcement that the U.S. Food and Drug Administration (FDA) has approved the ReZoom(tm) multifocal refractive IOL for cataract patients.

"The ReZoom(tm) multifocal lens adds to our portfolio of refractive IOLs that already includes innovative technologies such as the Verisyse(tm) phakic IOL and the Tecnis(r) Multifocal lens, which is currently being evaluated in a clinical trial in the U.S.," said **AMO** President and CEO Jim Mazzo. "With our expansive portfolio of refractive IOLs, AMO's strategy is to lead in building the burgeoning global refractive marketplace." For more information, visit AMO's Web site at www.amo-inc.com

Coopervision Announces New Management Structure

CooperVision unveiled a new management structure for its U.S. operations resulting from the completed acquisition of Ocular Sciences. Jeff McLean has been named president of CooperVision's U.S. operations. He previously served as vice president of sales. McLean, who reports to CooperVision's worldwide president and chief operating officer Grey Fryling, will manage all business aspects of the company's new U.S. portfolio. Brad Jones joins CooperVision's management team as vice president of U.S. sales. He was previously vice president of sales for Ocular Sciences. Jones now manages a sales force consisting of nearly 100 area sales managers and oversees all private practitioner, distributor, major retail optical and national accounts. Tom Shone serves as vice president of U.S. marketing. Shone is responsible for all marketing activity within the United States, including customer service, sales administration, and professional services.

Volk Optical Launches New Chalam Lens

Volk Optical, the leader in aspheric optics, has expanded its popular Chalam line with the addition of the Chalam AFX SSV®ACS lens. Developed specifically for visualization of the retina in an air filled eye after air/fluid exchange during citrectomy surgery, this new lens features a self-stabilizing vitrectomy (SSV®) design with a low profile and can be steam sterilized. The Chalam line's patented SSV feature was developed with K.V. Chalam, M.D. including the new AFX. Seven unique Chalam lens styles are available to accommodate a range of surgical treatment needs: the 15° Prism SSV® for off-axis fundus viewing; the Flat SSV® and HighMag 1.5x SSV® for fundus viewing; the Midfield SSV® for viewing air gas exchange; and the 30° and 45° Prism SSV® ACS for views of the peripheral retina. Select Volk wide-field indirect lenses are also available with the SSV® design. A free 30-day risk free trial is available from Volk direct for customers in the United States. Visit www.volk.com or phone Volk at 1-800-345-8655.

Essilor Sponsors Optometry Super Bowl At AOA Meeting

Optometry students from around the country will once again convene this summer to challenge each other with their knowledge in the annual Varilux(r) Optometry Super Bowl XIV, sponsored by **Essilor of America**. The Varilux Optometry Super Bowl is a game show sponsored by Essilor where representatives from each Optometry school across the U.S. compete through questions and answers to win the coveted crystal bowl. Not only does this event provide students with a unique educational experience, it also gives students and professors alike the chance to interact with their peers in a fun atmosphere and show off their skills. This highly energetic event takes place at the Optometry's Meeting and is put on by the American Optometric Association (AOA) and the American Optometric Student Association (AOSA). Optometry students are already preparing for this year's Super Bowl, June 23, at the Gaylord Texan Resort & Convention Center in Dallas, Texas. Saddle up and bring your game to the heart of Texas!

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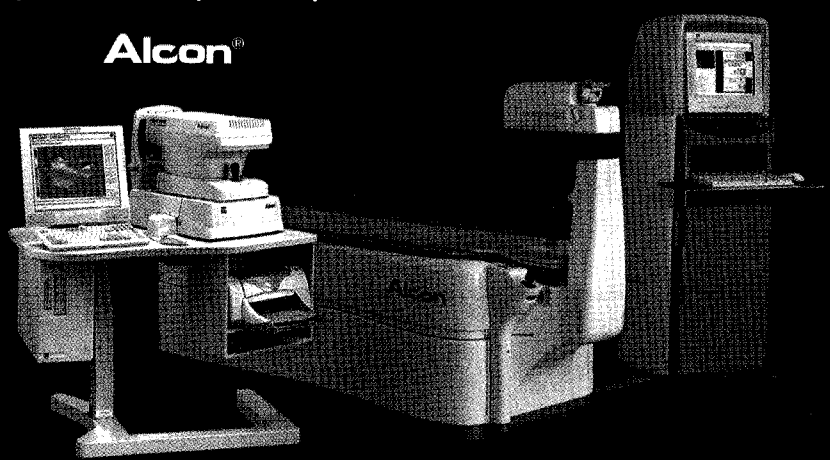

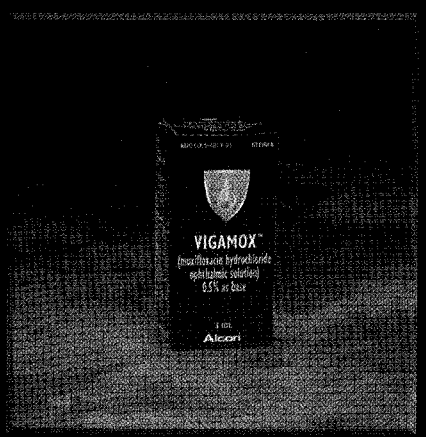

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