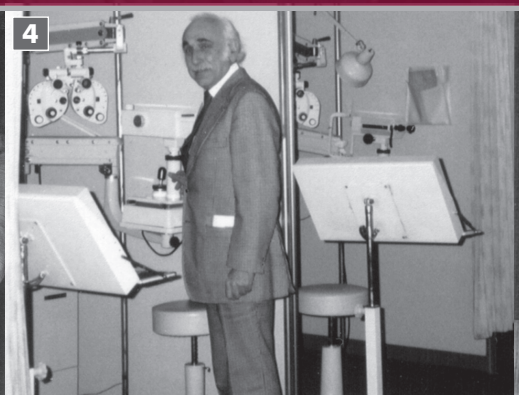
The Journal of the Association of Schools and Colleges of Optometry

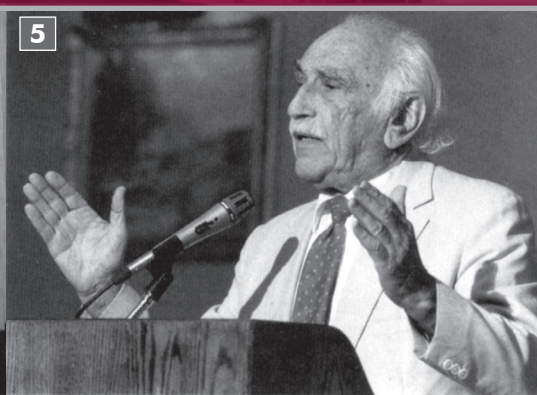
Optometric Education

Volume 37, Number 3 Summer 2012

Remembering Irvin Borish

Also Inside:





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 nonprofit, tax-exempt professional educational association with national headquarters in Rockville, MD.

OFFICERS AND MEMBERS

BOARD OF DIRECTORS

Executive Committee

President
Kevin L. Alexander, OD, PhD
President
Southern California
College of Optometry
Fullerton, CA 92831

President-Elect
David A. Heath, OD, EdM
President
State University of New York
College of Optometry
New York, NY 10036-8003

At-Large Member
Linda Casser, OD
Dean
Pennsylvania College of Optometry
at Salus University
Elkins Park, PA 19027

Secretary-Treasurer
Jennifer Smythe, OD, MS
Dean
Pacific University
College of Optometry
Forest Grove, OR 97116

Immediate Past-President
***Earl L. Smith, III, OD, PhD**
Dean
University of Houston
College of Optometry
Houston, TX 77204-2020

Executive Director
Martin A. Wall, CAE

BOARD MEMBERS

***Arol R. Augsburger, OD**
President
Illinois College of Optometry
Chicago, IL 60616

Joseph A. Bonanno, OD, PhD, FAAO
Dean
Indiana University
School of Optometry
Bloomington, IN 47401

Andrew Buzzelli, OD
Dean
University of The Incarnate Word
Rosenberg School of Optometry
San Antonio, TX 78209

Michael Cron, OD
Dean
Ferris State University
Michigan College of Optometry
Big Rapids, MI 49307

Kent Daum, OD
Professor and Vice-Dean
Massachusetts College of Pharmacy
and Health Sciences
School of Optometry
Worcester, MA 01608

***Larry J. Davis, OD**
Dean
University of Missouri at St. Louis
College of Optometry
St. Louis, MO 63121-4499

Elizabeth Hoppe, OD, MPH, DrPH
Founding Dean
Western University of Health Sciences
College of Optometry
Pomona, CA 91766-1854

Donald Jarnagin, OD
Dean
Midwestern University
Arizona College of Optometry
Glendale, AZ 85308

Dennis M. Levi, OD, PhD
Dean
University of California at Berkeley
School of Optometry
Berkeley, CA 94720-2020

***David S. Loshin, OD, PhD**
Dean
Nova Southeastern University
College of Optometry
Ft. Lauderdale, FL 33328

Rod Nowakowski, OD, PhD
Dean
University of Alabama at Birmingham
School of Optometry
Birmingham, AL 35294-0010

Andres Pagan, OD, MPH
Dean
Inter American University of Puerto Rico
School of Optometry
Bayamon, PR 00957

Douglas K. Penisten, OD, PhD
Dean
Northeastern State University
Oklahoma College of Optometry
Tahlequah, OK 74464

Richard W. Phillips, OD
President
Southern College of Optometry
Memphis, TN 38104

Clifford Scott, OD, MPH
President
New England College of Optometry
Boston, MA 02115

***Melvin D. Shipp, OD, MPH, DrPH**
Dean and Professor
The Ohio State University
College of Optometry
Columbus, OH 43210

**Past President*

ASCO Affiliate Members

Dr. Marlee Spafford, Director
University of Waterloo
School of Optometry
Waterloo, Ontario, Canada N2L 3G1

Dr. Christian Casanova, Director
University of Montreal
School of Optometry
Montreal, QC Canada H3C 3J7

Dr. Jairo H. Gardia, Dean
Universidad de la Salle
Facultad de Optometria
Bogota, Columbia

Pamela R. Happ, Exec. Dir.
College of Optometrists in
Vision Develpment
Aurora, OH 44202

Robert Williams, Exec. Dir.
Optometric Extension Program
Foundation
Santa Ana, CA 92705

Dr. John Townsend, Director
Dept. of Veterans Affairs
Optometry Service
Department of Veterans Affairs
Baltimore, MD 21202

Editorial Review Board

Editor:
Aurora Denial, OD, FAAO

ASCOTECH Editor:
James Kundart OD, MEd, FAAO

Communications Editor:
David Damari, OD

Diane T. Adamczyk, OD
Jamie Althoff, OD
Etty Bitton, OD, MSc
Nancy B. Carlson, OD
Keshia Elder, OD, MS
Joseph B. Fleming, OD
Daniel G. Fuller, BS, OD
Michael G. Harris, OD, JD, MS
Nada J. Lingel, OD, MS
Raymond Maeda, OD
Gregory J. Nixon, OD
Jeffrey Nyman, OD
Mayra Rullán, OD, FAAO
Marlee M. Spafford, OD, MSc, PhD
Mark Swan, OD, MEd
Ruth Trachimowicz, OD, PhD
Suresh Viswanathan, OD
Michelle Welch, OD
Suzanne M. Wickum, OD

OPTOMETRIC EDUCATION

ISSN 1933-8880

VOL. 37
NO. 3

SUMMER
2012

CONTENTS

The Journal of the Association of Schools and Colleges of Optometry

FEATURES AND DEPARTMENTS

Images on the cover:

1) Dr. Borish with members of the University of Houston College of Optometry class of 2013
(Photo courtesy of UHCO, David Gee photographer)
2) Dr. Borish (standing) and his father in 1929, just before Irvin left for Temple University
3) Accepting the AOA's Apollo Award from John Suggs in 1968
4) Inspecting the exam area in clinic at the Kituchi College of Optometry in Nagoya, Japan
5) Delivering the Max Schapero Memorial Lecture at the AAO annual meeting in 1987 (Photos reprinted with permission from *Borish* by William R. Baldwin, 2006 Bassette Co., Springfield, Mass.)

ARTICLES

(Continued on page 90)

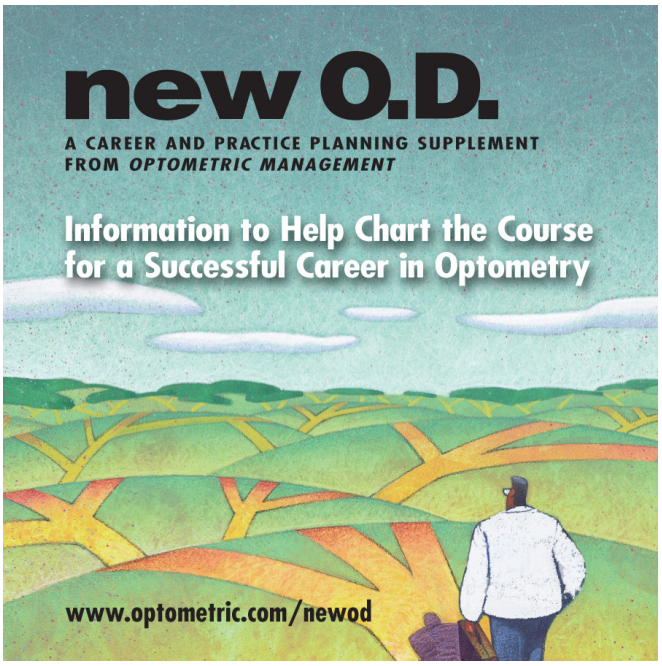
Past issues of Optometric Education *are available on the ASCO Web site at http://www.opted.org/i4a/pages/index.cfm?pageid=3404. Funding for archiving was generously provided by Transitions Optical.*

VOL. 37
NO. 3

Contents (Cont'd)

SUMMER
2012

The Journal of the Association of Schools and Colleges of Optometry



OPTOMETRIC EDUCATION is published by the Association of Schools and Colleges of Optometry (ASCO). Managing Editor: Desiree Ifft. Graphic Designer: Kerri McTigue. Business and editorial offices are located at 6110 Executive Boulevard, Suite 420, Rockville, MD 20852; (301) 231-5944. *Optometric Education* is published three times per year. To access *Optometric Education* online, please go to www.opted.org.

INDUSTRY NEWS

The following companies support ASCO's national programs and activities benefiting the schools and colleges of optometry in the United States and Puerto Rico.

Benefactors ($25,000 - $49,999)

Alcon Laboratories
Essilor of America
HOYA Free-Form Company
Luxottica / EyeMed Vision Care
Walmart Stores, Inc.

Supporters ($15,000 - $24,999)

Allergan, Inc.
Bausch + Lomb
Carl Zeiss Vision / Carl Zeiss Meditec
Pixel Optics
Transitions Optical
Vistakon®, Division of Johnson & Johnson Vision Care

Friends ($10,000 - $14,999)

Abbott Medical Optics
Compulink Business Systems
EMRlogic Systems, Inc.
Haag-Streit
HEINE
Keeler Instruments
M & S Technologies, Inc.
Marco
Oculus, Inc.
Optos North America
Vision Service Plan
Volk Optical

Contributors ($5,000 – $9,999)

CooperVision
Marchon Eyewear
Review of Optometry
Safilo Group
TLC Vision
Vision Source!

As of May 1, 2012

New Lenses Darken and Polarize in UV Light

Transitions Optical Inc. has launched the first and only spectacle lenses designed to both darken and polarize upon UV exposure. In a wearers test comparing the new Transitions Vantage lenses to Transitions VI lenses, eight out of 10 photochromic patients were satisfied with the outdoor experience of Vantage, and nine out of 10 photochromic patients were satisfied with the indoor clarity of Vantage. In addition, patients preferred Vantage over Transitions VI outdoors on all of the key benefits of polarization: visual contrast, crispness and sharpness.

Eyecare professionals can sign up to receive free support materials after completing an online quiz at www.TransitionsVantage.com.

New Products for Eye Health

Two new Systane products are now available from Alcon.

Systane Lid Wipes can be used to remove debris and makeup that can cause eye irritation and as part of a doctor-recommended daily regimen to help resolve the clinical signs of meibomian gland dysfunction. The eyelid cleansing wipes are individually packaged, premoistened and hypoallergenic.

The new Systane Vitamin Omega-3 Supplement promotes healthy tears and comfortable eyes by providing Omega-3 fatty acids and the antioxidant Vitamin E. The softgels utilize a proprietary technology to help control the unpleasant aftertaste commonly associated with fish oil-based supplements.

For more information, visit www.systane.com.

Daily Disposable for Presbyopes

CooperVision Inc. has introduced Proclear 1 day multifocal daily disposable contact lenses for presbyopic patients. The lenses offer the convenience of a daily disposable lens along with all-day comfort and high performance for full-time or occasional wearers. A recent study compared the vision performance of Proclear 1 day with a market-leading multifocal among patients with ADDs of +1.25 to +2.50. Proclear 1 day scored equivalent for near vision and equivalent or better for intermediate and distance vision after one hour of wear. The company says the center-near aspheric design of the lens and a simplified fitting approach make it easier to select the right lens for patients in all stages of presbyopia.

For more information, visit www.coopervision.com/multifocal.

Dr. Ball on AOF Board

W. Lee Ball Jr., OD, FAAO, Associate Director of Professional Affairs at Vistakon, Division of Johnson & Johnson Vision Care Inc., has been appointed to the Board of Directors of the American Optometric Foundation (AOF). The AOF, an affiliate of the American Academy of Optometry, is a philanthropic organization devoted to the advancement of optometric education and research. Before joining Vistakon, Dr. Ball was an adjunct clinical faculty member at the New England College of Optometry.

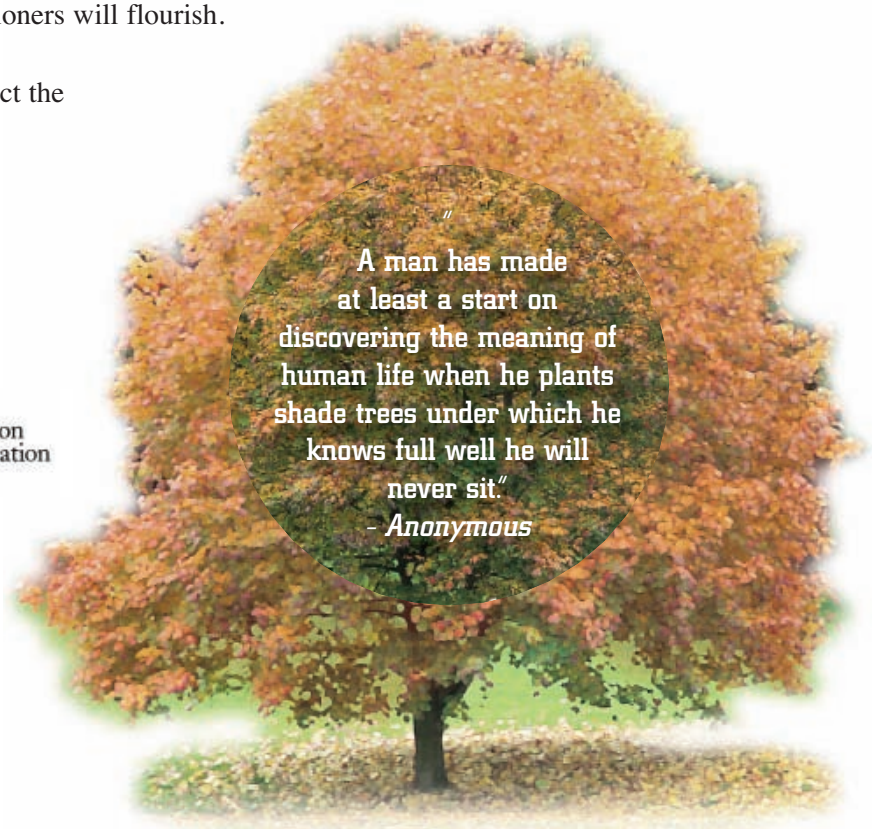
Have you thought about the future of Optometry?

We have!

The Partnership Foundation for Optometric Education is planting, cultivating, and nurturing. Together, this "true partnership" of state, regional, and national organizations is making a long-term investment in tomorrow. With the investment we make today in optometric education, future generations of practitioners will flourish.

For more information, contact the Partnership Foundation at www.opted.org or 301-231-5944, ext 3018.

Partnership Foundation for Optometric Education



EDITORIAL

Getting Involved in Our Profession: A Tribute to Dr. Irvin Borish

Aurora Denial, OD, FAAO

This spring, I had the opportunity to participate in the 2012 American Optometric Association Congressional Advocacy Conference and "Hill visits" in Washington, D.C. I have been coordinating and participating in these events for the past several years. The Hill visits are a grassroots citizen activist effort on behalf of the profession of optometry, our patients and students. The conference, which takes place prior to the Hill visits, prepares the conference participants to explain the bills and issues that are before the House and Senate. It is our job to inform, discuss and be a resource for the representatives and senators from each state. Additionally, the conference always provides interesting political speakers and sometimes political debates.

The issues vary from year to year. In the past, important topics focused on the health and safety of our patients, the distribution of contact lenses without a proper prescription, patient access to care, Medicare reimbursement or insurance inequities. This year, the bills before Congress focused on student loan forgiveness in exchange for practicing in underserved areas, and changing the language of Medicaid insurance to ensure continual access to vision care. Student loan forgiveness programs are a benefit for optometric graduates and patients. The patients benefit from greater access to eye care, and graduates are relieved of some student loan debt.

Although I do not think of myself as a very political person, the first time I went to this conference I was hooked. It usually occurs in April so the flowers are blooming in D.C., and the weather is usually about 10 degrees warmer than in Boston. The walk to Capitol Hill is spectacular. The National Mall provides a direct route to the Capitol.Walking along the National Mall with the Capitol as your destination and the Washington Monument behind provides a sense of history and participation in government.

I realized during my first visit the incredible access Americans have to their government and the potential influence. I also realized the challenges and frustration inherent in the political process. Some bills take years to become laws, and others never make it out of committee. By participating in this event, I am providing a service to my profession as well as enabling our government representatives to do their jobs more effectively. This year, I was accompanied by several students from the New England College of Optometry. Many students from the schools and colleges of optometry around the country were in attendance, benefiting from an educational experience outside the classroom.

A Model for All of Us

While encouraging our students to get involved, I could not help thinking of Dr. Irvin Borish, a legend in the profession of optometry whose accomplishments spanned more than 76 years. Dr. Borish, who died on March 3 at age 99, was thought of as the father of modern optometry. A graduate of Northern Illinois College of Optometry, he was a man who got involved in every aspect of his profession. During his career he influenced the profession as an academic, scholar, re-

Dr. Irvin Borish

searcher, practitioner and activist. His accomplishments are almost too overwhelming to list.

Dr. Borish ran a successful private practice for more than 30 years. He held faculty positions at Northern Illinois College of Optometry, Indiana University and the University of Houston College of Optometry. He was instrumental in the establishment of the Optometry College at Indiana University in Bloomington. He authored more than 85 articles and nine textbooks. His textbook *Clinical Refraction* is known by optometry students around the world. I remember purchasing my copy as a young optometry student. While I was somewhat intimidated by the quantity of information, throughout the years it was an invaluable resource for me.

Dr. Borish's efforts to define the profession were enormous, as was his involvement with the political concerns of optometry. He had direct impact in the accreditation of the profession as well as the establishment of the Association of Schools and Colleges of Optometry. Dr Borish contributed more than 70 years of service to the American Academy of Optometry (AAO) and its affiliate, the American Optometric Foundation. He served on almost every committee of the AAO and in 1996 endowed the AAO's Irvin M. and Beatrice Borish Award for outstanding young scientist or clinician-scientist.

In 1995, Dr Borish's commitment to research was honored by the naming of the Borish Center for Ophthalmic Research at Indiana University. His level of involvement and productivity in the area of scholarship was exemplary and helped to delineate the profession as one that is defined by evidence.

Dr. Borish was a special person and professional. Most optometrists over the course of their careers will only achieve a fraction of Dr. Borish's accomplishments. However, he illuminated for all of us the importance of research, scholarship, and true involvement in our profession. The students who took part in this year's Congressional Advocacy Conference and visits to Capitol Hill had the opportunity to get involved, which will hopefully translate into a pattern of active participation in the profession throughout their careers.

References:

1. About Dr. Borish. Indiana University School of Optometry, Borish Center for Ophthalmic Research [Internet]. Accessed 4 May 2012. Available from: http://www.opt.indiana.edu/borish_bio.aspx.
2. Irvin M. Borish 99. School of Optometry Indiana University [Internet]. Accessed 4 May 2012. Available from: http://www.opt.indiana.edu/BorishObit.aspx.

✯ Special Announcements ✯

ASCO Announces 2012 Recipients of Starter Grants for Educational Research

The Association of Schools and Colleges of Optometry (ASCO) and The Vision Care Institute, LLC, an affiliate of Johnson & Johnson Vision Care Inc., are pleased to announce the recipients of the 2012 Starter Grants for Educational Research. In this year's program, five applicants were chosen to receive grants. The investigators for each project are:

- Denise Goodwin, OD, FAAO, Associate Professor, and Len Hua, OD, PhD, Assistant Professor, both of Pacific University College of Optometry (Integration of Blended Learning into Optometric Education)
- Srihari Narayanan, OD, PhD, FAAO, Associate Professor, and Patricia Sanchez-Diaz, DVM, PhD, Assistant Professor, both of the University of the Incarnate Word Rosenberg School of Optometry (Evaluation of the Effectiveness of an Online and a Face to Face Format Interprofessional Case Based Course Involving Optometry Students)
- Lindsay Sicks, OD, Clinical Assistant Professor, and Sara Gaib, OD, Clinical Assistant Professor, both of Midwestern University - Arizona College of Optometry (Teaching GP Contact Lenses Concepts Through DVD Modules)
- Julia Appel, OD, Assistant Clinical Professor, and Rochelle Mozlin, OD, MPH, Clinical Associate Professor, both of State University of New York, State College of Optometry (Investigation of an Additional Critical Thinking Outcome Measure: The Efficacy of Critical Thinking Assessment in Predicting Clinical Success)
- Adam Blacker, MS, OD, Assistant Professor, Midwestern University - Arizona College of Optometry (Can Three Wrongs Make a Right?)

Faculty members from the 21 ASCO member institutions are eligible to apply for grants under the program, which is dedicated to educational research.The grants support the concept of the Scholarship of Teaching and Learning (SoTL). Although all types of educational research projects are considered for a grant, priority is given to those that embrace SoTL. SoTL applies to all disciplines and levels of academia. It embraces teaching as a worthy subject for research with the goal of producing a public body of knowledge that is reviewed, developed and tested for the purposes of increasing the effectiveness of teaching and student learning.

We congratulate this year's grant recipients and look forward to the completion and publication of their projects.

ASCO's Janoff Award to be Presented in 2013

The Dr. Lester Janoff Award for Writing Excellence recognizes the outstanding writing of a research article published in *Optometric Education*, the journal of the Association of Schools and Colleges of Optometry. The award, to be presented next in June 2013, is named in honor of the late Lester E. Janoff, OD, MSEd, FAAO. Dr. Janoff was editor of the journal from 2002 to 2005 and a longtime member of its editorial review board. He was known for his mentoring of young writers.

A committee of the journal's editorial review board selects the winner of the award. The judges rate all the research articles that appeared in the journal in the previous two years. Writing excellence is judged on significance of the topic chosen, quality of the article and potential impact. Authors of the winning paper receive a cash award.

The first Dr. Lester Janoff Award for Writing Excellence was presented to Barbara McGinley, MA, and Nancy B. Carlson, OD, FAAO, of the New England College of Optometry, and Elizabeth Hoppe, OD, MPH, DrPH, of the Western University of Health Sciences College of Optometry, for their article "Instilling Ethics and Professionalism in Today's Optometry Students." The paper appeared in the Winter 2007 issue of the journal.

The 2010 award was presented to Aurora Denial, OD, FAAO, of the New England College of Optometry, for her article "Association of Critical Thinking Skills With Clinical Performance in Fourth-Year Optometry Students." The paper appeared in the Summer 2008 issue of the journal.

Scholarship is an important component of any profession. Scholarly material needs to be reviewed and disseminated in order to reach and impact the members of the profession. Within a profession, there are usually several different journals, each contributing a unique perspective. Some journals have been publishing forever. Some are new, and some will be retired. What impact, if any, does it have on a profession when a journal is retired?

Optometric Educators Respond

Andrew S. Gurwood, OD, FAAO
Professor
Pennsylvania College of Optometry at Salus University

Staff
Albert Einstein Medical Center
Department of Ophthalmology

Healthcare providers are under constant and persistent pressure to generate flawless, critical, sometimes life-saving algorithms with speed and efficiency, while performing complex tasks. Initially, education is delivered through intense clinical and didactic training. Repetition and evaluation with emphasis on accountability indoctrinate students, of all levels, to the rigorousness of the occupation. Complex concepts and apparatus come together in the domain of the fragility of life and death, producing anxiety and culture shock, amidst the insecurity of self-doubt. Health care is a demanding profession, and its methods of education are unique. Adding to the idiosyncrasies, learners are almost always adult, teachers are infrequently trained as educators, and curricula are repetitively scrutinized and perpetually in flux, all while advancing technology fuels the evolution of new instruments. Without a thirst for, and commitment toward, the principles and philosophies of lifelong learning (the perpetual re-evaluation of knowledge, equipment, procedures and protocols), even seasoned personnel will inevitably find they are committing errors of commission or omission, which may, in the worst of circumstances, irreparably affect outcomes.[1-4]

The lifelong learning concept is appropriate for all who recognize that they have (or must create) opportunities to develop and expand their competencies once they begin their operational role.[2,5,6] The constant scrutiny inherent in healthcare delivery, in general, creates feelings of vulnerability in the provider. While many of our previously learned concepts endure, maintaining knowledge that is "up to date" is a necessity. Technological advances, new clinical practices and interventions, new drug interactions and increased patient demands all make balanced and continuous progress an unconditional requirement.[1-6]

Mistake anticipation is one of the hallmark features of veteran workers. Within the framework of risk prediction, healthcare workers, of all levels, must evaluate presenting clinical signs and symptoms to extrapolate outcomes and formulate contingencies. They do so to avoid initiating interventions that may place patients in danger. Without additional training, this subtle but necessary sense rests singly upon a provider's experiences. Lifelong learning increases the database for corrective anticipation (foreseeing the possibility of complications and initiating a correction to avoid an unwanted cascade before it occurs).[3,5,6]

Practitioners and healthcare professionals at large will unquestionably face a future of increasingly challenging care requirements. There is a need for collaboration between colleagues, personnel, hospitals, physicians and institutions to develop strategies embracing the philosophy of continuing education, so that ultimately, optimal care is delivered to the residents of their community.[1-4] The ethical and responsible way of reviewing old and new competencies, for organizations and individuals, begins when its leadership promotes nothing less than a hunger for knowing. We must motivate ourselves, and through our own actions, motivate our colleagues, to enforce

lifelong-learning accountability. We must each renew our dedication to the standards of excellence placed before us by our professors and predecessors. We must recognize our responsibilities to the patients and public we serve.

When any journal (electronic or printed) that participates in this mission is retired after years of providing a light that guided followers down the road of understanding, a void is created as a counted-upon friend is lost. While the basic laws of nature and physics dictate that everything must have a beginning, a middle, and an end, there is always a period of sadness and meditation at the moment when even something as inanimate as a journal ceases in its functioning. The immediate effect is the silencing of the voices that contributed to its valor. The ripple effect follows when colleagues wishing to share their ideas no longer have that venue. The lasting effect is the loss of the process by which that particular periodical, as guided by its editor and editorial board, approached the mission of education for its readership.

Our world is in a constant state of evolution and flux, but even in the moment of contemplation when one journal has run its last issue there can be optimism. Inevitably, another journal will rise to take its place. The receding publication should be remembered and celebrated for the good that it offered and the growth it sustained. So long as there is continued effort toward the commitment of lifelong learning, there will be progress. It's more than just ethics. It's a matter of spirit.

References

1. Nkanginieme KE, Eke N. Learning and evaluation in medical education. Niger Postgrad Med J. 2001;8(1):46-51.
2. Roberts JM. Developing new competencies in healthcare practitioners in the field. Stud Health Technol Inform. 2000;72:73-6.
3. Jeanguiot NP. Learning by mistake. The status of error in the initial education of nurses. Rech Soins Infirm. 2000;(62):36-8.
4. Ross MM, Carswell A, Dalziel WB, Aminzadeh F. Continuing education for staff in long-term care facilities: corporate philosophies and approaches. J Contin Educ Nurs. 2001;32(2):68-76.
5. Banfield V, Fagan B, Janes C. Charting a new course in knowledge: creating life-long critical care thinkers. Dynamics. 2012;23(1):24-8.
6. Cadorin L, Suter N, Dante A, et al. Self-directed learning competence assessment within different healthcare professionals and amongst students in Italy. Nurse Educ Pract. 2012;12(3):153-8.

Leon Nehmad, OD, MSW
Associate Clinical Professor

State University of New York, State College of Optometry

To answer the question as to the impact the loss of a journal has upon a profession, one first has to consider the purpose of the journal to the profession. The answer may not be so obvious in today's information age, where a massive amount of material can be obtained on a myriad of topics by a proficient searcher using a few clicks and keystrokes. This raises an additional question: What does a professional journal — in this case, that of a healthcare profession like optometry — provide that other types of resources do not?

One way to approach the issue is by first identifying those constituencies that the journal serves. As I see it, they include four groups, all interconnected: the individuals who contribute to the journal, those who read the journal, the profession associated with the journal, and the public at large. To take each individually:

- For those contributing to the journal, the publication provides a vehicle to disseminate their work to a select readership with a vested interest and/or knowledge of the subject matter. In this sense it serves not only as a means of expression, but also as a stimulus and impetus for their scholarship.
- For the reader, a professional journal can keep him or her up-to-date with current scholarly developments within the profession. It serves as a source of knowledge, which in the case of a refereed journal, has passed through an editing process by professionals familiar with the subject and qualified to speak for its quality. For healthcare professionals, this is used to enhance themselves as patient care providers.
- For the profession as an organizational unit, a journal may serve several purposes. It allows it to coalesce around a theme or a particular aspect within the profession. It unites those within the profession. It provides a forum for communication to members within the profession to comment, dialogue and interact with one another. It represents a statement to those outside of the profession, and in doing so helps to define the character of the profession. It allows the profession to define, refine and advance its scope, as well as to develop its direction.
- Finally, for the public at large, a healthcare journal can provide a body of knowledge that can be applied to treat conditions in an effort to improve patients' lives. Particularly at a time when the magnitude of medical information is so great — and the quality so variable — it is crucial that publications containing scientifically sound material exist to inform clinical practice.

Most healthcare professions have more than one journal devoted to serving the scope of the profession. Thus, not one journal can cover all aspects of a profession as broad as optometry. Multiple journals are needed to address various aspects of the profession. In a dynamic profession and market, an individual journal may expand or contract in content, and the number of journals within a profession may increase or decrease over time.

When a journal is retired, it has the potential to leave needs unfulfilled for the writers, readership, profession or society at large that are served by it. All have a potential to be diminished

by its absence. Some of the journal's functions may be taken up by the expansion of another journal within the profession. Thus, another journal may expand its content to include areas that had previously been covered by the retired journal. This can be a positive development. If another journal with significant readership is able to function as a focal point, it may in fact serve the profession well, by capturing more "market share" in the establishment of a more unified and robust meeting place for its membership. The presence of such a journal will depend on other journals in the profession. Are there others with the interest, inclination and resources to fill this gap?

On the other hand, if a journal serves a particular niche within the profession not served by other journals, it can be difficult for another journal to fill the void. Members of the profession may turn to journals of other professions to obtain material or make submissions to journals unavailable in their own profession. This may work toward the detriment of the profession. For a journal that represents a public face of its profession, that profession may be diminished without having the journal to represent itself. The profession itself may lose esteem in the eyes of other professions and the public. Its sense of identity may become compromised. The profession's contribution to society as a whole may be lessened if its uniqueness in content becomes diluted in blending with that of the journals of other professions. New material may be less likely to emerge without the banner of a profession serving as a stimulus for submission.

It represents a challenge for the profession — its leadership, editorship, and membership at large — to assess the consequences of the loss of one of its journals, and to determine whether its needs can be met by existing ones. If not, steps must be taken to establish new publications to compensate for the loss, in order to assure that long-established professional gains are not lost. The profession needs to look into the future with wisdom and foresight regarding the impact of these changes and take action accordingly.

Kenneth R. Seger, OD, MSc, FAAO
Associate Professor

Nova Southeastern University College of Optometry

When a journal ceases to publish, my first feeling is that there is a sense of loss, as the journal was familiar and comfortable. Then I wonder whether the retirement of the journal is another sign of a "dumbing down" or lack of seriousness in the profession?

Academics worry whether they will have an outlet for publishing. What journal(s) will reach the audience the retired journal used to reach? What other journal(s) are on the side of organized optometry or speak for optometry?

William L. Miller, OD, PhD, FAAO
Associate Professor
Chair, Clinical Sciences Department

University of Houston College of Optometry

A professional journal is the keystone to any profession, illuminating for others the ideas, attitudes, specialized knowledge, research and technical expertise embodied within. In our profession, a journal represents these same goals wrapped under the envelope of vision and clinical science.

But, before embarking on the necessity of a professional journal, one must reflect on what are the attributes of a profession. This question is not without a history in our own ranks. In the early parts of the 20th century, optometry also wrestled with these same questions in the face of adversity from not only medical professionals but also trade entities that did not see the need to advance and be recognized as a profession. The attributes of a learned profession were best described several decades ago and continue to have relevance in the literature for those seeking this status. In short, professions were marked by the autonomous control of the education of their members, and they produced a body of knowledge, ideas and skills aimed at serving people, all of which earned status within the society at large. Enveloping this was an understanding that the professional would maintain a standard of competence and ethics as a member.

Progressing onward, optometry needed and benefitted from visionaries who molded and shaped what would become a full-fledged, recognized profession. Uniquely, they could see the best for the profession despite the currents and climate that might exist at the moment. One of these visionaries, Dr. Charles Sheard, remarked in a 1939 address to the profession, as published in *Optometry: Journal of the American Optometric Association*, "However, it is a matter of no consequence to those who are not fundamentally concerned with 'ologies' and 'isms'; for, if optometry cannot measure up to the standard it will be superseded by systems which will be developed (and, in part, are being developed) in and by the field of medicine."[1] It is always the measured "standard" to which a profession must achieve in order for it to continue its status amongst other professionals.

The distinguishing features of a profession are the production of standard knowledge that is inherent in the research and scholarly activity accomplished by those constituents that belong. The dissemination of this knowledge is essential to highlight new ideas, transmit important research findings, review important concepts, develop new clinical techniques and discuss clinical cases, to name just a few. In all, these activities strive toward the ultimate goal of moving the profession forward by advancing a set of knowledge that becomes part of the intellectual property for the profession. This form of intellectual dissemination can exist in a variety of formats that generally include peer- and non-peer-reviewed journal venues. In this way, a clinical profession has within its means various forms of publications providing a multitude of benefits to ultimately enhance patient care.

Fundamentally, a profession's journal serves at least four functions. First, it serves to validate material, both scientific and clinical, that can benefit its own members. In the case of a clinical profession, this validation will also serve its individual patients. Second, it serves to highlight particular sets of information or ideas that are important to the

profession or may be of current significance for patient care. Thirdly, it provides a platform for academic optometrists and vision scientists to publish. Most are required, as part of their promotion advancement, to publish their work. These same academics are also an important facet for the education of future optometric colleagues, thus it is important to their academic lives as well as the continuity of an institution's teaching to provide a means for advancing in rank via publishing. Lastly, it is a sounding board for the profession itself and to others, as a means to clearly demonstrate the scholarly depth and breadth of the profession.

The role of a journal is not only important to the profession, but all university settings, and many private optometry programs require, as part of the promotion process, whether tenure exists or not, the ability to publish in peer-reviewed publications. This is a time-honored tradition that allows colleagues (peers) to assess the information presented. Although not foolproof, it does assure a vetting process that promotes the veracity of the information prior to publication. Currently, only one peer-reviewed publication exists for optometry within the United States, which limits venues for publication by scholars of all types and limits information to those who would benefit from this scientific rigor.

Information provided by professional journals also influences information conveyed through lectures and seminars. When fellow professionals attend continuing education courses, one finds a growing cadre of presenters that use evidence-based medicine to support their information. Most, if not all, this evidence-based information is from referenced journal articles that serve to reinforce basic clinical principles. Landmark studies, first appearing in print, are used from the podium to enlighten, educate and help practicing optometrists stay current with the literature.

Therefore, to ensure a profession's vibrancy, especially one that is growing and expanding like optometry, a journal plays a vital role. The greater the access and dissemination of information, whether in the realm of vision science or clinical science, the greater the opportunity for individual practitioners to benefit from a lifelong learning avenue of education. The 21st century offers multiple ways in which information is circulated. For instance, we have the standard and more traditional paper journal route as well as an expanding group of more contemporary forms such as electronic journals, newsletters and e-blasts. All are important forms of delivering information; however, peer-reviewed avenues are still considered to be the gold standard, whether in print or electronic format. Without these forms of publication, I daresay the profession sacrifices the opportunity to influence its fellow colleagues but also loses legitimacy among other professionals. It is also of fundamental importance that a profession has a journal that bears its name on the front cover banner. All major professions — medicine, dentistry, nursing, chiropractic — have journals that bear their name and are important conduits of information to their respective professions.

The struggles optometry has faced have been longstanding and have been battled on a number of fronts, all of which are important. Legislative and scholarly are just a few ways in which the profession serves to protect itself and progressively move forward. Without one of these, the profession slowly recedes back into its former self, moving into a tradesman occupation.

In this very journal in 1991, Dr. Alden Haffner stated, "Optometrists, as well as scientific authors, have published more texts, and appear as primary or as co-authors in research papers and in books and journals. Many of these newer journals and textbooks are under the aegis of major national publishers, an indication of the increased standing of the profession."[2] It is the "standing" that we risk when a journal is discontinued. The hope is that visionaries within the profession will emerge to understand and implement a more holistic approach to preserving the professional standing of optometry.

Finally, it is important to visit part of the mission statement of the American Optometric Association, which reads, "Optometrists and other professionals will look to the American Optometric Association for professional standards, research and education leadership which serve to enhance and ensure competent, quality patient care."[3] Journals provide a means to fulfill this mission statement and enhance the knowledge base of its individual members as well as showcase the ideas, research and clinical expertise to other professionals and the public at large. It can be argued that the imparting of knowledge may be able to be attained by another journal elsewhere; however, the rapid increase in knowledge is severely limited or impaired when the available avenues to publish are diminished. An expanding discipline is often marked by an expanding collection of journal opportunities. One only has to look at an area close to our own profession, refractive surgery. Expansion of a profession requires expansion of information and knowledge. The profession is weakened, in small part, with the passing of any professional journal.

References

1. Sheard C. Higher education – better profession – greater service. J Am Optom Assoc. July 1939:p.229.
2. Haffner AN. Professional trends in American optometry. Optometric Education. 1991 Fall;17(1):20-21.
3. About the AOA [Internet]. American Optometric Association; c2006-12. Mission & Vision; 2006 Mar [cited 4 June 2012]. Available from: http://www.aoa.org/x4874.xml.

Send Us Your Comments

Do you have any thoughts or insights related to the impact on a profession when a journal ceases to be published? Send your comments to Dr. Aurora Denial at deniala@neco.edu, and we will print them in the next edition of the journal.

An Ethical Dilemma in Modern Optometry

ASCO Student Award in Clinical Ethics

Daniel Harker

As optometry's scope of practice expands, the myriad of ethical challenges facing eyecare practitioners multiplies. The profession of optometry adheres to several ethical theories and values to protect the welfare and health of the public. Among these are the virtue theory and theories of consequentialism. As well, optometrists uphold ethical values such as responsibility, charity, fidelity and integrity. With these standards in place, optometrists are held accountable for their actions and regarded as professionals in the healthcare industry. These ethical theories and values were challenged in this case from a Veterans Administration health center in Texas. The patient in the case, a 68-year-old Hispanic male, admitted to being physically abused by his spouse, but stated he did not want to press charges or legally pursue the matter. The situation was analyzed, and a decision was reached on how to handle the issue in an ethical manner.

An Unremarkable Examination

On March 15, 2012, the patient presented for an appointment at the health center. He had no ocular complaints, and the ocular exam did not reveal anything out of the ordinary. The anterior segment appeared normal. No bruising, subconjunctival hemorrhages or traumatic cataracts were observed. The posterior pole also appeared to be normal. There were no signs of commotio retinae or abuse. Visual acuity was 20/25 in each eye. (No cuts, bruises or swelling were seen on the body.)

An Unexpected Disclosure

As the patient was selecting new spectacle frames, it was noted that his old frames were bent out of shape. When asked about the condition of his spectacles, the patient hesitated for a moment and then confided that his wife occasionally beats him and the bent glasses were a direct result of these beatings. He went on to state that he did not want to report the abuse, fearing his wife would face legal action. This presented a serious ethical dilemma: Should the patient's wishes be respected, or should the alleged abuse be reported to those with proper authority to deal with the matter?

Making a Decision

Several ethical theories were considered before a firm decision was made. According to theories of consequentialism, "an action is right if it promotes the best consequences."[1] The best consequence in this case is subjective. From the patient's point of view, the best consequence would be to avoid punishment and legal strife with his wife. On the other hand, the eyecare practitioner could view the situation from a completely different perspective. If the abuse were to continue, further physical harm and neglect could occur, leaving the patient's body and mind damaged.

The virtue theory was also contemplated. Based on this theory, an action is right if it is what a virtuous agent would do in the circumstances. A virtuous agent is bound by several ethical values, such as responsibility, charity, fidelity and integrity. A virtuous agent in this situation would want the best for the patient and his or her current and future health. Furthermore, the ethical value of responsibility demands that a virtuous agent be accountable for his or her actions. Eyecare practitioners must be held accountable to the public for their decisions. The public demands that the case is reported to the proper authorities if certain people are experiencing abuse. In the state of Texas, the law requires "anyone who thinks a child, or person 65 years or older, or an adult with disabilities is being abused, neglected, or exploited must report it to DFPS (Department of Family and Protective Services)."[2] Because the patient in this case is over the age of 65, this law clearly must be followed, and the case must be reported. Those outside of Texas jurisdiction should abide by their state's law.

The American Optometric Association (AOA) also clearly defines what is required by a licensed optometrist in the United States. In its Standards of Professional Conduct, the AOA states: "Optometrists have the responsibility to identify signs of abuse and neglect in children, dependent adults and elders and to report suspected cases to the appropriate agencies, consistent with state laws."[3] Based on the AOA standards, the patient in this case is considered an elder; therefore, his case must be reported to the appropriate agency, consistent with Texas state law.

The ethical values of charity, fidelity and integrity also suggest this case should be reported to the proper authorities. The ethical value of charity encompasses goodwill, mercy and compassion.[4] Knowing that a patient is abused may invoke compassion in practitioners, urging them to report the case. The ethical value of fidelity holds that the professional has an allegiance to public trust.[4] Therefore, practitioners would want to uphold their trust with the public and report the case. The ethical value of integrity demands that professionals exercise good judgment in professional practice. The best judgment in this situation from an ethical and legal standpoint is to report the case. Reporting this controversial case to the authorities demonstrates the ethical values of charity, fidelity and integrity.

With these ethical theories and values considered, the patient's case was reported to the health center's mental health unit. An appointment has been made to discuss the abuse and find a resolution.

The profession of optometry adheres to several ethical theories and values to protect the welfare and health of the public. Among these are the virtue theory and theories of consequentialism. In addition, optometrists are bound by ethical values such as responsibility, charity, fidelity and integrity. As optometrists abide by these ethical theories and values, they will continue to be regarded as professionals in the healthcare industry.

References:

1. Railton P. Alienation, consequentialism, and the demands of morality. Philosophy & Public Affairs. 1984;13(2):134-171.
2. Report abuse, neglect, or exploitation. Texas Department of Family and Protective Services. Accessed 19 Mar 2012. Available from: http://www.dfps.state.tx.us/Contact_us/report_abuse.asp.
3. Standards of Professional Conduct. American Optometric Association. Accessed 19 Mar 2012. Available from: http://www.aoa.org/documents/Standards-of-Professional-Conduct_Adopted-June-2011.pdf.
4. Fritzsche DJ. Personal values: potential keys to ethical decision making. J Business Ethics. 1995;14(11):909-922.

Dr. Harker, a 2012 graduate of the Southern California College of Optometry, is the winner of this year's Student Award in Clinical Ethics. The award is sponsored by the Association of Schools and Colleges of Optometry's Ethics Educators and Practice Management Educators Special Interest Groups and judged by optometrists with no affiliation to a school or college of optometry.

Khan Academy and "Flipping the Classroom"

James Kundart OD, MEd, FAAO

Dr. Kundart is the Chairman of the Educational Technology Special Interest Group for the Association of Schools and Colleges of Optometry. He is a researcher and author and an Associate Professor at the Pacific University College of Optometry. He can be contacted at (503) 352-2759 or kundart@pacificu.edu.

"The very first time that you're trying to get your brain around a new concept, the very last thing you need is another human being saying, 'Do you understand this?'"[1] This radical quotation is from Salman Khan, an MIT and Harvard graduate, former hedge fund analyst, and founder of Khan Academy.

Recently featured on 60 Minutes, Khan Academy is a nonprofit educational organization that is doing some very exciting things. It has a repository on You Tube of more than 3,100 video "micro lectures" covering subjects from math and science to healthcare and medicine. The videos are for students to watch at home and are meant to be paired with computer exercises found on the Academy's Website.[2] The strategy of sending schoolwork home in the form of short video lectures and doing homework at school is called "flipping the classroom." Should the schools and colleges of optometry adopt a similar strategy?

For many of us, the volume of material we must present to increasingly large numbers of students can be overwhelming. Prior to the Information Age, the most efficient way to present copious information was the lecture format. The lecture format was how we were taught, the same way as our teachers before us, stretching back to ancient times. We would listen and take notes. Some optometric education programs now use a transcription service so taking notes may be unnecessary, as it may also be for courses that are built around a good textbook.

Before laptops and tablets were the norm in classrooms, textbooks were the tool we used to flesh out the material we did not understand. Our teachers encouraged us to read them before class, but time constraints often prevented it. Besides, much benefit could be had from reading a good text even after the lecture was presented. For those of us who did not have an eidetic auditory memory, it was during the reading of the textbook that real learning took place. The lecture was the warm-up.

With our students today, surprisingly little has changed, except for the very important fact that textbooks are increasingly irrelevant to today's classroom learners. It is one of the ironies of the computer revolution that information is more available than ever, but as more students avoid traditional print media, they rely largely on what is presented in the classroom. To many educators, relying on lecture and class notes almost exclusively is an inefficient and limited way to secure information into long-term memory, which is a necessity for future patient care.

If there is one source that could replace textbooks for today's students, it is online video. Enter You Tube and programs like Khan Academy. Microsoft founder Bill Gates was so impressed when he discovered Khan that he used the free courses in topics like math and science to teach his own kids. Subsequently, both the Gates Foundation and Google have backed Khan Academy with millions of dollars in support.

These sorts of financial endorsements should command the attention of optometric educators. Can flipping the classroom help to improve graduate school the same way it might improve elementary school? While Khan does not (yet) offer many of its videos on topics of interest to optometric education, several of its principles are potentially of use to us as we teach the eye doctors of the future.

Principle #1: Asking Questions About Something They Should Already Know is Embarrassing to Students

Even our best students have holes in their understanding. Often, this includes some basic concepts. Without using textbooks for reference, concepts that are missed the first time (or forgotten since) may become more and more shaky. As students progress through a lecture-based curriculum, one that doesn't encourage interrupting to ask questions to begin with, these missed concepts can interfere with adding new knowledge. Avoiding embarrassment is human nature, so questions remain unasked all too often.

Now, consider the possibilities when a lecture – or better still, a micro lecture – is recorded for the student to play and pause at will. This condensed presentation needs only the basic concepts on a PowerPoint slide with voice-over audio. Khan Academy uses a digital whiteboard (SmoothDraw 3) but no video of the presenter.[3] Now, the student can take in the lecture when and where he or she is ready to learn, pausing and rewinding when a concept does not make sense.

These micro lectures are not hard to make with a podcast. Many university programs are already podcasting. At Pacific University College of Optometry, we use Camtasia Relay for classroom capture of video and audio, and iTunes University to collect the podcasts. However, podcasting can be done in a quiet home office (or closet as Sal Khan reportedly uses) and doesn't require a live audience present, just one to listen to it on their computers, tablets or MP3 players.

How these targeted podcasts can reach more students than a traditional lecture is the subject of the second principle.

Principle #2: One-On-One Tutoring is More Effective Than Teaching to the Middle

One challenge that optometric educators face is reaching students at different levels of achievement. Like all educators, out of necessity the instructor often has to adopt an almost utilitarian philosophy. With the aim of reaching the most students, many educators "teach to the middle," or somewhere between the most advanced and least advanced students on the topic. This may work for the middle of the class but has the distinct disadvantage of leaving the upper quartile unchallenged, and the lower quartile potentially unreached.[4]

While many other strategies exist, such as "teaching to the top," all have the limitations of the one-size-fits-all lecture style. Yet there is one educational strategy that is orders of magnitude more effective than standard classroom lecture: one-on-one tutoring. While extraordinarily effective, individual tutoring is inefficient, and therefore expensive. It has traditionally been limited to those who can afford to pay for it for themselves or their children. However, in the computer age, must efficiency be inversely proportional to effectiveness? Not necessarily. When delivered by a talented teacher, the recorded micro lecture is like having a personal tutor. When done well, the student feels as if the teacher is right there giving a personal lesson. This is partly because the micro lecture can be given at the time and place of the listener's choosing. Also, micro lectures can fit into small chunks of time.

By definition, the micro lecture is short. Khan Academy lessons last 10 minutes on average, which may be approaching the attention span of the typical student these days. Thus, it needs to distill information to its essence, while not skipping any critical subtleties. It can and should be heavy in illustrations as necessary to teach the salient points. It should also be unscripted and certainly not read from a slide. Sal Khan does no video edits. Instead, he re-records each take that doesn't come out well in one try. This preserves the one-on-one nature.

The short, home-based lecture is one half of flipping the classroom. The other half is assessment. This takes the form of classroom-based homework, when students get to ask questions one-on-one rather than in front of all their classmates, as explained in the next principle.

Principle #3: Students Prefer Self-Paced Learning to Instructor-Paced Lessons

While listening to micro lectures on an MP3 player, a student is typically alone, be it at home, in the car or at the gym. This should happen before class, when a student of the flipped classroom will be expected to practice what was learned. Khan Academy students are often ones who have not yet graduated high school, but here's how the principle of self-paced learning might be applied to optometric education.

Imagine geometric optics lab taught with a flipped classroom. As currently taught, the students may work on an optical bench and may keep hard copy or virtual lab books in order to learn how light is affected by lenses, prisms and filters. Although the emphasis on some age-old topics (like mathematical ray-tracing) may be changing, other things are not. For instance, in many cases students must still complete their labs in the assigned lab period, whether or not they have mastered the principles being taught. Those who struggle may go through the motions but be carried along in part by their lab partner when they do not understand.

If the classroom is flipped, both lectures and assessments will occur at the student's own pace. The latter are done with computer-based drills given online. The instructor has access to graphs showing the speed and accuracy of each student's answer, and is free to answer questions even before they arise. The clock on the wall doesn't determine how far each student progresses during class time, but instead progress is dependent on each individual student.

Another key to the success of the Khan techniques is constant assessment. While every topic comes with exercises to be practiced in class the next day, there is some modularity to each lesson. In other words, in many non-linear topics, students may choose to tackle the middle or the end of the material first. For example, a lecture on five related congenital conditions affecting the eyes might be flexible as to which order a student masters them. However, they must all be mastered.

One might inquire why a student would need the teacher – or classmates – at all in this type of model. The answer is that the flipped classroom encourages collaboration. Classmates are encouraged to assist each other when one is stuck. Also, the teacher plays the important role of providing "surgical instruction" for any students who are stuck on a concept.[5] An instant study group can be assembled (to the extent allowed by the Family Educational Rights and Privacy Act). This is because in the flipped classroom, it is critical to master one concept before proceeding, the topic of the next principle.

Principle #4: Old Concepts Should be Mastered Before Moving on to New Ones

Think about the way American education traditionally works. First, information is delivered in traditional lecture format with spot checks in the form of quizzes, midterms and final exams. Except where practical exams are given,

such as in optometric procedures or methods courses, we do not usually expect that all students will reach mastery at each assessment. We may recheck as many areas as we can on the final and National Board exams, but because every student is not required to get an "A," this still leaves something to be desired.

In Khan Academy courses, "mastery-based learning" means students must get 10 questions in a row correct to move on to the next lesson.[4] When they do not, they continue to practice the muddy points until they clear up, in much the same way optometric procedures or methods courses are taught.

How do optometric educators know when their students need assistance? Too often, students don't know enough to ask. How many of us have sat through empty office hours the day before an exam without seeing a single student because they were studying for the exam and did not know which questions to ask?

For Khan Academy, the answer is the teacher's dashboard. Performance-measuring apps, long-used and old hat in the financial sector from which Sal Khan came, are novel to educators at all levels. Perhaps some have seen real-time test results roll in on learning management software like Blackboard or Moodle. Using a tablet or other portable interface, the instructor can circulate around the classroom and know exactly where each student may be excelling — or struggling.

All too often, optometric educators may find mathematics is the area of difficulty, which is the topic of the next principle.

Principle #5: Math is a Stumbling Block for Many Students Today

Schools and colleges of optometry face a challenge of homogeneity. Most incoming students, as high as 85%, were biology majors as undergraduates. The reasons for this are obvious when the prerequisites of optometry school are compared with those for various undergraduate majors.

For all the strengths of the average biology major in ocular anatomy, physiology and disease, as a rule, mathematics is not the strong suit. Fortunately, the Khan Academy techniques are most easily applied to very concrete subjects like mathematics, including optics.[3] In fact, most of the existing 3,100 Khan Academy videos on topics of interest to optometry students are currently in optics.

For most students who struggle, the problem in American education in mathematics certainly precedes optometry school. Many intelligent students may not have ever been required to attain mastery in basic arithmetic, algebra or trigonometry. While the prevalence of mathematical illiteracy in American society is on the rise, there is some disagreement as to the reason. Some blame the use of calculators from an early age. Others blame the use of manipulatives like geoboards instead of paper-and-pencil exercises.

Whatever the cause, it is not the sole duty of optometric educators to bring about a mathematical renaissance. However, if we wish our interns to be able to quickly calculate a net add or conversions from plus to minus cylinder, drills to practice these conversions should be done until the student attains mastery.

Principle #6: Be a Guide on the Side, Not a Sage on the Stage

This catchphrase of the flipped classroom movement has been around in educational circles since at least the 1990s.[6] Pragmatists can legitimately point out that it is a nice sentiment, but may be much easier to say than to implement. Proponents will admit it is easier for educators to imagine constructing new courses in the flipped classroom format than to imagine converting pre-existing standard lectures. While some topics in optometric education may lend themselves to this format better than others, with preparation of micro lectures and practice problems, the flipped classroom will come to life.

Personally, I plan to attempt some version of these techniques in my 40-student elective this summer. The long nights of the warmer months may lend themselves to both creating and listening to micro lectures, while the smaller class size (for us) may work better for me to be a guide on the side.

In the words of Bill Gates at the end of the Technology, Education and Design (TED) lecture by Salman Khan: "I think you've just got a glimpse of the future of education."[1]

References

1. TED: Ideas Worth Spreading [Internet]. Talk by Salman Khan. Accessed 15 May 2012. Available from: http://www.ted.com/talks/salman_khan_let_s_use_video_to_reinvent_education.html.
2. Khan Academy [Internet]. Assessed 15 May 2012. Available from: www.khanacademy.org.
3. Wikipedia. Khan Academy [Internet]. Accessed 15 May 2012. Available from: http://en.wikipedia.org/wiki/Khan_Academy.
4. Thompson C. How Khan Academy is changing the rules of education. Wired magazine [Internet]. Assessed 15 May 2012. Available from: http://www.wired.com/magazine/2011/07/ff_khan/all/1.
5. Khan Academy: the future of education? Excerpt from 60 Minutes interview. YouTube [Internet]. Assessed 15 May 2012. Available from: http://www.youtube.com/watch?v=zxJgPHM5NYI#t=62s.
6. Wikipedia. Flip teaching [Internet]. Accessed 15 May 2012. Available from: http://en.wikipedia.org/wiki/Flip_teaching.

Comparing Proportional Estimates of U.S. Optometrists by Race and Ethnicity with Population Census Data

Elizabeth Edmiston Chen, MBA, MPH, FAAO

Abstract

The purpose of this paper is to characterize optometrists in the United States based on race and ethnicity. A 40-year record of students enrolled in doctor of optometry programs in the United States was used to estimate proportions, which were then compared with Census 2010 data. Black and Hispanic optometrists comprise a substantially lower proportion when compared with the population. Non-Hispanic White and Asian optometrists are a higher proportion than the population. This is the first effort to estimate the racial and ethnic mix of the profession.

Key Words: *optometrists, racial, ethnic, disparity, clinician, demographics*

Elizabeth Edmiston Chen is a Visiting Professor at the Massachusetts College of Pharmacy and Health Sciences. She was President of the New England College of Optometry from 2006 to 2009 and is currently active on various boards of directors in public education and social service policy. She conducts research independently and has been an invited guest lecturer at colleges and universities in the Boston area.

Introduction

In the medical professions, shared race and ethnicity[+] between clinicians and patients have been shown to improve communication and result in greater patient satisfaction, improved quality of care, improved access, and higher retention in care.[2-8] The literature exploring whether shared race and ethnicity in the physician/patient dyad could play a role in reducing health disparities experienced by Hispanic and Black patients shows that minority patients are likely to choose minority physicians, and minority physicians are likely to have a disproportionately large share of minority patients when compared with their non-minority colleagues.[3,9,10] Understanding the demographics of the optometric profession, then, is important in planning the educational pipeline of future optometrists, both for recruitment of any under-represented groups and for development of curricula to bridge patient or clinician perceptions leading to unintended bias in clinical care. These biases are not only in one direction. They can originate from the patient or from the clinician.[11,12]

A review of literature and government and private sources of data shows that little is available to characterize the demographics of today's "clinician-optometrists," i.e., optometrists who are primarily engaged in caring for patients. Throughout this paper, "optometrist" is used to refer to "clinician-optometrists," and intended to exclude those primarily engaged in non-patient-care activities.

In the late 1960s, the National Center for Health Statistics sponsored *The 1968-69 Vision and Eye Care Manpower Survey*.[13] The study estimated that there were 20,300 doctors of optometry in the United States, and 91% were in active practice. The median age was 47.5; 3% were female; nearly 90% were in private practice. The study did not collect race and ethnicity data. The American Optometric Association (AOA), an organization that frequently advocates for political issues of importance to the profession, also does not collect race and ethnicity information on its members.[14] Its *Workforce Study of Optometrists* estimates 39,228 optometrists in the year 2011. Age and sex are available, but not

[+] *Consistent with the U.S. Census, "race" in this paper refers to White, Black, Asian, American Indian/Alaska Native, and Native Hawaiian/Pacific Islander. "Ethnicity" reflects a common cultural heritage. The U.S. Census captures Hispanic or Latino ethnicity in addition to race. Used interchangeably by the U.S. Census, Hispanic or Latino reflects "a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race."*[1]

race and ethnicity.[15] The U.S. Bureau of Labor Statistics also does not report race and ethnicity of optometrists, but provides this information for a broad range of healthcare providers, including dentists, physicians, pharmacists and chiropractors.[16] The U.S. Department of Education collects extensive data on enrollment and degree attainment, but aggregates optometry into the category of "First Professional Degree," which includes Doctor of Medicine (MD), Doctor of Optometry (OD), Doctor of Dental Surgery (DDS) and Juris Doctor (JD).[17] Finally, it appears there are no peer-reviewed papers that estimate the current racial and ethnic composition of optometrists.

Census 2010 estimated the U.S. population at 310 million; 98% consider themselves of one race and 2% are of two or more races. Of those who are of one race, 81% are White, 13% are Black, 5% are Asian, 1% are American Indian or Alaska Native, and 0.2% are Pacific Islander. Hispanic ethnicity comprises 16% of the population. As in the total population, 98% are of one race and 2% are of two or more races. The largest racial group for Hispanics is White (92%), followed by Black (4%). Non-Hispanics are largely White (77%), Black (15%), and Asian (5%). By 2050, Hispanics are expected to be become 30% of the population. Non-Hispanic Whites are expected to be the group in fastest decline, from 65% of the population today to 46% in 2050.[18]

These changing racial and ethnic demographics raise the question of how optometrists might compare with population proportions. The Institute of Medicine revealed in 2002 that Americans differed in their ability to gain access to the healthcare system. The report showed that racial and ethnic health disparities have not improved over time and, in some cases, they worsened.[19, 20] In optometry, a broader understanding of demographics could serve as a basis for discussions about the role of race and ethnicity in both the recruitment and education of future optometrists. Moreover, results might stimulate research on whether patient preferences for racial and ethnic concordance are also evident in the optometrist/patient dyad.

This paper provides an estimate of the race and ethnicity of optometrists using student enrollment data reported by the Association of Schools and Colleges of Optometry (ASCO). These estimates are then compared with U.S. Census 2010 to ascertain gaps between the racial and ethnic proportions in the profession and the U.S. population.

Data

ASCO, as part of its mission to serve the interests of optometric education, collects and disseminates data from a number of surveys.[21] The *Annual Student Data Report* aggregates applicant and enrollment data from the schools of optometry in the United States, Puerto Rico, and through 1988, also Canada.[22]

Enrollment data have been collected for more than 40 years and now provide almost a half-century of information to harvest and analyze. In addition to race and ethnicity, the breadth of information has grown. The most recent *Annual Student Data Report* captures the number of applicants per program, numbers graduating with the doctor of optometry degree, enrollment in each of the 4 years in the doctor of optometry program, and extensive student characteristics, such as sex, age and financial aid received.

The data from the latest surveys are available through ASCO's Web site. The executive director of ASCO provided printed copies of data tables for the student race and ethnicity section of annual reports from 1969 to 2008. Data extracted or calculated for this paper are: Total Enrollment and number of students who are categorized as White, Black, Hispanic, Asian, American Indian and Pacific Islander.

All schools of optometry in the United States and Puerto Rico are members of ASCO, and 100% participate in the annual survey. Early reports were written by hand. Electronic data collection and storage have improved consistency and completeness over the years. Comparable data were not consistently available throughout the period for Canadian schools of optometry and were omitted from this study. Demographic information in the U.S. Census includes Puerto Rico.[18, 23] For comparability, ASCO data used in this study also include Puerto Rico.

Methods

Standardizing race and ethnicity categories

Throughout this paper, the nomenclature for "race" adheres to U.S. Census 2010 categories. "Race" refers to a respondent's self-identified region of origin. "White" refers to peoples of Europe, the Middle East, or North Africa. "Black" refers to origins in Africa. "Asian" includes the Far East, Southeast Asia, and India subcontinent. "Pacific Islander" refers to "a person having origins in any of the original peoples of Hawaii, Guam, Samoa or other Pacific Islands. It includes people who indicate their race as 'Native Hawaiian,' 'Guamanian or Chamorro,' 'Samoan' and 'Other Pacific Islander,' or provide other detailed Pacific Islander responses."[18,23,24] "Hispanic" is considered an ethnicity and refers to one of Spanish, Latin American, Cuban, Mexican or Puerto Rican origin separate from race.[25] In the ASCO data, the nomenclature for students of Hispanic descent changed over time: "Mexican American" from 1969 to 1973; "Spanish Surname" from 1974 to 1987, and "Hispanic" from 1988 to the present. For this paper, all have been reclassified as "Hispanic."

Total Enrollment

Knowing the values for Total Enrollment is key to the results because they form the denominator in calculating the proportions of students by race and ethnicity. In some years, Total Enrollment numbers were missing. In others, they could be calculated with available information. All missing values occurred prior to 1999. There were a small number of years missing Total Enrollment counts (1971-1974), but a larger number of years missing annual reports, i.e., when no data were available. These were categorized into: single years, 1981

and 1993, and multiple-year periods, (1988-1991) and (1997-1998).

Total Enrollment numbers were calculated from information provided whenever possible. Beginning with 1975, the counts and percentage of the student body attributed to minorities (Black, Hispanic, Asian and Other) were available, but a count for Total Enrollment did not appear in the reports. Thus, Total Enrollment numbers for 1975-1980, 1982-1986, and 1992-1996 were calculated by dividing the percent of minority students into the sum of minority students. All decimals at 0.5 and above were rounded to the next larger integer.

When reports were missing for single years, the midpoint between the two adjacent years was chosen as an estimate for Total Enrollment and for each of the race and ethnicity categories. For the three periods with missing multiple-year annual reports, a linear regression using the least squares method was fitted to the four adjacent values for the period, i.e., two years before and two years after the period of missing data. The equations for each of these lines were used to estimate counts for Total Enrollment as well as each category of race and ethnicity in the missing periods.

Estimating graduates by race and ethnicity

The doctor of optometry program is a four-year curriculum, and typically students enroll after completing a baccalaureate degree. Annual numbers of graduates in each racial and ethnic group were estimated by taking one quarter of Total Enrollment for each year. This method assumes that attrition is already accounted for in the Total Enrollment numbers of each academic year. A systematic review of literature in medicine showed that race and ethnicity were not associated with attrition from medical school.[26] If minority student attrition rates were higher in optometry, then the estimates for minority optometrists in this paper will be larger than actual proportions.

Method to estimate numbers of optometrists in 2011

The number of clinician optometrists in 2011 was estimated by using two key assumptions. First, 10% of the graduates are assumed to pursue a non-clinical career.[13] Second, retirement is assumed to begin 30 years after graduation. The youngest age at graduation is assumed to be 25, thus retirement will begin for 10% of each year's graduates at the age of 55.

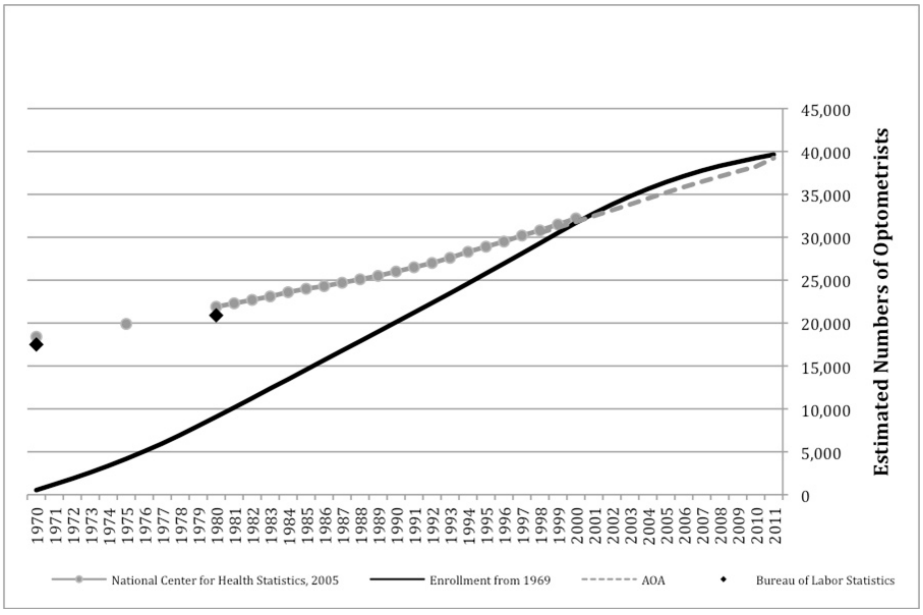
The rate of retirement is set at a constant rate of 10% per year in the period 30 to 40 years after graduation, from age 55 to 65. At 40 years after graduation, all are assumed to have ceased clinical practice full-time. The general economic climate,[27] the supply of clinicians relative to demand for services, and federal law raising the minimum mandatory retirement age[28] are macro-level factors that contribute to varying rates of retirement over the years. The average retirement age in the United States was 67 in 1950, but has dropped to 62 in 2000.[29] The economic downturn in more recent years suggests that retirement age is delayed for certain cohorts of clinicians.[30-32] For the purposes of building a model and making an estimate encompassing almost a half-century of data, the retirement rate was assumed to be a straight-line function. Attrition from the profession is assumed to be constant across racial and ethnic groups.

For reference, the estimates in the model were compared **(Figure 1)** with available data published by the U.S. Department of Labor, U.S. Department of Health and Human Services, and the AOA.[14,16,33] The gap between the model and federal estimates is due to constructing a model that begins with enrollment in 1969, and assumes that there were no optometrists before that date. This was necessary because there was no information about the age of optometrists in the numbers from the federal estimates, thus making it impossible to factor in retirement.

Comparing race and ethnicity proportions with population

The final estimates for the race and ethnicity of optometrists were compared with U.S. Census 2010. The assumption in this paper is that primary eye care will serve all age groups and all races, so no adjustments were made to account for any variability in the need for eye care due to race or age of the population segments.

Figure 1
Comparing Estimates of U.S. Optometrists



In the U.S. Census, an individual falls into one of three categories: "One Race," "Two or More Races," or "Race Alone or In Combination." The "Race Alone or In Combination" counts exceed the numbers of individuals in the United States by 2%. ASCO does not have a mechanism for capturing students of mixed races. Thus, a judgment was made by the author to use Census data for "One Race," which accounts for 98% of the population, rather than "Race Alone or In Combination," which accounts for 102% of the population. Compared with proportions in the "Race Alone or In Combination," the Census proportions for "One Race" understates the proportions of American Indian/Alaskan Native by 0.6% and Pacific Islanders by 0.2%. There is no difference in the proportions for Whites, Blacks and Asians.[18]

The category of "Other" was created in this study by the author to include "American Indian/Native Alaskan" and "Pacific Islander" in the U.S. Census, and "American Indian," "Pacific Islander," and "Foreign Nationals" in ASCO data. The category of Pacific Islander did not come into use by ASCO until 1992. From 1969 to 2005, Foreign Nationals, i.e., students who were not U.S. citizens, appeared as a separate category within the report of minority students and captured non-U.S. students of all races and ethnicities as a mutually exclusive group. Foreign Nationals contributed only 1-2% of optometry students through the 1980s. However, their numbers grew dramatically in the 1990s, and they now account for 33% of Total Enrollment. The distortions to racial proportions in the model over these past 20 years cannot be avoided due to the manner in which ASCO data were collected.

A two-proportion z-test (using STATA v.11.2) was conducted to test the null hypothesis that there is no difference between U.S. Census and optometrists proportions for each race and ethnicity category.

Results

The numbers of students enrolled in U.S. optometry schools in 2010 is 2.56 times that of 1969. There were 11 institutions in 1969, 13 by 1980, and 17 by 1990. In 2013, two more institutions will have graduates.

The proportion of Black students, accounting for 0.63% of Total Enrollment in 1969, grew to 2.71% in 2010. Hispanic students were 1.00% in 1969, and now account for 4.52%. By far, the largest minority group is Asian, making up 3.43% in 1969, and 28.18% in 2010. **(Table 1)**

Table 1
Enrollment in U.S. Optometry Schools

Year Beginning	Total Enrollment	Black	Hispanic	Asian	White	Other
1969	2,364	15	24	81	2,211	33
1970	2,966	15	28	105	2,775	43
1971	**2,983**	22	38	115	2,758	50
1972	**3,203**	37	41	138	2,918	69
1973	**3,423**	52	39	143	3,137	52
1974	**3,643**	73	45	144	3,333	48
1975	3,888	83	55	166	3,542	42
1976	4,034	89	46	157	3,706	36
1977	4,425	81	55	162	4,070	57
1978	4,675	64	64	180	4,303	64
1979	4,736	58	67	223	4,324	64
1980	4,778	60	80	256	4,326	56
1981	4,876	70	94	283	4,362	68
1982	4,974	79	108	310	4,397	80
1983	4,777	91	124	309	4,167	86
1984	4,979	98	224	286	4,282	89
1985	4,976	114	257	336	4,163	106
1986	4,919	123	271	378	4,024	123
1987	4,863	120	272	442	3,905	124
1988	**4,931**	**127**	**283**	**489**	**3,878**	**154**
1989	**4,957**	**130**	**290**	**542**	**3,821**	**173**
1990	**4,957**	**134**	**297**	**596**	**3,738**	**193**
1991	**4,983**	**137**	**304**	**649**	**3,681**	**212**
1992	4,998	144	314	698	3,604	238
1993	5,099	142	316	758	3,638	247
1994	5,199	139	318	818	3,671	255
1995	5,149	120	330	930	3,522	248
1996	5,212	122	312	1,019	3,482	275
1997	**5,282**	**122**	**302**	**1,109**	**3,455**	**293**
1998	**5,345**	**122**	**290**	**1,197**	**3,422**	**314**
1999	5,464	120	275	1,307	3,410	352
2000	5,428	126	268	1,357	3,338	339
2001	5,414	141	282	1,357	3,263	371
2002	5,362	163	294	1,254	3,225	426
2003	5,354	171	302	1,244	3,230	407
2004	5,369	177	273	1,212	3,237	470
2005	5,377	189	273	1,252	3,399	264
2006	5,488	175	271	1,306	3,363	373
2007	5,556	172	255	1,380	3,349	400
2008	5,595	169	249	1,465	3,313	399
2009	5,832	165	258	1,601	3,339	469
2010	6,060	164	274	1,708	3,421	493

Source: Association of Schools and Colleges of Optometry. Data estimated by linear regression are in bold.

The model estimates 39,445 clinician-optometrists in 2011. The U.S. Census estimated that in 2010, 16% of the population were Hispanic, 12% were Non-Hispanic Black, 65% were Non-Hispanic White, and 5% were Asian. The percentage of White and Asian optometrists exceeds their proportions in the population by 7.3% and 11.6%, respectively. Black and Hispanic optometrists are substantially smaller in proportion than the population by 9.7% and 11.3%. The two-proportion z-test for each category of race and ethnicity consistently reveals that the probability of finding no difference in proportions is < .001. **(Table 2)**

When looking at the race and ethnicity proportions of optometry school graduates compared with those achieving their first professional degrees,[34] the Hispanic share of graduates from optometry schools is consistent with the percentage achieving first professional degrees across the nation. For example, the ratio of Hispanic optometry school graduates to Hispanics attaining first professional degrees is approximately 1:1 over the past 10 years. **(Figure 2)** Over the same period, that ratio is closer to 0.5:1 for Blacks and 2:1 for Asians.

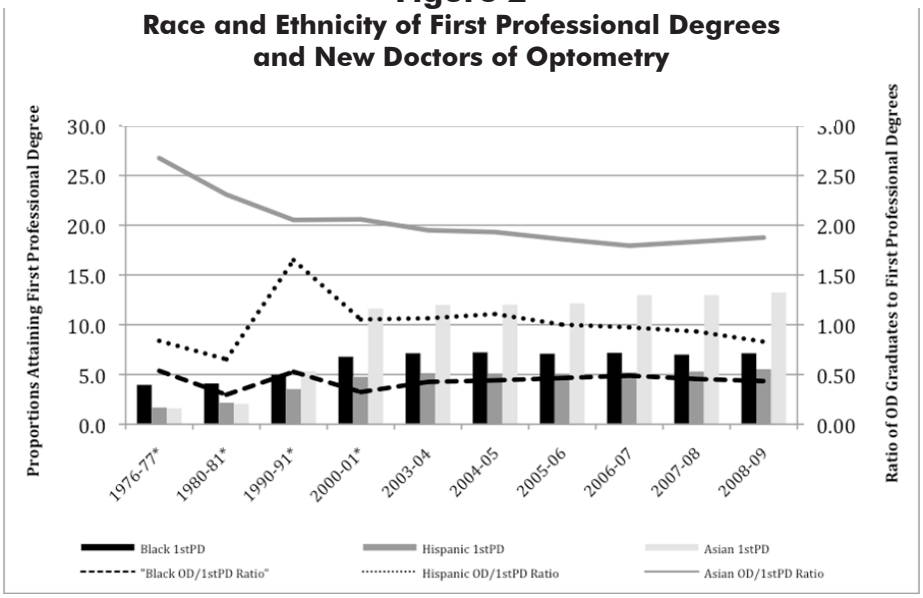
Careers in the patient care professions are longer than the average U.S. worker's, so the educational pipeline affects the race and ethnicity of clinicians for many decades.[35, 36] When compared with other healthcare professions requiring at least four years of post-baccalaureate training, optometry seems to do slightly better than dentistry in attracting Black individuals, about the same for Hispanics in dentistry, but not as well as medicine in attracting Blacks or Hispanics. **(Table 3)** Still, the gap between Black and Hispanic clinicians and their proportions in the population remains large regardless of profession.

These gaps will persist, as the percent of Black and Hispanic students enrolled in U.S. optometry schools has remained below 5% each, while the percent of Asians now exceeds 28%. The Hispanic population in the United States is expected to reach 30% in 2050, and Non-Hispanic Blacks are anticipated to remain steady at 12% over the next 40 years. Non-Hispanic Whites are ex-

Table 2
Estimated Numbers of Optometrists in 2011 Compared with U.S. Census 2010

	Numbers of optometrists 2011 (model)	Proportion of optometrists (model)	Population proportions (U.S. Census 2010)	Difference in proportions between optometrists and population	P – value (2 proportion z-Test)
White (non-Hispanic)	28,434	72.0	64.7	7.3	< .001
Black (non-Hispanic)	983	2.5	12.2	- 9.7	<.001
Hispanic	1,855	4.7	16.0	- 11.3	<.001
Asian	6,396	16.2	4.6	11.6	<.001
Other	1,777	4.5	2.5	2.0	<.001
Total	39,445	100.0	100.0		

Figure 2
Race and Ethnicity of First Professional Degrees and New Doctors of Optometry



Source: First Professional Degrees from U.S. Department of Education [34] and O.D. graduates from model. Annual data were available from 2003 through 2009. Only select earlier years were available, and they are marked with an asterisk (*). The ratio of O.D. graduates to First Professional Degrees is calculated by dividing the proportion of O.D. graduates by the proportion of First Professional Degrees for each race and ethnicity. For example, in 2009, the proportion of Asian O.D. graduates is almost 2 times that of the proportion of Asians receiving their First Professional Degrees.

Table 3
2011 Proportion of Professions and Population by Select Race and Ethnicity

	Population (Census 2010)	Optometrists (model)	Dentists (U.S. Bureau of Labor Statistics)	Physicians and surgeons (U.S. Bureau of Labor Statistics)
Non-Hispanic Black	12%	2.5%	1.0%	5.3%
Hispanic	16%	4.7%	5.8%	6.6%
Asian	5%	16.0%	11.0%	16.1%

pected to drop to 46% in 2050, and Asians will grow to 8%.[18]

Limitations

The model begins with 1969 enrollment data and assumes there were no optometrists prior to that date. Although federal estimates of optometrists were available sporadically from 1969 through 1979, and consistently from 1980 through 2000, no information was available about the age of optometrists, thus making it difficult to estimate retirement. As a result, the model is a poor estimator of the numbers of optometrists in the early years, but converges with other published estimates by the late 1990s **(Figure 1)**.

A more typical method of measuring demographic characteristics is to conduct a national survey of a random sample of optometrists across the nation. Such a study is already planned in a partnership between ASCO and the AOA.[37] In the absence of survey data, the model outlined in this paper is a method to estimate race and ethnicity using data already collected on an annual basis.

In any data set collected over a span of time exceeding 40 years, imperfections will be found, requiring some adjustment before meaningful analysis can take place.

The inclusion of "Foreign Nationals" in the category of "Other" assumes this group stayed in the United States rather than returned to their home countries after graduation. Until the end of the 1980s, Foreign Nationals accounted for 1-2% of students, and this assumption would not have made a large difference in the results. By 1992, however, this group accounted for more than 4% and grew to 33% of Total Enrollment in 2010. Canadian students were 93% of Foreign Nationals enrolled in U.S. optometry programs in 2010. Future research should analyze this group in greater detail, but the data collected must have more granularity in order to understand their race and ethnicity and whether these graduates leave or remain in the United States.

Excluding the population of mixed race individuals (2%) has no impact on proportions of the largest racial groups in 2010, i.e., White, Black and Asian. However, by 2050, individuals of mixed races are expected to account for nearly 4% of the population. Future studies may wish to take this growth into account.

The inconsistent availability of Total Enrollment data is less likely to occur in the future because electronic record-keeping began in 1999. Estimates using linear regression provided 16% of the data in this paper. To minimize the effect of variance over a long period of time, a separate regression analysis was conducted for each segment with missing data. Separate regression analyses were conducted for each racial and ethnic group for missing periods to take into account differences by group. The regression coefficient for each model is shown in **Table 4**.

Attrition rate in the model is assumed to be the same for all students throughout optometry school and throughout their careers. In one study, race and ethnicity did not predict dropout from medical school.[26] Optometry school students may be different. ASCO data capture race and ethnicity by enrollment year beginning in 1989.[38] Attrition by race and ethnicity in optometric education should be studied as a separate issue in the future.

The retirement assumptions in the model, a constant 10% annual rate beginning 30 years and ending 40 years after graduation, have not been validated. Further, the assumption that retirement from the profession is the same across racial and ethnic groups in optometry needs to be tested. Overall economic conditions, job satisfaction, age, retirement income and insurance reimbursement are among the many factors that can affect retirement.[15,39-43]

Comparing different estimates for the numbers of optometrists in the United States is one approach to help gauge the overall soundness of the retirement assumptions in the model. **Figure 1** shows that the numbers in this model for 2011 and the projections from the AOA are very close, if not statistically the same.

Finally, all data were obtained by survey, thus self-reported error is inherent in the information. For this paper, however, self-reported error is not a large concern because the data reflect how optometry students self-identify on the issue of race and ethnicity. Census 2010 race and ethnicity information also is based on respondent self-identified group. This is a window to the respondent's perception of identity, which is arguably more accurate than an observer-assigned approach.

Discussion

The reasons for improving racial and ethnic diversity among optometry students can be argued from a social justice perspective, i.e., Blacks and Hispanics are under-represented[44] in optometry. As a profession, optometry is a high education attainment and well-compensated profession. Injustices in our social structure are, in part, responsible for the disparity. Thus, the advantaged members of society should make an effort to reduce those disparities.

Another reason for reducing racial and ethnic disparities is tied to patient care. Concordance research conducted in medical and dental settings has shown that minority practitioners see a disproportionate share of minority patients, they tend to locate in areas with large numbers of minority patients, and

Table 4
Regression Coefficients (R^2) for Linear Regression Models

	Total Enrollment	Black	Hispanic	Other	Asian
1971-1974	.9592	Not applicable	Not applicable	Not applicable	Not applicable
1988-1991	.8042	.9159	.9829	.9834	.9992
1997-1998	.9305	.3529	.9885	.9221	.9943

when given a choice, patients subconsciously prefer and choose a clinician of the same race.[3-5,9,10] Giving patients choice often reveals unspoken sex, race and ethnicity preferences.[3,8,12] Racial and ethnic concordance, then, could have positive outcomes in patient access and retention in care. In optometry, offering patients the opportunity for provider and patient concordance could reduce racial disparities in primary eye care. However, these opportunities are less available when the gap in proportions of optometrists compared with the population is large.

Post-secondary-school educational attainment data may lead one to conclude that the small numbers of Black and Hispanic students in optometry school is a result of racial and ethnic disparities in higher education. Indeed, Blacks and Hispanics are more likely to attend two-year colleges than four-year colleges.[45, 46] Nonetheless, important gains have been made in increasing the proportion of Blacks and Hispanics completing first professional degrees. In academic year 1976-1977, 4% of first professional degrees were awarded to Blacks; 1.7% to Hispanics. By 2008-2009, 7.1% were awarded to Blacks; 5.5% to Hispanics.[17,34] While these gains are important, the gaps compared with their proportions in the population are still very large.

Optometry is not alone; other health professions face similar disparities. While some steps have been taken to bridge race and ethnicity gaps,[47] the optometric profession has an opportunity to make a deep impact. Educators, serving the beginning of the professional pipeline, logically should take the lead. Perhaps optometric educators could consider establishing an optometry program at one of the historically Black colleges[48] or at a college serving primarily Hispanic students.[49] Given that Blacks and Hispanics have a greater tendency to attend two-year institutions, perhaps a pathway could be developed for those with a two-year degree.

Conclusion

This paper provides a current estimate of the race and ethnicity of optometrists using optometry school enrollment data. The model estimates fill a void in federal sources of data, which stopped in 1999. As a reference point, the 2011 estimate of the total number of optometrists in the United States is consistent with the number used by the AOA.

The race and ethnicity of optometrists, like physicians and dentists, are disproportionately White and Asian compared with the U.S. population. Measuring gaps, whether sex, race, income or educational attainment, helps society to decide where to allocate resources. It serves as a benchmark to chart progress if change is desired.

The rationale for bridging these gaps can be argued from a social justice perspective as well as from the point of view of improving patient access and quality of care. That is, disparities in eye health may be reduced and patient satisfaction increased if Black and Hispanic patients were offered more opportunity to choose a racially and ethnically concordant optometrist.

Acknowledgements

Many thanks to Marty Wall, CAE, Executive Director of the Association of Schools and Colleges of Optometry, for providing historical data and responding to many questions, and to Lauren SanFilippo, Research Coordinator at the American Optometric Association, for responding to various inquiries.

References

1. Grieco E, Cassidy R. Overview of Race and Hispanic Origin Census 2000 Brief. March 2001.
2. Ashton CM, Haidet P, Paterniti DA, Collins TC, Gordon HS, et al. Racial and ethnic disparities in the use of health services: Bias, preferences, or poor communication? Journal of General Internal Medicine. 2003;18(2):146-152.
3. Garcia J, Paterniti D, Romano P, Kravitz R. Patient preferences for physician characteristics in university-based primary care clinics. Ethnicity and Disease. 2003;13(2):259-67.
4. LaVeist TA, Nuru-Jeter A. Is doctor-patient race concordance associated with greater satisfaction with care? J Health Soc Behav. 2002 Sep.;43(3):296-306.
5. LaVeist TA, Nuru-Jeter A, Jones KE. The association of doctor-patient race concordance with health services utilization. J Public Health Policy. 2003;24(3/4):312-323.
6. Saha S, Arbelaez J, Cooper L. Patient-physician relationships and racial disparities in the quality of health care. American Journal of Public Health. 2003;93(10):1713-9.
7. U.S. Department of Health and Human Services Bureau of Health Professions. The rationale for diversity in the health profesions: A review of the evidence. October 2006.
8. Williams K, Demko C, Lalumandier J, Wotman S. Caring for African-American patients in private practice - disparities and similarities in dental procedures and communication. Journal of the American Dental Association. 2008;139(9):1218-26.
9. Gray B, Stoddard JJ. Patient-physician pairing: Does racial and ethnic congruity influence selection of a regular physician? J Community Health. 1997;22:247-259.
10. Murray-Garcia JL, Garcia JA, Schembri ME, Guerra LM. The service patterns of a racially, ethnically, and linguistically diverse housestaff. Acad Med. 2001;76:1232-1240.
11. Berger JT. The influence of physicians' demographic characteristics on physician practice. Academic Medicine. 2008;83(1/23/2012):100-105.
12. Bender D. Patient preference for a racially or gender-concordant student dentist. Journal of Dental Education. 2007;71(6):726-45.
13. Mount H, Hudson B. Optometrists employed in health services - United States 1968. U.S. Department of Health and Human Services 1973.
14. SanFilippo L. Email inquiry between Elizabeth Chen and the American Optometric Association regarding its estimate of practicing optometrists for 2011. American Optometric Association June 21, 2011.
15. White AJ, White C, Doksum T. Workforce study of optometrists. Abt Associates for the American Optometric Association February

2000.
16. U.S. Department of Labor. Labor Force Statistics from the Current Population Survey [Internet]; http://data.bls.gov/cps/cpsa2011.pdf.
17. U.S. Department of Education. Digest of Education Statistics [Internet]; http://nces.ed.gov/fastfacts/display.asp?id=72.
18. U.S. Census Bureau. U.S. interim projections by age, sex, race, and Hispanic origin.; 2008:http://www.census.gov/ipc/www/usinterimproj/.
19. Smedley BD, Stith AY, Nelson AR, Editors. Unequal treatment: Confronting racial and ethnic disparities in health care. The National Academy Press; 2003. Institute of Medicine.
20. Institute of Medicine. Race, ethnicity, and language data: Standardization for health care improvement. National Academy of Sciences; 2009.
21. Association of Schools and Colleges of Optometry. Survey Results [Internet]; http://www.opted.org/i4a/pages/index.cfm?pageid=3392.
22. Association of Schools and Colleges of Optometry. Annual Student Data Report: Enrollment 2009-2010 [Internet]; http://www.opted.org/i4a/pages/index.cfm?pageid=3396.
23. U.S. Census Bureau. 2010 census data product descriptions. March 2012: http://2010.census.gov/2010census/data/.
24. U.S. Census Bureau. State & County QuickFacts: Race [Internet]; http://quickfacts.census.gov/qfd/meta/long_RHI505210.htm.
25. Humes KR, Jones N, Ramirez R. Overview of race and Hispanic origin: 2010. U.S. Census Bureau; 2011.
26. O'Neill LD, Wallstedt B, Eika B, Hartvigsen J. Factors associated with dropout in medical education: A literature review. Med Educ. 2011;45(5):440-54.
27. Glaeser EL. Goodbye, golden years. New York Times. November 19, 2011.
28. Barker D, Clark R. Mandatory retirement and labor-force participation of respondents in the retirement history study. Social Security Bulletin. 1980;43(11):20-55.
29. Gendell M. Retirement age declines again in 1990s. Monthly Labor Review 2001.
30. Konrad R, Dall T. Physician retirement intentions and trends: Implications for supply. 2004 Academy Health Poster Presentation.
31. Lowes R. Physicians delaying retirement because of recent recession. Medscape News; August 8, 2011.
32. Oetjen RM OD. Retire already! managing physicians who no longer want to work, but have to. The Journal of Medical Practice Management. 2010;26(1):26-52.
33. National Center for Health Statistics. Health, United States, 2005. U.S. Department of Health and Human Services; 2005.
34. U.S. Department of Education Table 305: First professional degrees conferred by degree granting institutions by race/ethnicity of student [Internet]. Available from: http://nces.ed.gov/fastfacts/display.asp?id=72.
35. Bethke W. The golden years can wait. Review of Ophthalmology; November 15, 2003.
36. Meghea C, Sunshine JH. Retirement patterns and plans of radiologists. The American Journal of Roentgenology. December 2006;187(6):1405-1411.
37. American Optometric Association Press Release. AOA, ASCO combine to conduct optometric workforce study. February 24, 2011 [Internet] http://newsfromaoa.org/2011/02/24/aoa-asco-combine-to-conduct-optometric-workforce-study/.
38. Wall M. Email correspondence with Elizabeth Chen. March 29, 2012.
39. Behmann M, Schmiemann G, Lingner H, Kuhne F, Hummers-Pradier E, Schneider N. Job satisfaction among primary care physicians: Results of a survey. Dtsch Arztebl Int. 2012 Mar;109(11):193-200.
40 Bovier PA, Perneger TV. Stress from uncertainty from graduation to retirement-a population-based study of Swiss physicians. J Gen Intern Med. 2007 May;22(5):632-8.
41. Farley FA, Kramer J, Watkins-Castillo S. Work satisfaction and retirement plans of orthopedic surgeons 50 years of age and older. Clin Orthop Relat Res. 2008 Jan;466(1):231-8.
42. Kletke PR, Polsky D, Wozniak GD, Escarce JJ. The effect of HMO penetration on physician retirement. Health Serv Res. 2000 Dec;35(5 Pt 3):17-31.
43. Schieber S. Retirement income adequacy: Good news or bad? Benefits Quarterly. 2004;20(4):27-39.
44. AAMC: Association of American Medical Colleges Underrepresented in Medicine Definition [Internet]: Association of American Medical Colleges; c2011June 22, 2011]. Available from: https://www.aamc.org/initiatives/urm/54288/urm.html.
45. U.S. Department of Education Fast Facts [Internet]. Available from: http://nces.ed.gov/fastfacts/display.asp?id=72.
46. U.S. Department of Education Table 236: Total Fall Enrollment [Internet] Available from: http://nces.ed.gov/fastfacts/display.asp?id=72.
47. U.S. Department of Health and Human Services: Bureau of Health Professions and Office of Public Health and Science, Office of Minority Health. Pipeline programs to improve racial and ethnic diversity in the health professions: An inventory of federal programs, assessment of evaluation approaches, and critical review of the research literature. April 2009.
48. The White House Office of the Press Secretary. President Obama signs executive order promoting excellence, innovation, and sustainability in historically black colleges and universities. Press Release February 26, 2010.
49. Hispanic Association of Colleges and Universities. Annual Report 2009.

Idiopathic Intracranial Hypertension: A Teaching Case Report

Aurora Denial, OD, FAAO
Nancy B. Carlson, OD, FAAO

Abstract

Idiopathic intracranial hypertension (IIH), previously known as pseudotumor cerebri, is a condition of increased intracranial pressure of unknown etiology. The most common ocular sign of the disorder is bilateral optic disc edema. Early and appropriate diagnosis and effective management are crucial. This teaching case report will highlight the overall role of the primary care optometrist in the diagnosis and management of a patient with IIH. The case specifically deals with the challenges involved in delivering bad or upsetting news to patients, the facilitation of communication, both interprofessional and doctor/patient, and the critical thinking skills needed for accurate patient management.

Key Words: *idiopathic intracranial hypertension, pseudotumor cerebri, primary care, optometrist*

Dr. Denial is an Associate Professor of Optometry at the New England College of Optometry and a clinical instructor in the Boston area.

Dr. Carlson is a Professor of Optometry at the New England College of Optometry and Chair of the Department of Primary Care.

Background

This case involves a 37-year-old African American female who is diagnosed with idiopathic intracranial hypertension (IIH). IIH, previously known as pseudotumor cerebri or benign intracranial hypertension, is a condition of increased intracranial pressure of unknown etiology.[1] Symptoms often include headache, nausea and pulsating sounds within the head. The most significant ocular sign is optic disc edema.[2] The greatest consequence of the bilateral optic disc edema in IIH is vision loss.[3] Up to 25% of IIH patients will develop permanent vision loss.[4] Persistent headaches, depression, anxiety, reduced quality of life, and loss of vision are often long-term consequences of the condition.[5] The economic cost of this condition is significant and estimated to exceed $444 million annually in the United States.[6]

This teaching case report will highlight the overall role of the primary care optometrist in the management of a patient with IIH. The case specifically deals with the challenges involved in delivering serious or upsetting news, the facilitation of communication, both interprofessional and doctor/patient, and the critical thinking skills needed for accurate patient management. It is appropriate for use with students who have had at minimum some patient care experience and knowledge in ocular and neuroanatomy and ocular disease. At most colleges, it would be appropriate for third- and fourth-year optometry students. Optic disc edema can indicate a potentially life- or sight-threatening condition; therefore, early and appropriate diagnosis along with effective patient management is crucial.

Student Discussion Guide

Case description

Patient PC, a 37-year-old African American female, presented to a community health center eye clinic for a comprehensive eye exam on May 3, 2011. The community health center provides medical, eye, dental, mental health, urgent care and nutritional ser-

vices to the people in the community. The patient had received medical care at the clinic during the past 4 years, although this was the first time she was examined at the eye clinic. The patient could not recall the date or provider of her last eye exam. Her main complaint was eye fatigue. Her eyes felt "heavy and tired." The eye fatigue would occur after the patient had been working all day on the computer, and it had started 3-4 months ago. In the past, the eye fatigue had resolved on its own. The patient did not wear any spectacle correction and reported good distance and near vision. The patient felt the eye fatigue was related to excessive computer use and an increase in job responsibilities, which occurred 3-4 months ago. The patient, an administrative assistant at a local university, reported spending approximately 6-8 hours per workday on the computer. She said the symptoms did improve on the weekend with less computer use, and she did not report any other ocular symptoms.

Past ocular history of the patient and her family were unremarkable. Her medical history was positive for hypertension for the past 14 years, obesity, asthma and depression. The patient reported longstanding (ongoing at least 3-5 years), occasional headaches relieved by Motrin. The headaches were not related to her complaint of eye fatigue and occurred randomly. There had been no recent changes in her headaches. Her primary care physician (PCP) had evaluated the headache complaint and felt tension headaches were the most likely cause. The patient's current medications were: hydrochlorothiazide 25 mg per day, linsinopril 40 mg per day, atenolol 50 mg per day, and Flovent twice daily. The patient was allergic to Augmentin and morphine. The patient reported fair compliance with hypertension medications. She admitted to not using all three of the medications prescribed for hypertension on a consistent basis.

The patient's medical records were accessed by an electronic medical records system and indicated blood pressure readings of 150/103 mmHg in 2011 and 156/103 mmHg in 2010. At her annual physical exam in 2011, the patient's height was recorded as 61 inches and her weight was recorded as 260 lbs. The patient was alert and oriented and reported no current use of recreational drugs or alcohol. The patient said she smoked half a pack of cigarettes per day.

The initial differential diagnosis based on symptoms and case history consisted of: dry eye syndrome (primary or secondary), uncorrected refractive error, specifically hyperopia, binocular/accommodative anomalies, or asthenopia related to excessive computer use. The patient was also considered at risk for hypertensive retinopathy secondary to her history of poor compliance and poor control. The findings for the comprehensive eye exam are listed in **Table 1**.

The initial impression was bilateral disc edema. Hypertensive emergency, also known as malignant hypertension, vs. other causes for the disc edema were considered. Moderate hypertensive retinopathy with other causes for the disc edema was also a possibility. Although there are many possible differential diagnoses for disc edema, IIH, space-occupying lesion or infection were the most significant at this time.

Table 1
Comprehensive Initial Eye Exam: May 3, 2011

	OD	OS
Distance and near visual acuity, sc	20/20	20/20
Pupils	Pupils equal, round and reactive to light (PERRL) Negative afferent pupillary defect (APD)	
Motility-extra ocular muscles	Smooth, accurate, full and extensive	
Color vision (Ishihara)	11/11	11/11
Cover test	Ortho dist and 4 prism diopters exophoria at near	
Finger counting fields	Full	Full
Near-point convergence	To the nose	
Retinoscopy	+0.50= -0.25 x 90	+0.25
Subjective refraction	+0.75= -0.25 x 90 20/20	Plano 20/20
Slit lamp	Capped meibomian glands lower lid Otherwise all structures unremarkable	Capped meibomian glands lower lid Otherwise all structures unremarkable
TBUT	5 seconds	5 seconds
Intraocular pressures (GAT) @ 6 p.m.	15 mmHg	10 mmHg
Dilated @7:30 p.m. Patient gave consent for dilation and indicated she understood benefits and potential side effects	1 drop 2.5% phenylephrine (punctal occlusion) 2 drops 1.0 % tropicamide	1 drop 2.5% phenylephrine (punctal occlusion) 2 drops 1.0 % tropicamide
Fundus exam with 90D lens and binocular indirect ophthalmoscopy	Disc: elevated, blurred margins, 360 degrees, hyperemic in color Blood vessels: A/V crossing changes with engorgement of vessels Background: multiple flame-shaped hemorrhages Cup/disc estimate: H/V 20/20% Macula: clear Periphery: no holes, tears or detachments	Disc: elevated, blurred margins, 360 degrees, hyperemic in color Blood vessels: A/V crossing changes with engorgement of vessels Background: multiple flame-shaped hemorrhages Cup/disc estimate: H/V 20/20% Macula: clear Periphery: no holes, tears or detachments
Blood pressure with large-person cuff, patient sitting	Right arm 180/115 mmHg	Left arm 160/120 mmHg
Fundus photos	**Figure 1 OD**	**Figure 2 OS**

Additional impressions were meibomian gland dysfunction with secondary dry eye, minimal refractive error OD, and asymmetric intraocular pressure.

The plan was to immediately escort the patient to the urgent care clinic, which was located within the health center. The next day, the patient would report to the emergency room (ER) of a local hospital, with a follow-up neuro-ophthalmology appointment within 1 week. Both the urgent care clinic and ER physicians were called in advance to prepare them for the patient's visit. Plans for the diagnoses of meibomian gland dysfunction with dry eye, refractive error and asymmetric intraocular pressure were deferred until the more emergent issues were addressed.

Patient education

The patient was educated on the retinal findings and elevated blood pressure. The potential plan for the patient was discussed with the patient. The patient preferred to visit the urgent care department that night for blood pressure control and the ER the next morning for imaging. The patient was also educated on the importance of compliance with the urgent care and ER visits.

The patient was told that the disc edema could be the result of the increase in blood pressure or other conditions. The patient was informed that the other conditions ranged from benign conditions to potentially life- or sight-threatening conditions. The patient was told that the emergency department of the local hospital was the best place to quickly implement the necessary testing to accurately diagnose and manage her condition. The patient was informed of the importance of proper and timely diagnostic testing, which necessitated the visit to the ER. The patient indicated understanding by paraphrasing in her own words the information she received.

The patient had many questions and was upset by the potentially serious findings revealed during the examination. She did not anticipate her routine comprehensive exam would necessitate a visit to the ER. As much as possible, all of the patient's questions were answered and the patient was reassured. The patient was given the clinician's cell phone number and was told that

Figure 1
Right Eye at Comprehensive Initial Exam: May 3, 2011

Figure 2
Left Eye at Comprehensive Initial Exam: May 3, 2011

the eye clinic staff would be available for her. **Table 2** lists the findings for the urgent care visit.

Phone conversation with patient: May 4, 2011, 9 a.m.

The patient was called the following morning. She reported feeling "okay" but was very anxious about her condition. She indicated she had transportation to the hospital and assured the clinician she would comply. The patient was reassured and reminded of the importance of proper testing and diagnosis. The patient was reminded that she could call the eye clinic or the clinician at any time to ask questions or to get information or help facilitating follow-up appointments. **Table 3** lists the findings for the ER visit.

Phone conversation with patient: May 5, 2011, 11 a.m.

The patient reported being discharged from the hospital earlier in the morning. The patient reported being given medication for her condition and that the ER physician spoke to her about the importance of taking the medication to prevent loss of vision. She was given an appointment by the ER staff with the attending neurologist for the next day. The patient was informed that the eye clinic would schedule an appointment with a neuro-ophthalmologist within 2 weeks for follow-up. The patient reported "not feeling well." The patient felt tired and weak and was told by the hospital staff to spend the day resting.

Appointment with neurologist: May 6, 2011

The neurology appointment was initiated and scheduled by the ER personnel. The neurologist confirmed the diagnosis and treatment plan initiated in the ER. The patient now reported to the neurologist extreme side effects from the medication. The patient reported an inability to walk, disorientation and feeling weak. The neurologist told the patient to discontinue the medication and keep the neuro-ophthalmology appointment, which was scheduled for May 17, 2011.

Phone conversation with patient: May 8, 2011

The patient was extremely distraught. She was suffering side effects from the medication given to her by the ER physician. Despite experiencing extreme side effects and getting the okay from the neurologist to discontinue the medication, the patient was still taking the medication. The patient reported being told in the ER that taking the medication was important because of the potential of losing vision. The patient reported that her appointment with the neurologist was very quick and she felt she did not have adequate time to ask the doctor questions. Despite several attempts, she was unable to contact her PCP at the community health center.

In order to help the patient, eye clinic personnel took the following steps:

- The patient's PCP was contacted via the electronic medical records flagging system, informed of the patient's desire to speak with him, and alerted to her recent health issues. (There was no record of any communication between the ER or urgent care staff and PCP.)
- The patient was instructed to call the neurologist to discuss the side effects of the medication and possible visual consequences of discontinuing it. The patient was reassured that she was not bothering the neurologist and needed to get her questions answered. The patient declined the eye clinic's offer to contact the neurologist.
- The neuro-ophthalmology appointment was scheduled for 14 days after the patient's initial visit to the clinic. Rescheduling it to a sooner date was attempted but not possible.

Table 2
Urgent Care Visit: May 3, 2011, 8 p.m.

Constitution **Skin** **Head** **Cardiovascular** **Respiratory** **Neurology** **Psych**	Alert, no acute distress Normal turgor, color, no bruising Atraumatic, normocephalic No murmers, no gallops Clear to auscultation Cranial nerves II-XII intact, DTRs normal, sensation intact Within normal limits
Blood pressure (sitting position, right arm, large cuff)	192/136 mmHg
Impression	Uncontrolled hypertension Bilateral optic nerve edema
Treatment/management	Clonidine 0.2 mg po x 1 Extensive patient education on the importance of blood pressure control Follow-up in ER in the morning Neuro-ophth follow-up, PCP 1-2 days

Table 3
Emergency Room Visit: May 4, 2011, 10 a.m.

Medical history	Hypertension, obesity, asthma and depression
Physical examination	No systemic causes found for increase in cerebrospinal fluid (CSF) pressure
Lumbar puncture	Opening pressure 320 mm of water, closing pressure 150 mm water, clear yellow fluid obtained CSF sent for analysis of cell count, chemistry and gram staining CSF cytology report subsequently found to be normal
MRI	Within normal limits, no space-occupying lesions or obstructions
Impression	IIH
Plan	Admission to hospital Acetazolamide 250 mg qid by mouth Follow-up with neurologist after discharge

- The patient was reminded she could call the eye clinic any time.

Phone conversation with patient: May 12, 2011

The patient reported talking with the neurologist and her PCP. She was told to discontinue the medication and reassured that her vision was not in immediate danger. The patient followed their instructions and had discontinued the medication 1 day prior. She reported feeling "a little better." The patient was instructed to call her PCP or neurologist if her condition did not improve, and she was reminded she also could contact the eye clinic with any general questions.

Neuro-ophthalmology appointment: May 17, 2011

The patient was evaluated by the neuro-ophthalmologist. The patient reported no changes in previous ocular or health history. The neuro-ophthalmologist reviewed the results of the lumbar puncture (LP), magnetic resonance imaging (MRI) and neurology report. The neurologist report indicated a diagnosis of IIH. The report also indicated that the patient was prescribed acetazolamide but was unable to tolerate the medication. She had discontinued it 6 days prior and felt "much better." **Table 4** reflects the findings from the neuro-ophthalmology visit.

Phone conversation with patient: May 18, 2011

The patient reported she was "feeling better." She felt comfortable with the neuro-ophthalmologist and felt she was given adequate time to ask questions. The patient assured us she would comply with the follow-up appointments with the neuro-ophthalmologist and PCP. The patient was reminded she could call the eye clinic with any questions. **Tables 5 and 6** reflect the findings from the follow-up appointments.

Educator's Guide

The Educator's Guide includes the necessary information for teaching and discussing the case. The key concepts, learning objectives and discussion questions should guide the teaching of the information in this case.

Key concepts

1. The role of communication, devel-

Table 4
Neuro-Ophthalmology Findings: May 17, 2011

	OD	OS
Distance and near visual acuity, sc	20/20	20/20
Pupils	Pupils equal, round, and reactive to light (PERRL) Negative afferent pupillary defect (APD)	
Motility, extra-ocular muscles	Smooth, accurate, full and extensive	
Color vision (Ishihara)	Normal	Normal
Cover test	Ortho dist/near	
Anterior segment examination	Unremarkable	Unremarkable
Fundus	Discs with good color and blurring of the temp margin	Discs with good color and blurring of the temp margin
Intraocular pressure with applanation @10:30a.m.	13 mmHg	13 mmHg
Humphrey visual fields 30-2 SITA-Fast	22% false positive with -2.97 dB mean deviation and multiple nasal points depressed	-6.33 dB mean deviation with superior and inferior defects
Impression	IIH given her elevated opening pressure	
Plan	Monitor for progressive visual field loss, RTC 1 month	

Table 5
Primary Care Physician Follow-Up: June 4, 2011
The patient has been monitored and followed by her PCP for control of blood pressure and weight reduction

Constitution	Alert, no acute distress
Skin	Normal turgor, color, no bruising
Head	Atraumatic, normocephalic
Cardiovascular	No murmers, no gallops
Respiratory	Clear to auscultation
Neurology	Cranial nerves II-XII intact, DTRs normal, sensation intact
Psych	Within normal limits
Blood pressure (sitting position, large cuff)	Right arm 145/89 mmHg Left arm 170/116 mmHg
Impression	Hypertension Past diagnosis of IIH
Treatment/management	The patient was given instructions on diet, exercise, and importance of maintaining good compliance with medication. Weight reduction was emphasized and the patient was advised to schedule a consult with the nutrition department.

Table 6
Follow-Up Visit with Neuro-Ophthalmologist: 1 Month Post Original Visit

History	37-year-old female with IIH, alert and oriented, no complaints, no change in meds since last visit	
	OD	OS
Distance and near visual acuity, sc	20/20	20/20
Pupils	Pupils equal, round, and reactive to light (PERRL) Negative afferent pupillary defect (APD)	
Motility-extra ocular muscles	Smooth, accurate, full and extensive	
Fundus	Discs with good color and mild chronic papilledema and vessel tortuosity	Discs with good color and mild chronic papilledema and vessel tortuosity
Impression	IIH doing well	
Plan	Monitor for progressive visual field loss, RTC 3 month	

oping patient rapport and trust in patient care.

2. Ethical responsibilities of a primary care health/eyecare provider.
3. The pathophysiology of optic disc edema, including steady state of cerebrospinal fluid (CSF).
4. The role of basic science in understanding disease in patients.
5. Critical thinking in diagnosis.
6. The meaning of a diagnosis of exclusion.

Learning objectives

1. To gain a general understanding of IIH, including signs, symptoms, patient characteristics, diagnostic testing, treatment options and management.
2. To gain a basic understanding of the grading system for hypertensive retinopathy and the management of a hypertensive crisis.
3. To apply critical thinking skills to the care of a patient.
4. To gain skills in the delivery of upsetting or bad news.
5. To understand the role and responsibilities of the primary care optometrist in the management of a patient with IIH.
6. To understand the critical role of communication and building trust and rapport between doctor and patient.

Discussion questions

1. Knowledge, concepts, facts and information required for critical review of the case
    a. Describe the anatomy of the optic nerve head.
    b. Describe the anatomy that allows for the outflow of CSF.
    c. Discuss the general risk/symptoms for IIH and compare them to the patient's individual risk/symptoms factors.
    d. Describe hypertensive retinopathy fundus findings and describe the grading criteria.
    e. What is the pathophysiology of IIH?
    f. What is the mechanism of action of the pharmaceutical agents involved?
2. Differential diagnosis
    a. What is the differential diagnosis from the patient's presenting symptoms and medical history?
    b. Describe the retinal findings and determine the differential diagnosis from the patient's retinal signs and medical history.
    c. Determine and discuss the differential diagnosis for optic disc edema.
    d. How is true optic disc edema differentiated from pseudo disc edema?
    e. What diagnostic testing is needed? Include specificity of testing and potential risk to patient.
    f. Discuss the concept of a diagnosis of exclusion.
    g. After analysis of all information/data, what is the best possible diagnosis?
3. Patient management and the role of the primary care optometrist
    a. What is the appropriate optometric management of this patient?
    b. Discuss the general management of hypertensive retinopathy and the specific management related to this case.
    c. Discuss the role of the primary care eye doctor in measuring blood pressure. Should this be done routinely in optometrists' offices as a screening test?
    d. Describe the role of the primary care optometrist in coordinating the care of this patient. Does an optometrist have an ethical role to oversee the patient's care? Is it sufficient for the optometrist to just make the appropriate referral?
    e. What pertinent information should be used to educate the patient regarding the condition and who should give this information to the patient?
4. Communication and delivery of serious/upsetting news, doctor/patient relationship
    a. What is the professional obligation of the provider in disclosing exam findings? What is informed consent? Discuss the ethical and legal responsibilities of a provider in disclosing examination findings to a patient even if that information may increase patient stress.
    b. What is the SPIKES model for delivery of bad news?
    c. Use role-playing and the SPIKES model to simulate the delivery of bad news in this case.
    d. Identify the interactions where patient/doctor trust was established and lost.
    e. Discuss the interprofessional communication that facilitated or hindered the care of this patient.
5. Critical thinking concepts
    a. What assumptions are made in the case?
    b. What inferences are made in the determination of the differential diagnosis?
    c. What are the implications of prematurely inferring that the patient has hypertensive retinopathy?
    d. What are the potential implications involving the management of this patient?
    e. What are the implications of withholding information from the patient?
    f. What is the patient's point of view?

Literature review

Historically, IIH was referred to as benign intracranial hypertension or pseudotumor cerebri. The term idiopathic implies that the cause is unknown. The condition is defined by an increase in intracranial pressure characterized by a rise in CSF pressure with normal CSF composition, in the absence of any brain masses, abnormalities or secondary causes.[1]

Although the disorder can occur in children and men, it most frequently occurs in women age 20-50 who are overweight.[1] Several studies have demonstrated that African American patients and men with the condition have a more aggressive form of the disease and require more aggressive intervention.[7] The incidence of this condition per year is 0.9 per 100,000 people in the general population and 3.5 per 100,000 in women 15-44 years of age.[1]

Cerebrospinal fluid, optic nerve: basic review

The brain, its blood supply and the CSF are maintained within the skull. Because the skull is made of bone and is nonflexible, a delicate balance must be maintained between all the structures within the skull. CSF is a clear, colorless liquid, which is mainly produced in the choroidal plexus within the ventricular system of the brain.[8] CSF resides in the space between the arachnoid mater and the pia mater, the subarachnoid space.[8] The CSF provides nutrients, aids in waste removal, maintains chemical stability and cushions the brain.[8] The CSF is produced at a rate of half a liter per day and is turned over several times per day.[8] A steady state must be maintained between production and drainage of CSF to maintain an appropriate amount of fluid within the skull.

The CSF circulates from the site of formation to the subarachnoid space and interpeduncular and quadrigeminal cisterns.[9] Drainage of fluid involves absorption into the venous system, which occurs mainly through the arachnoid villi in the brain and the arachnoid granulations.[9] This occurs via two pathways: active transport through the cells of the arachnoid granulations into the dural venous sinus or transport between the cells of the arachnoid granulations.[9] CSF absorption can also occur through the extracranial lymphatic system.[1]

The optic nerve is considered part of the central nervous system.[10] Retinal ganglion cells exit the eye at the lamina cribrosa and acquire a myelin sheath to form the optic nerve.[10] The optic nerve sheath is comprised of fibrous tissue and has a limited ability to expand.[11] The optic nerve and fibrous tissue run within the subarachnoid space.[11]

The subarachnoid space around the optic nerve communicates with the subarachnoid spaces around other parts of the brain.[10] The formation of optic nerve edema depends on the interaction of CSF pressure, intraocular pressure and systemic blood pressure.[11] An increase in CSF pressure from overproduction, underabsorption or any obstruction of CSF combined with low intraocular pressure or low perfusion pressure can result in optic nerve edema.[1] Increased intracranial pressure and resulting optic nerve edema damage the optic nerve by disruption of axonal transport, intraneuronal ischemia or a combination of both.[1]

There are several hypotheses of mechanisms for the increase in intracranial pressure in IIH. They include increased brain water content, increased CSF production, reduced CSF drainage, increased cerebral venous pressure and, more recently, connections between CSF space and the nasal lymphatic system.[5] The most supported hypothesis for increased pressure is reduced CSF absorption.[1] Reduced absorption may be secondary to dysfunction of the absorptive mechanism of the arachnoid granulations or through the extracranial lymphatics.[12]

Clinical features

Common clinical features of IIH are:

- Headaches

Ninety to 94% of patients with IIH present with headaches.[13-17] The headaches are described by patients as severe, "the worst headache of my life."[1] The pain is generalized, pulsatile, may awaken the patient from sleep, usually lasts for hours and is worse in the morning.[18] Occasionally patients report neck, back or shoulder pain.[18] The headache may be associated with nausea and vomiting, with vomiting being less common.[1]

- Transient visual disturbances

Transient blurred vision or other visual disturbances that usually last less than 30 seconds are reported in 68% of patients.[1,17] The symptoms may be monocular or binocular and are believed to be related to transient ischemia secondary to increased tissue pressure.[19]

- Tinnitus

Intracranial pulsatile noises are reported by 58% of patients.[17] These noises can vary in description, intensity and duration.[2] The noises have been described by patients as "buzzing," "thumping" or "heartbeat."[17] The causes of the noises are believed to be related to the movement of CSF under high pressure.[20]

- Papilledema

Optic disc edema caused by an increase in intracranial pressure is known as papilledema. Papilledema is the hallmark ophthalmoscopic sign of IIH.[1] Stereoscopic disc viewing such as with fundus biomicroscopy is essential to avoid missing early papilledema. Absence of a previously documented venous pulse or inability to induce a venous pulse can also be a helpful sign. A useful grading scheme for papilledema was devised in 1982 by Frisen and modified in 2010 by Scott.[22] The Modified Frisen Scale grades papilledema from grade 0 (normal) to grade 5 (severe). Grade 1 is considered minimal with a C-shaped peripapillary ring of edema and nasal disc margins obscured.[22] Grade 2 (low degree) is characterized by a circumferential peripapillary ring with nasal disc margin elevation and temporal disc margins obscured.[22] Grade 3 (moderate) is obscuration of at least one major vessel as it passes over the disc with elevation of disc borders.[22] Grade 4 (marked) is total obscuration of a vessel at its origin.[22] Grade 5 (severe) is characterized by total obscuration of all vessels both on the disc and leaving the disc.[22]

- Vision loss

The consequences of papilledema can result in vision loss. According to Corbett et al., vision loss is the main morbidity associated with IIH.[3] Visual field defects found in IIH are directly related to papilledema and are similar to visual field defects that occur in other optic neuropathies. The most common defects are enlargement of the physiological blind spot and an inferior nasal step.[1] Other possible defects include arcuate defects, generalized constriction or depression of isopters, paracentral scotoma and temporal wedge defects.[21] This type of vision loss is indicative of damage at the level of the optic disc rather than posterior to the disc.[1] Although there is some evidence that vision loss corresponds to the severity of

disc edema, there is considerable variation between individuals.[1] Visual field loss leads to blindness in 5% of cases.[1]

- Other

Photopsia (54%), retrobulbar pain (44%), horizontal diplopia (33%), and sixth-nerve palsies (10-20%) are also reported in the literature.[17] Patients with IIH may be asymptomatic.[18]

Diagnosis and diagnostic action

The diagnosis of IIH is a diagnosis of exclusion. In 2002, Friedman and Jacobson updated the criteria that must be met to make the diagnosis of IIH. The criteria include: "elevated intracranial pressure measured in the lateral decubitus position, normal CSF composition, no evidence of hydrocephalus, mass structural or vascular lesion on MRI or contrast-enhanced computed tomography (CT) for typical patients and magnetic resonance (MR) venography for all others and no other causes of intracranial hypertension identified. If symptoms or signs present, they may only reflect those of generalized intracranial hypertension or papilledema."[23]

Neuroimaging and LP with the patient in the lateral decubitus position are the initial tests done in determining the diagnosis. Physical examination with blood testing and other tests to rule out secondary causes of intracranial hypertension may also be performed.

Neuroimaging can be done with CT scans, MRI and MR venography. Although CT scans are adequate, MRI is more specific in detecting causes of increased intracranial pressure.[23] MR venography is useful in differentiating between a diagnosis of IIH and venous sinus occlusions.[24]

LP is the definitive test for determining an increase in CSF pressure.[23] Neuroimaging of the brain is usually done before LP to rule out space-occupying lesions or other causes of papilledema.[18] The LP is done in the lateral decubitus position with the legs as relaxed as possible. LP in other positions can result in misleading readings.[18] CSF pressure can fluctuate throughout the day or be elevated in a patient with anxiety from pain or crying.[23] Therefore, repeat measurements may be needed to confirm a diagnosis.

It is generally agreed that opening CFS pressure of greater than 250 mm of water is considered elevated, and readings of 200-250 mm of water are borderline and not diagnostic.[23] Normal CSF composition must be established; therefore, an analysis of fluid to rule out other conditions is done.

There are several medical conditions and medications that mimic IIH. These conditions all have an associated cause for the intracranial hypertension. The literature is inconclusive about the strength of the relationship between these conditions and IIH.[1] The general categories for these associations are: decreased flow through arachnoid granulations, obstruction to venous drainage, endocrine disorders, nutritional disorders and medications.[1] All patients suspected of having IIH must be screened for secondary causes before a definitive diagnosis can be made.

Management

- Optometric management of papilledema

A diagnosis of papilledema in a symptomatic or asymptomatic patient requires immediate action. Many systemic conditions can result in papilledema. **(Table 7)** Because some of these conditions can be life- or sight-threatening, a quick and accurate management plan is imperative. Appropriate optometric testing involves a detailed medical history, including use of medications, blood pressure measurement, visual acuity, pupil and color vision assessment as well as fundus examination with stereoscopic lenses.[25] Emergency imaging of the head is also warranted and should be arranged by the examining eye doctor.[25] Hospital emergency rooms or departments are an excellent resource because most are available 24 hours a day, 7 days a week, staffed with trained personnel, and usually able to perform imaging in a rapid manner.

- Management of IIH

Due to a paucity of evidence related to treatment options, there are no specific treatment recommendations.[18] Management of IIH involves management of symptoms and the prevention of vision loss.[1]

LP performed as part of the diagnostic workup can often be therapeutic.[26] A single LP can offer a lasting decrease in CSF pressure in some patients.[26] Weight loss has been demonstrated[27,28] to be an effective treatment for IIH. Only a moderate reduction in weight loss, 5-10% of total body weight, is needed.[28] Therefore, all obese patients with IIH should be encouraged and monitored for weight loss.

Drugs that reduce CSF production are also used for treatment. The carbonic anhydrase inhibitor acetazolamide is the most commonly used.[18] The mode of action of the drug involves decreasing sodium ion transport across the choroidal epithelium, which causes a decrease in CSF.[18] The efficacy of acetazolamide in treating the condition is still being studied.[1] The starting dose is 250 mg twice a day and is steadily increased to 1000-2000 mg/day.[18] Common side effects of the drug include changing the taste of food, anorexia, tingling in fingers, toes and perioral region, and malaise.[1] Furosemide, which works by diuresis and reducing sodium transport into the brain, can also be used.[1]

Table 7
Examples of Systemic Conditions that Can Result in Papilledema[25]

Space-occupying lesions	Intracranial tumors Subdural or epidural hematomas Subarachnoid hemorrhage
Infection	Brain abscess Meningitis Encephalitis
Other	Aqueductal stenosis producing hydrocephalus Sagittal sinus thrombosis Arteriovenous malformation Uncontrolled hypertension Increased intracranial hypertension

Optic nerve sheath fenestration and CSF shunting procedures can be performed in cases of progressive or significant visual field loss. These procedures have potential complications and can be less effective over time.[29,30]

Careful follow-up of patients with IIH is essential. Follow-up schedules are determined by severity of signs and symptoms.[18] Follow-up assessment should include visual acuity, color vision, optic disc evaluation and visual fields with either an automated or Goldmann perimeter.[18]

Teaching methodology and critical thinking concepts

The teaching of this case can occur in many different formats. Faculty may consider a problem-based teaching method where only small pieces of information are given out at a time with the students identifying information needed, problems to be solved, etc. Alternatively, a case-analysis method could be used where students are given the case in its entirety followed by an in-depth discussion of the material.

Throughout the teaching of this case, students should be challenged with identifying and using critical thinking concepts. Clinical decision-making involves the use of clinical knowledge, skills, experience and critical thinking. Critical thinking provides a strategy for accurate, thorough and efficient thinking, which utilizes analysis, evaluation and reflection of thinking.[31] Analysis of thinking divides thinking into smaller parts with a focus on purpose of thinking, questions, information, inferences, assumptions, concepts, implications and point of view.[31] Evaluation of thinking involves assessing the clarity, accuracy, precision, relevance, depth and breadth of thinking.[31] **Table 8** defines the concepts of the analysis of critical thinking.

Critical thinking concepts should be applied to all aspects of the clinical encounter, case history, physical examination, determination of diagnostic testing and patient management to ensure the highest level of patient care.

For more in-depth information on the topic of critical thinking, **Table 9** contains a list of recommended readings that are appropriate for both students and educators.

Table 8
Parts of Analysis[32]

PARTS OF ANALYSIS	DEFINITION
Purpose	Your purpose is your goal, your objective, what you are trying to accomplish.
Question	The question lays out the problem or issue and guides thinking.
Information	Information includes the facts, data, evidence or experiences we use to figure things out.
Inferences	Inferences are interpretations or conclusions you come to. Inferring is what the mind does to figure something out.
Assumptions	Assumptions are beliefs you take for granted.
Concepts	Concepts are ideas, theories, laws, principles or hypotheses we use in thinking to make sense of things.
Point of view	Point of view is literally the place from which you view something.
Implications	Implications are the things that might happen if you decide to do something.

Table 9
Recommended Readings on Critical Thinking

1. Hawkins D, Paul R, Elder L. The Thinker's Guide to Clinical Reasoning. Dillon Beach, California, Foundation for Critical Thinking Press; 2010.
2. Facione NC, Facione PA. Critical Thinking and Clinical Reasoning in the Health Sciences. Millbrae: California, Academic Press; 2008.
3. Nosich G. Learning to Think Things Through. Upper Saddle River, New Jersey, Pearson Prentice Hall; 2009

Table 10
SPIKES Model for Delivery of Bad News[34]

Six steps of the SPIKES model	
Setting	Be prepared; rehearse what you are going to say; arrange for privacy; with the patient's permission involve a significant other; sit down; connect with the patient; manage time constraints.
Patient's perception	Use open-ended questions to assess what the patient perceives.
Obtaining the patient's invitation	How does the patient want to receive the information?
Knowledge and information	Use vocabulary that the patient understands, non-technical words; avoid excessive bluntness; give information in small chunks; check to make sure the patient is understanding the information.
Addressing the patient's emotions with empathetic responses	Identify the emotions the patient is feeling; identify the reason for the emotion.
Strategy and summary	Summarize the information; make a plan for the future; share the decision-making with the patient.

Delivery of bad or upsetting news

The literature cites many models for delivering bad news and for teaching students how to do it. It is beyond the scope of this paper to provide a review of all models used for the delivery of bad news. Bor et al. provide a useful definition of bad news: "situations where there is either a feeling of no hope, a threat to a person's mental or physical well-being, a risk of upsetting an established lifestyle, or where a message is given which conveys to an individual fewer choices in his or her life."[33] The SPIKES model, which is used in many medical settings and is appropriate for optometric settings, is one model for the delivery of bad news.[34] It is characterized by: setting, patient's perception, invitation, knowledge, empathizing and summary/strategy.[34] **Table 10** provides additional information on the SPIKES model. Teaching strategies may involve: lecture/didactic approach, small group

discussion, role-playing with peers or standardized patients or observation of skilled clinicans.[35]

Management of systemic hypertension

Hypertension or high blood pressure is a common condition affecting more than 60 million people in the United States.[36] Retinal findings associated with hypertension, along with in-office blood pressure measurements, can be useful in the management of patients with hypertension. Accurate blood pressure readings involve a patient quietly sitting in a chair for at least 5 minutes with the arm supported at heart level, an appropriate size cuff and at least two blood pressure measurements.[36] Common retinal findings associated with hypertension include: generalized arteriolar narrowing, focal arteriolar narrowing, artery/vein (A/V) crossing changes, hemorrhages, retinal aneurysms, cotton wool spots, hard exudates and optic nerve swelling.[37]

The *Seventh Report of the Joint National Committee on Prevention, Detection and Treatment of High Blood Pressure* (JNC-7) identified hypertensive crisis as either hypertensive urgencies or emergencies.[36] Hypertensive emergency, a condition previously known as malignant hypertension, requires immediate medical attention with control of blood pressure within 2-6 hours.[37] Hypertensive urgencies require a timely and appropriate referral with blood pressure control within 24-72 hours. Optic disc edema is the hallmark sign of hypertensive emergency.[37] **Table 11** identifies the classification of hypertensive retinopathy.

Table 11
Classification of Hypertensive Retinopathy and Blood Pressure Readings[37,38]

	Acute (severe) HTN	HTN Urgency	HTN Emergency
Blood pressure measurement	>180/110	>180/120	>180/120
Clinical eye findings	Mild hypertensive retinopathy, characterized by generalized arteriolar narrowing, focal arteriolar narrowing, A/V crossing changes	Moderate hypertensive retinopathy, characterized by hemorrhages, retinal aneurysms, cotton wool spots, hard exudates	Moderate hypertensive retinopathy with disc edema, characterized by mild and moderate findings in addition to optic nerve swelling

Discussion

The patient's initial presenting complaint of "eye fatigue" along with relevant medical information generated a differential diagnosis of dry eye syndrome (primary or secondary), uncorrected refractive error, specifically hyperopia, binocular/accommodative anomalies or asthenopia related to excessive computer use. The patient was also considered at risk for hypertensive retinopathy secondary to her history of poor compliance and control. This was a reasonable list of possible causes for the patient's entering chief complaint.

The case history involves the process of gathering information, formulating working hypotheses and the questioning of patients to generate an initial differential diagnosis. The case history is an ideal time to utilize the critical thinking concepts of evaluation, clarity, accuracy etc., to ensure completeness of information. In this case, the use of electronic medical records facilitated the accuracy, depth and precision of information concerning current medical diagnoses, medications, height, weight and blood pressure readings. For this information, we did not have to rely on the patient as a historian.

Initially, the patient's weight, gender and age did not generate any additional differentials. The rising prevalence of obesity is a public healthcare issue, which can impact the practice of optometry. As optometrists see more obese patients, the implications of ocular consequences from obesity will need to be considered by eyecare practitioners. In this case, the patient presented with several risk factors for IIH. The headache complaint would not have been considered a risk factor because it did not fit the typical profile of the IIH patient. Did the clinician make an assumption that the patient's weight, gender and age did not have any impact on the eyes?

The exam proceeded, guided by the initial list of differential diagnoses. The signs from the retinal examination (A/V crossing changes, retinal vein engorgement, flame-shaped hemorrhages and elevated, blurred and hyperemic discs) along with the patient's diagnosis of hypertension and history of noncompliance with hypertensive medications demanded a revision to the list of differential diagnoses. At this time, blood pressure readings were obtained and revealed elevated readings (right arm 180/115 mmHg; left arm 160/120 mmHg).

Evaluating evidence is part of critical thinking. True disc edema should not be inferred until all the evidence is evaluated. Conditions that could result in pseudo disc edema must be considered. Pseudo disc edema can be caused by optic disc drusen or congenitally anomalous disc.[25] The patient's prior eye examination records were not available nor were any imaging techniques available to rule out disc drusen. However, the fundus findings and hyperemic color of the discs provided supporting evidence for true disc edema.

The fundus findings necessitated a revision to the initial differential diagnosis list. What differential diagnosis should now be considered? If the assumption is made that only one condition is causing the fundus findings, then severe hypertensive retinopathy vs. other causes of optic disc edema need to be considered. Severe hypertensive retinopathy is supported by the fundus findings, medical history and blood pressure measurements. Hypertensive urgency vs. emergency needs to be evaluated because of the implications in the management plan. The blood pressure measurements could indicate either category, but the presence of optic disc edema would indicate a hypertensive emergency.

Optic disc edema can potentially indicate a life-threatening condition. The signs associated with optic disc edema are: retinal hemorrhages, often flame-shaped, dilated tortuous retinal veins with normal pupillary response and

color vision.[25] Therefore, other causes of optic disc edema, such as a space-occupying lesion, infection or IIH, must be considered. The patient did not present with any other systemic symptoms, such as fever, malaise, weakness or disorientation. The patient's weight, age and gender are consistent with IIH.

The astute clinician must consider all possibilities when analyzing information related to the determination of the differential and final diagnoses. The retinal findings and blood pressure readings along with the patient's history of longstanding hypertension with moderate compliance and control could lead to a premature conclusion that the findings were secondary to uncontrolled hypertension. The analysis of information involved in coming to a diagnostic conclusion involves not only demonstrating support for a particular disease/condition but also ruling out the other possible disorders/conditions. This emphasizes the importance of the differential diagnosis list. If other possibilities are never considered, there is a risk of noninclusion in the thinking leading to the final diagnosis. The implications of this incomplete thinking could have put this patient at enormous risk because the other possibilities were life- or sight-threatening.

The elevated blood pressure and the disc edema needed to be immediately addressed. The role of the optometrist is coordination of care, appropriate and timely referral(s) and providing appropriate patient education. The optometric management of this patient involved the immediate referral for control of blood pressure and imaging to determine the cause of the bilateral disc edema.

The urgent care department of the health center was contacted and advised of the case. The urgent care department was able to see the patient immediately for management of the blood pressure. After review of the patient's record and physical examination, the urgent care physician felt the patient's blood pressure could be controlled on an outpatient basis with oral medications. If blood pressure control involved intravenous medications or in-patient hospitalization, the patient would have been referred that night to the emergency department. Although the optic disc edema could have been caused by the uncontrolled hypertension, neuroimaging and additional testing were needed to rule out the other possibilities.

Although decision-making for appropriate medical diagnostic testing is ultimately the responsibility of the medical provider, as optometrists and primary care eye providers, it is our responsibility to communicate with other healthcare professionals and properly educate the patient. What diagnostic testing was needed to make the diagnosis?

After consultation with the physician at the ER of a nearby hospital, it was determined that neuroimaging would be performed the next morning. Both a CT scan and MRI were available. A CT scan uses X-rays to show cross-sectional images of the body.[39] High-energy radiation can potentially cause damage to DNA and therefore increase a patient's lifetime risk of cancer.[39] MRI uses strong magnetic fields and radio waves to image the body. MRI does not use ionizing radiation and there are no known harmful side effects.[40] MRI was chosen as the initial neuroimaging test for the patient because MRI is more specific in identifying causes of increased intracranial pressure and does not involve exposure to radiation. The additional use of MR venography was under the discretion of the ER doctor. If neuroimaging was negative, a lumbar spinal puncture would be done to confirm or rule out IIH. LP is generally recognized as a safe procedure.[41] Possible side effects include headache, back discomfort, bleeding or brain stem herniation if a space-occupying lesion is present.[41]

Diagnostic testing revealed normal neuroimaging, normal CSF composition, opening CSF pressure of 320 mm of water and closing pressure of 150 mm of water. Physical examination and case history of the patient did not reveal any other causes of elevated CSF pressure. The elevated opening pressure along with the negative findings on neuroimaging and normal CSF composition excluded other possibilities and met the criteria for the diagnosis of IIH.

The LP may have been sufficient to bring down the CSF pressure. Although the effectiveness of acetazolamide as a treatment of this condition has not yet been established, the patient was treated with the medication.[5] The medication was discontinued secondary to the side effects. The patient is currently doing well and is being managed by the neuro-ophthalmologist and PCP with weight control and monitoring. Follow-up assessment includes visual acuity, color vision, optic disc evaluation and automated visual fields.

Optometrists play an important and vital role in the delivery of eye care. Optometrists in some circumstances work under time constraints and productivity quotas. What level of involvement is expected for the primary care optometrist? Is it sufficient to make the appropriate referral, communicate impressions and educate the patient, or is it our ethical duty to oversee the care of the patient after he or she leaves the office? The primary care optometrist played a significant role in overseeing the care of this patient after the initial referral to urgent care and the ER. By staying in constant communication with the patient, the optometrist was able to be a resource for the patient, facilitate her care and offer a support system for the patient. Primary care optometrists provide a valuable link between the patient and a specialist.

If a patient is lost to follow-up, the clinician is unable to intervene and help the patient. At several points in this case there were opportunities for the patient to have been lost to follow-up. What was done to avoid this? The more complex and serious a patient's diagnosis and follow-up plan, the greater the consequences of losing the patient to follow-up. The patient may get frustrated with the process of going to additional doctors and to different places for follow-up care. The patient may not feel comfortable with the person to whom she has been referred and may not fully understand the importance of the testing and treatment that has been given by someone other than the original practitioner whose care she sought. The patient may simply be overwhelmed by the prospect of a serious health crisis and decide to ignore it. In this case, the patient was frustrated with lack of follow-up by her primary care physician and was ill from side effects of the medication but worried about giving it up and losing vision. The fact that the

primary care optometrist was willing to give the patient her cell phone number and made the effort to see that things were proceeding as they should have, meant that the patient was not lost to follow-up care. The optometrist used the characteristics of respect for the patient, concern about the outcome, empathy, understanding and sensitivity to provide this patient with appropriate care.[42]

Understanding the patient's point of view is an important component in providing compassionate and appropriate care. The patient had many questions and was visibly upset by the examination findings. Communication with the patient was potentially hindered by the patient's reaction to the findings. The patient was scared because her findings were unexpected and she felt well. As optometrists, we have a duty to inform our patients of their healthcare status, including appropriate procedures and the risks/benefits of those procedures.[43] Additionally, we must make the effort to ensure that the patient has a reasonable understanding of the information presented.[43] We asked the patient to repeat back to us in her own words the information we had given her. Our concern was that her emotional state would impact her understanding and compliance. This case presented a challenge because full disclosure of exam findings was viewed as potentially causing the patient a great deal of stress and possibly impacting her already high blood pressure. There is always a careful balancing act that the primary care optometrist must perform to give the patient enough information to describe the seriousness of the situation without unnecessarily scaring the patient. However, it is the optometrist's ethical obligation to inform the patient of all the exam findings.

Delivering bad or potentially upsetting news to a patient is difficult for clinicians and students. The patient was informed of the exam findings in the exam room. The patient was alone and did not want to call a family member. The patient was informed of the swollen optic nerves and the potential implications of the condition, from the more benign to the life-threatening. It was clearly stated that additional testing would need to be done to confirm a diagnosis. The patient was reassured as much as possible and every effort was made to provide empathic care. We acknowledged how stressful and scary it must be for a patient to wait for the completion of tests before a final diagnosis could be made. In some circumstances, seeking additional help from mental healthcare providers may be necessary.

Having access via cell phone to the optometrist was very reassuring to the patient and provided continuity of care. The patient wasn't able to reach her PCP and did not feel appropriate time was given to question the neurologist. We can also assume that sufficient doctor/patient trust was also not established with the neurologist. These circumstances led to a communication breakdown, unnecessary stress and the continuation of medication that was producing undesirable side effects. Primary care optometrists can provide an important resource in navigating through the healthcare system.

Conclusions

The primary care optometrist played a significant role in the coordination of care, as a resource for the patient and in the delivery of patient education. This case highlights the importance of accurate and thorough thinking in analyzing information and patient management. Interprofessional communication and communication between patient and doctor is also a major component in facilitating the care of the patient. The majority of this patient's care was under the supervision of other medical professionals, but despite this involvement the optometrist was a key professional in the successful care of this patient.

References

1. Wall M. Idiopathic intracranial hypertension. NeurolClin. 2010;28(3):593-617.
2. Krajewski K, Gurwood S. Idiopathic intracranial hypertension: pseudo tumor cerebri. Optometry. 2002;73:546-552.
3. Corbett JJ, Savino PJ, Thompson HS, et al. Visual loss in pseudo tumor cerebri. Arch Neuol. 1982;39:461-474.
4. Digre KB. Not so benign intracranial hypertension. BJM. 2003;326(7390):613-614.
5. Bruce BB, Biousse V, Newan NJ. Update on idiopathic intracranial hypertension. Am J Ophthalmol. 2011;152(2):163-169.
6. Friesner D, Rosenman R, Lobb BM, Tanne E. Idiopathic intracranial hypertension in the USA: the role of obesity in establishing prevalence and health care cost. Obes Rev. 2011;12(5):372-308.
7. Bruce BB, Preechawat P, Newan NJ, Lynn MJ, Biousse V. Racial differences in idiopathic intracranial hypertension. Neurology. 2008;70(11):861-867.
8. Nolte J. The human brain: an introduction to its functional anatomy: 6th edition. Philadelphia, PA: Mosby Elsevier; 2009, p.105-110
9. Moore KL, Dalley A, Agur A. Clinically oriented anatomy: 6th edition. Philadelphia, PA: Wolters Kluwer, Lippincott Williams, & Wilkins; 2010, p.879-882.
10. Nolte J. The human brain: an introduction to its functional anatomy: 6th edition. Philadelphia, PA: Mosby Elsevier; 2009, p.438.
11. Hayreh SS. Pathogenesis of optic disc edema in raised intracranial pressure. Trans OpthalmolSoc UK. 1976;96:404-407.
12. Boulton M, Armstrong D, Flessner M, et al. Raised intracranial pressure increases CSF drainage through arachnoid villi and extracranial lymphatics. AM J Physiol. 1998;275(3):889-896.
13. Wall M. The headache profile of idiopathic intracranial hypertension. Cephalalgia. 2002;10:331-335.
14. Redhakrishnen K, Ahloskog E, Cross SA, Kurland LT, O'Fallon WN. Idiopathic intracranial hypertension (pseudo tumor cerebri): description epidemiology in Rochester, Minnesota 1976-1990. Arch Neurol. 1993;50:78-80.
15. Rush JA. Pseudotumorcerebri: clinical pitfall and visual outcome in 63 patients. Mayo Clinic Proc. 1980;55:541-546.
16. Wall M, George D. Idiopathic intracranial hypertension (pseudo tumor cerebri), a perspective study of 50 patients. Brain. 1991;114:155-180.
17. Giuseffi V, Wall M, Siegel P, et al. Symptoms and diseases associa-

tions in idiopathic intracranial hypertension (pseudo tumor cerebri): a case control study. Neurology. 1991;41:239-244.
18. Dhungana S, Sharrack B, Woodroof N. Idiopathic intracranial hypertension. ACTA Neurol Scand. 2010;12(2):71-82.
19. Sadun A, Currie J, Lessell S. Transient visual obscurations with elevated optic discs. Ann Neurol. 1984;16:489-494.
20. Farb RI, Vanek I, Scott JN, et al. Idiopathic intracranial hypertension: the prevalence and morphology of sinovenous stenosis. Neurology. 2003;60:1418-1428.
21. Rowe FJ, Sarkies NJ. Assessment of visual function in idiopathic intracranial hypertension: a prospective study. Eye. 1998;12:111-118.
22. Scott CJ, Kardon RH, Lee AG, Frisen L, Wall D. Diagnosis and grading of papilledema in patients with raised intracranial pressure using optical coherence tomography vs clinical expert assessment using a clinical staging scale. Archives of Ophthalmology. 2010:128(6):705-11.
23. Friedman D, Jacobson D. Diagnostic criteria for idiopathic intracranial hypertension. Neurology. 2002;59:1492-1495.
24. Purvin VA, Trobe JD, Kosmorsky G. Neuro-opthalmic features of cerebral venous obstruction. Arch Neurol. 1995;52:880-888.
25. Kunimoto D, Kanithkan K, Makar M. Editors.The Wills Eye Manual 4th Edition. Philadelphia, Pennsylvania. Lippincott Williams & Wilkins; 2004, p.223-226.
26. De Simone R, Marano E, Fiorillo C, et al. Sudden re-opening of collapsed transverse sinuses and long-standing clinical remission after a single lumbar puncture in a case of idiopathic intracranial hypertension. Pathogenetic implications. Neurol Sci. 2005;25(6):342-344.
27. Kupersmith MJ, Gamell L, Turbin R, Peck V, Spiegel P, Wall M. Effects of weight loss on the course of idiopathic intracranial hypertension in women. Neurology. 1998;50:1094-1098.
28. Johnson LN, Krohel GB, Madsen RW, et al.The role of weight loss and acetazolamide in the treatment of idiopathic intracranial hypertension (pseudo tumor cerebri). Opthalmology. 1998;105:2313-2317.
29. Spoor TC, Ramocki JM, Madion MP, et al. Treatment of pseudo tumor cerebri by primary and secondary optic nerve sheath decompression. Am J Ophthalmol. 1991;112:177-185.
30. Eggenberger ER, Miller N, Vitale S. Lumboperitoneal shunt for the treatment of pseudo tumor cerebri. Neurology. 1996;46:1524-1530.
31. Paul R, Elder L. Introduction. In R. Paul and L. Elder (Eds.), Criti¬cal thinking: Tools for taking charge of your learning and your life. Columbus, OH; Pearson Prentice Hall, 2006, p.xvii-xxx.
32. A miniature guide to the foundation of analytic thinking [internet]. The Foundation for Critical Thinking. Dillion Beach, California. c2005 [cited 2012 Feb 27]. Available from: http://www.criticalthinking.org/ctmodel/logic-model1.htm.
33. Bor R, Miller R, Goldman E, Scher I. The meaning of bad news in HIV disease.Couns Psych Q. 1993;6:69-80.
34. Baile W, Buckman R, Lenzia R, Globera G, Beale E, Kudelka P. A six- step protocol for delivering bad news: application to the patient with cancer. The Oncologist. August 2000;5(4):302-311.
35. Rosenbaum M, Ferguson K, Lobas J. Teaching medical student and residents skills for delivering bad news: a review of strategies. Academic Medicine. 2004;79(2):107-117.
36. Chobanian AV, Bakris HR, et al. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. The JNC 7 Report. JAMA. 2003;289(19):2560-2572.
37. Meetz R, Harris T. The optometrist's role in the management of hypertensive crisis. Optometry. 2011;82:108-116.
38. Hammond S, Wells JR, Marcus DM, et al. Ophthalmoscopic findings in malignant hypertension. J Clin Hypertension. 2006;8:221-230.
39. Computed Tomography (CT). United States Food and Drug Administration. Silver Spring, Maryland. C2010[cited 2012 Mar 14]. Available from: http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/MedicalImaging/MedicalX-Rays/ucm115317.htm#.
40. MRI Magnetic Resonance Imaging. United States Food and Drug Administration. Silver Spring, Maryland. [cited 2012 Mar 14]. Available from: http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/MedicalImaging/ucm200086.htm#.
41. Mayo foundation for medical education and research. Mayo Foundation for Medical Education and Research Rochester. Minnesota. [cited 2012 Mar 14]. Available from: http://www.bing.com/health/article/mayo-MAMY00982/Lumbar-puncture-spinal-tap?q=lumbar+puncture.
42. Ettinger, Ellen R. Professional Communications in Eye Care. Boston: Butterworth-Heinemann, 1994, p. 78-90.
43. AOA standards of professional care. C2011 [cited 2012 Mar 14]. Available from: http://www.aoa.org/documents/standards-of-professional-Conduct_Adopted-June-2011.pdf.