Financing Optometric Education
Association of Schools and Colleges of Optometry

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Student Indebtedness: The Challenge of Financing an Optometric Education
Lawrence H. McClure, Ph.D.
The author discusses student indebtedness in the context of educational costs, financial assistance, student borrowing, loan repayment, projected incomes and individual choices.

Educational Debt and Professional School Students
Sandy Baum, Ph.D.
The author's findings suggest that while high debt-to-income ratios are causing dissatisfaction among borrowers, it is unfulfilled expectations that are the real problem.

Towards a New Model in Training and Delivery of Optometric Education
Kovin S. Naidoo, M.P.H., O.D.
The author examines optometric education and training in developing nations in the context of limited resources and enormous service delivery challenges with particular reference to the African experience.

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The Educational Contract

One of the many benefits of being a member of the Association of Schools and Colleges of Optometry's (ASCO's) clinical directors and administrators special interest group (SIG) is that we meet on an annual basis to exchange information about issues impacting clinical education. This year the meeting was hosted by the Southern California College of Optometry (SCCO), with the program coordinated by Dr. Julie Schornack, assistant dean of clinical education. Dr. Schornack introduced the group to a document entitled "The Learning Contract," which is used as an instrument to facilitate teaching remedial or failing students at SCCO's clinic. The terms of the contract are straightforward, with all components laid out in writing. Dates of the contract, required clinical exercises, supervised clinical activities, case reviews, assigned readings, and even required numbers of patients to be seen in clinical sub-specialties under the guidance of a clinical preceptor and/or tutor(s) are all clearly specified in the "terms" of the contract.

Ever since that meeting, I have been intrigued by the notion of an educational contract in the context of an institution's responsibilities to its students, perhaps even to all students. When a student is accepted into a professional degree program, does that admission constitute a binding contract between the institution and the student? If it does, would an educational contract ever be appropriate as part of a student's formal education? While an educational contract can easily be created for any point in time of a student's education, I will limit my remarks to the clinical teaching and learning contract. In my experience as a clinical preceptor and department chair, the issue of what students should know vs. what they actually do know (and apply) to clinical care is a frequently discussed problem in clinical education. The incorporation of an educational contract into the teaching process may be a useful adjunct in the evaluation and assessment of students.

The difficulty with the educational contract is that if we (the faculty) are going to take it seriously, then we will also need to accept that we have contractual obligations. Without joint obligations, an educational learning and teaching contract is nothing more than a one-sided mandate of one party (the faculty) insisting that another party (your student) do something in a specified period of time. But a true educational contract between a preceptor and a student creates a thoughtful balance of what the student and the preceptor jointly agree to accomplish in order to improve the student's clinical performance.

In order for the educational contract to carry significance, it will need to be in writing, with the dates of the agreement specified in the contract, and of course both you and your student will need to sign it. But once the formalities are completed, then the commitment begins. If an educational contract is consummated, gone will be the days of telling your student to "come get me when you are finished with your patient," while you go about returning telephone calls, catching up on correspondence, or surfing the Web. In its place will be a binding document (ethically at least, but perhaps legally as well) that states that you have agreed to proactively participate in your student's clinical education.

As part of the contract, your student may have to provide you with evidence that a certain number of supervised clinical procedures have been accomplished under the scrutiny of a skilled and qualified observer (yes, it could be you). Your student may also need to complete certain assignments and write some reports - which you agree to grade and return promptly (and with a high degree of enthusiasm). And since clinical care is what optometric education is all about, both you and your student will be jointly examining an agreed upon number of patients in your clinic, perhaps even with a specified array of clinical problems. You might also agree to sit with your student and review charts prior to seeing your patients and discussing likely problems and differentials, and afterwards guide your student in a quality assurance review of the patients you have just examined.

If either party does not fulfill the agreed upon elements of the contract then certain consequences may result. If the student does not follow-through with the specific requirements of the contract, the outcome could be a failing grade or even result in a dismissal hearing. But what about if the faculty member fails in like kind? What will be the consequences, if any, to the faculty member in this case, and what would then happen to the student? Perhaps the faculty member has the greater burden, for if the student follows the contract to the letter and the faculty member does not, the consequences for the student, the faculty member, and the institution could be unfortunate, embarrassing, and expensive. Therefore, the educational contract needs to be carefully written, carefully explained, and thoroughly executed by both parties. Faculty and students may even need to complete a formal program explaining what an educational contract is, how it works, and how it will be used. The joint nature of responsibilities in the contract should also be emphasized.

While an educational contract can be applied to every student's education, its use will require a significant degree of professional time and commitment. Dr. Schornack and the clinical faculty at SCCO are presently using it as an educational tool with remedial students. If you are presently using a formalized educational contract at your institution, or if you should decide to incorporate one into your clinical teaching techniques, we at Optometric Education would enjoy hearing from you. For more information on the educational contract at SCCO, you can contact Dr. Schornack via email at "jschornack@scco.edu"

Good luck!

Roger Wilson, O.D.
Editor
Optometry

With over 175 optometrists working in 134 medical facilities serving our nation’s 26 million veterans, VA offers more opportunities than any other health care system. Because of VA’s affiliations with many schools and colleges of optometry, teaching and research opportunities are currently available in addition to direct patient care.

VA offers an outstanding opportunity for recent optometry graduates in our residency training program, that includes areas such as hospital-based, rehabilitative, geriatric, and primary care optometry. After one year, a VA residency-trained optometrist enters the workforce confident, capable, and qualified to fulfill virtually any professional opportunity. Residency program run for one year from July 1 to June 30.

As valuable members of the VA health care team, our staff optometrists enjoy a broad range of clinical privileges and challenging interdisciplinary practices at VA medical centers, outpatient clinics, and blind rehabilitation centers. They are also well published in the ophthalmic literature. We invite you to join our team and work with the best. Where The Best Care Is Yours!

For further information, please contact us at
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Letters to the Editor

As Dr. Dell pointed out so well in the editorial, “Meeting the Educational and Professional Needs of Our Faculty,” published in the last issue of Optometric Education (Volume 25, Number 1), the educational and professional needs of our faculty have not been adequately addressed. He suggested that optometric educators are functioning with a mind-set consistent with the first half of this century. If we agree, then we have to ask why this is so. Is it the mind-set of optometric educators, of optometric education, or of the optometric profession? The answer is probably all three to varying degrees.

Optometry needs to recognize, as other professions have, that its educators are crucial members of the organization and deserve equal status and recognition as other specialty areas within the profession. Optometric education needs to become more organized and educators need to concern themselves with participating in an educational organization for the purpose of improving their individual teaching skills as well as advancing the whole field.

“I am an optometric educator.” Making that statement among a group of optometrists is like stating to a group of medical doctors that I am an optometrist. There is a tendency for members of both groups to insert the word “just.” To optometrists I am ‘just’ an educator and to medical doctors I am ‘just’ an optometrist. Optometry has worked hard to improve its professional image among other health professionals as well as its own self-image. We all know the expense and effort that has gone into “expanding the scope of optometry,” much of which has been, not just to benefit the public, but also to benefit the profession by “elevating” our image or status as primary health care providers. It is time for the profession of optometry to direct more of its efforts into enhancing the practice of educating future practitioners.

There is a whole new dimension to education that optometry has not even begun to explore. Computer and video technology has revolutionized many business practices, but education has been slow to embrace the concept and optometric education has lagged even further behind. There have been very few real innovations in optometric education. For the most part, any “educational technology” purported within optometric education has been simply using newer technology to teach the same old teaching methods. What is the advantage of reading print on a computer screen rather than from a page of print? A newer approach to teaching is to consider the teacher as a facilitator of learning who helps students ask the right questions and guides their quest for the answers. Interactive computer and multimedia technology is an integral part of the process. How much of that teaching paradigm do we see in optometry schools today? It would take a concerted effort from educators to make those kinds of changes. Rather than each institution or each faculty member repeatedly inventing a wheel, we can work as a team and build upon each other’s experiences.

There are many issues facing optometric education that need attention by the profession as a whole but more specifically by the educators themselves. Issues concerning curriculum demands imposed by changing state practice laws, shortages of experienced educators, new developments in technology and instructional methods need input from educators at all optometric institutions. As pointed out in Dr. Dell’s editorial, we do not have a forum for adequate exchange of ideas for educators.

In order to build a framework for change and innovation, optometric educators need support from the optometric profession and they need to recognize their important and unique contributions to the profession. I fully support Dr. Dell’s comments concerning the need for organized conferences, workshops, and meetings. In this way we will grow as professional educators and further define education as a specialty within optometry.

Samuel D. Hanlon, O.D., M.S. University of Houston College of Optometryshanlon@uh.edu

Correction

The biographical information for the authors of the article, “Color Microfiche: Applications to Biomedical Optometric Education,” which appeared on page 27 of Volume 25, Number 1 (Fall 1999), was omitted. The authors are: Joan Tanabe Wing, O.D.; Connie Chronister, O.D., F.A.A.O.; Stephen G. Whittaker, Ph.D.; and Gilda Crozier, O.D., F.A.A.O.

Dr. Wing is an associate professor in the Department of Basic Sciences and a clinical preceptor at PCO. Dr. Whittaker is an associate professor who teaches in the binocular vision and low vision courses at PCO. Dr. Chronister is an associate professor in the Department of Basic Sciences and chief of a Primary Care Module at The Eye Institute of PCO. She also practices at the VA Hospital in Philadelphia, PA. Dr. Crozier is professor emeritus and former chairperson of the Department of Biological Sciences at PCO. She designed and developed the ocular biology course.
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VCA Restructures
Thomas Named CEO
Vision Council of America (VCA) announced today the appointment of Bill Thomas, executive vice president and CEO of the former Optical Industry Association, as CEO of the newly merged organization. Susan Burton, CAE, executive vice president of VICA (the other partner in the merger) will continue at VCA to deal with transition issues, with the title of executive vice president.

The restructuring is effective immediately. The organizations will share space in VICA's present offices at 1655 N. Ft. Myer Drive, Suite 200, in Arlington, Virginia.

VCA promotes and expands vision care and vision services and products by communicating the importance of eyecare and eyewear to consumers and by helping to improve the marketing skills of eyecare providers. VCA also co-sponsors the International Vision Expo and EyeQuest. For more information, contact Bill Wilson (703) 243-1508, ext. 230.

New Vistakon Products Help To Build Practices
The launches of the ACUVUE®2 and the ACUVUE®2 BIFOCAL contact lenses by Vistakon, a division of Johnson & Johnson Vision Products, Inc., have provided eye care professionals with two innovative products that are helping to build practices and expand the contact lens market. The launch of the ACUVUE®2 contact lens in June 1999 was the strongest in Vistakon's history; in part, this success can be attributed to the company's Doctor-Controlled Patient Delivery (DCPD) System, which is supporting the ACUVUE®2 contact lens. The ACUVUE®2 contact lens, according to Vistakon, has changed the dynamic of the once-static soft bifocal contact lens market; the number of new fits of soft bifocal contact lenses has increased by 285 percent during the product's first twelve months on the market.

"Vistakon is committed to developing innovative products and services that help eye care professionals meet their patients' vision needs. With the launches of the ACUVUE®2 and the ACUVUE®2 BIFOCAL contact lens(es), as well as our Doctor-Controlled Patient Delivery System, we are helping the eye care community treat its patients and grow their practices," said Philip R. Keefer, president, Vistakon Americas. "The DCPD System is one of the largest investments we've made to market a new product."

The DCPD System was designed specifically to help practitioners maintain a doctor-patient relationship that promotes effective eye care while providing the convenience of home delivery at a competitive price. Under the program, patients who purchase a year's supply of ACUVUE®2 contact lenses will receive free home delivery and a $30 rebate. For further information on the program, contact Vistakon's Specialty Lens Consultation Team at 1-877-334-EYES (3937).

Wesley Jessen Works To Stop Illegal Vendors
At the request of Wesley Jessen, eBay has adopted a policy to prohibit the auction of contact lenses on its popular website. The initiative by Wesley Jessen was undertaken upon learning of various eBay auctions of FreshLook ColorBlends® lenses, both plano and prescription. Because Wesley Jessen is committed to the safe dispensing and use of contact lenses, it has adopted a program aimed at ensuring that its contact lenses are legally dispensed only through licensed eye care practitioners.

As part of this program, Wesley Jessen is working with enforcement agencies to stop illegal vendors. The company also is cooperating with news organizations across the country that are exposing the potential public health hazard associated with the illegal dispensing of contact lenses.

In communications with eBay, Wesley Jessen noted that the individuals offering Wesley Jessen contact lenses for sale on eBay were not licensed practitioners. Wesley Jessen was most alarmed at the auction of used contact lenses. "This offer invited dangerously conduct, since sharing contact lenses could spread micro-organisms that could result in serious eye health problems," said Dwight H. Akerman, O.D., F.A.A.O., director of professional services.

Ebay responded promptly to Wesley Jessen's request, immediately posting a policy prohibiting future auctions of contact lenses. In addition, eBay terminated the pending auctions of Wesley Jessen lenses.

"Wesley Jessen is concerned about the illicit sales of its cosmetic lenses. It is a long-standing policy to sell our lenses only to eye doctors, opticians and businesses licensed by a state to dispense contact lenses and to authorized distributors, who are permitted to re-sell lenses only to licensed practitioners," said Dr. Akerman. For further information, contact Dr. Akerman at (847) 294-3283.

Marchon Eyewear Expands Its Optical Industry Software
Adding to its suite of industry revolutionizing practice management software programs, OfficeMate® by Marchon, Delta ADD-POWER® and CARE®, Marchon acquired OPIS® and CPR™ from Bright Eye-Deas, Inc. of South Dennis, Massachusetts in September 1999.

"In keeping with the Marchon strategy of providing our customers the best possible products, the OPIS/CPR acquisition brings the best practices in the optical software industry to the optical industry," said Burton, CAE, executive vice president, Marchon, Inc. By acquiring OPIS/CPR, Marchon now offers one integrated product to optical professionals. The powerful software suite includes the following:

- "OfficeMate®", a comprehensive practice management software package
- "ADD-POWER®", a comprehensive refraction software package
- "OPIS®", a comprehensive practice management software package
- "CPR™", a comprehensive practice management software package

For more information on the OPIS/CPR acquisition, please contact Burton, CAE, executive vice president, Marchon, Inc., at (800) 374-9069.
In the first Optometric Education ASCOTECH column, Dr. William Dell said that we would review the literature regarding teaching, distance learning, computer-aided instruction and other uses of technology within the realm of education. In the ASCOTECH columns we will abstract a current article and then discuss its implications regarding how this would affect the way we teach our students. This format suggests several basic questions: Where do you find articles appropriate for this task? What journals or other resources are available to us? Can we use current technology to aid us in our search for relevant articles? This column will begin to address these issues.

Journals

There are relatively few journals specifically devoted to the topic of the use of technology in education. The Association for the Advancement of Computing in Education (AACE) has several publications that can assist us in our search for articles that directly link educational outcomes and the technological tools currently available. The AACE's (www.aace.org) membership includes educators, "researchers, developers, and practitioners in schools, colleges, and universities; as well as administrators, policy decision-makers, trainers, adult educators, and other specialists in education, industry, and the government [who have] an interest in advancing knowledge and learning with information technology in education."

The AACE offers several publications, conferences and other resources that the optometric educator would find appropriate. These publications include:

WebNet Journal: Internet Technologies, Applications and Issues

This is a quarterly publication whose main emphasis is on the World Wide Web and the use of the Internet. Other areas discussed include educational applications of intranet-based technology, applications, research and issues. This journal's authors are from academia, the corporate world, developers and educators. There are many how-to articles and discussion of the latest developments in the use of the WWW and teaching. The latest issue of this magazine had articles reviewing Web-based training systems, the role of the library, instructional graphics, and other issues related to cyberspace and education.

Journal of Computers in Mathematics and Science Teaching (JCMST)

This is also a journal that is published quarterly. JCMST is devoted to using information technology for teaching mathematics and science.

Journal of Interactive Learning Research (JILR)

This publication emphasizes the theory, design, implementation, effectiveness and affect on education when using authoring systems, computer-mediated communications and collaborative learning. Articles reviewing distributed learning environments, performance support systems, multimedia systems, simulations and games are also included. Other topics discussed include intelligent agents on the Internet, intelligent tutoring systems, micro-worlds, and virtual reality based learning systems.

Journal of Educational Multimedia and Hypermedia (JEMH)

The primary goal of JEMH is to present the theories and practice of teaching how to apply new and powerful technology while using images, sound, text and data tools.

International Journal of Educational Telecommunications (IJET)

IJET is a forum that facilitates the international exchange of information on the current theory, research, development, and practice of telecommunications in education and training.

Journal of Technology and Teacher Education (JTATE)

JTATE content discusses teacher education, graduate programs in areas such as curriculum and instruction, educational administration, staff development, instructional technology, and educational computing.

Information Technology in Childhood Education Annual (ITCE) formerly JCCE

This journal reports the research and applications for using information technology in the education of children enrolled in early childhood education, preschool, and the elementary grades.

Educational Technology Review (ED-TECH Review or ETR)

This publication allows AACE members to exchange information.
among disciplines, educational levels and information technologies. All AACE professional and student members receive ETR as a benefit of membership.

ACCE also offers various conference proceedings on CD-ROM. These include: WebNet 99—World Conference on the WWW and the Internet, ED-MEDIA 99—World Conference on Educational Multimedia and Hypermedia and Telecommunications, SITE 99—Society for Information Technology and Teacher Education Annual, and the M/SET 99—International Conference on Mathematics/Science Education & Technology Annual. Over the next several months, I will review various articles from the journals listed above. Until then you might want to log on to the ACCE homepage and start your own review of these journals.

Websites for Educators
Where should you start your search for grants and other sources of funding for your many projects? You could begin your search by going to the U.S. Department of Education (www.ed.gov/funding.html or http://ocfo.ed.gov/) Another resource for grants related to teaching and learning opportunities is located at www.ntlf.com/html/grants/titles.htm. Do you want to know how technology is going to affect education? All you need to do is log on to http://www.millennaire.com to find out. How about putting your course online for FREE? Go to http://www.blackboard.com for more information.

Send column ideas to:
Dr. Dominick Manno
(dmanno@wvcare.edu)
or
Dr. William Dell
(bdell@wcu.edu).

Increase awareness about glaucoma and help reduce severe vision loss and blindness.

Millions of Americans are at risk of losing their eyesight to glaucoma, a leading cause of blindness in the United States. Although anyone can get glaucoma, some people are at higher risk. People at higher risk for glaucoma include Blacks over age 40, everyone over age 60, and people with a family history of glaucoma.

Please join the National Eye Health Education Program in a nationwide effort to increase awareness about glaucoma and the importance of receiving a dilated eye exam at least once every two years for people at higher risk for glaucoma.


Glaucoma Awareness Month is sponsored by the National Eye Health Education Program Partnership. The Partnership represents leading public and private organizations that are members of the National Eye Health Education Program, coordinated by the National Eye Institute, National Institutes of Health.
On March 26-28, 1999 in Leesburg, Virginia, the deans and presidents of the 17 schools and colleges of optometry and a resource team of financial experts from the schools gathered for ASCO's fourth Critical Issues Seminar (CIS). The topic — student indebtedness and the challenge of financing an optometric education — is an important and timely issue that merits attention and investigation.

The following papers by Drs. McClure and Baum are based on presentations that they made at the seminar and that supplement what has been a rather limited amount of information available on educational indebtedness and its impact on optometry students and practitioners.

The meeting, funded by Vistakon, Inc., a division of Johnson & Johnson Vision Products, resulted in five action items that ASCO will implement over the next three years. The action items are: (1) develop a debt management curriculum model; (2) initiate a Financial Aid Officers Special Interest Group (SIG); (3) issue regular surveys regarding student debt data and income for the purpose of distributing the results to the colleges; (4) enhance the ASCO website with material that addresses debt management and include the provision of a loan calculator and links to other sites that will help students calculate their own actual or anticipated debt levels; and (5) solicit a corporate underwriter for the development of a debt management module that can be utilized by all institutional members of ASCO.
Student Indebtedness: The Challenge of Financing an Optometric Education

Lawrence H. McClure, Ph.D.

As the title of this article suggests, the focus of the March 1999 Critical Issues Seminar was student indebtedness and the challenge of financing an optometric education. This paper focuses on and summarizes a number of the issues that relate to and impact on student indebtedness. Much of the data presented in this article was taken from ASCO’s annual surveys of schools and colleges, which include sections on the cost of education, student financial assistance and student indebtedness.

The Cost of Education

A student’s budget, or cost of education, typically includes three basic components - tuition and fees, books and instruments and personal living expenses. Of these three, tuition/fees and books/instruments are normally considered direct educational expenses that result from the individual’s decision to enroll in post-secondary or professional school. Living expenses, while a large portion of a student’s budget, actually are indirect expenses that any individual has regardless of the decision to attend professional school. Together, these three items comprise a student’s cost of education. Of these three, tuition/fees and living expenses are the most costly.

Books and Instruments: While contributing to the cost of education (in 1996/97 the average student enrolled in optometry school had $2,251 budgeted for books and instruments), most observers would agree that the cost of books and instruments is not a driving force in the controversy surrounding student debt.

Table 1 provides a breakdown of the average cost of books and instruments over the four-year optometry program. (Unfortunately, no information was available for either the 1993/94 or 1994/95 academic years.) In 1989/90 the total cost of books and instruments for the four-year optometry degree averaged $5,423. By 1996/97 the schools and colleges of optometry listed the total cost of books and instruments for the four-year OD program at slightly over $9,000. This represented a 66% increase over the 1989/90 figures. Although Table 1 does not contain detail on individual schools, the ASCO annual surveys indicate that wide variation exists among schools and colleges regarding the amounts budgeted for books and instruments. For example, during the 1996/97 academic year one institution budgeted $4,300 for the total cost of books and instruments for the entire four-year OD program. During that same academic year, another institution budgeted books and instruments at $18,860. While it is not difficult to understand the difference in tuition charged by public and private institutions, it is hard to account for such wide variation in the amount institutions budget for books and instruments.

For the remainder of this section, we will limit our discussion to the cost of education as a function of the student’s tuition and living expenses.

Tuition and Living Expenses: (Educational expenses used in this section represent averages — means, for institutions that provided information in ASCO’s annual surveys. The tuition charges reported for public institutions are based on that paid by in-state residents. The tuition charges listed for private institutions do not reflect the application or deduction of any state contract monies and/or appropriations. Accordingly, there are non-resident students enrolled at public institutions with tuition charges equal to or, in some cases, greater than that paid by students enrolled at private institutions. There are also students enrolled at private institutions who, as a result of the application of state contract monies and/or appropriations, pay less than the tuition listed in this article.)

Figure 1 illustrates that during the 1989/90 academic year, the average cost of education (tuition and living expenses) for optometry students was $15,628. At that time tuition averaged $7,615 and represented 49% of a student’s cost of education. Living expenses, at $8,013, comprised the remaining 51% of a student’s educational expenses. By 1996/97 the average cost of education for students enrolled in optometry school totaled $21,959. This reflected a 40.5% increase in the average cost of education from 1989/90 to 1996/97. Over that eight-year period, tuition rose 59%, to an average of $12,113, and now represented 55%, or the majority, of a student’s cost of education.

Table 2 provides greater detail on the average cost of an optometry student’s education. It also reveals that living expenses increased at a slower rate, approximately 23%, than did tuition over the eight-year period in question (59%). However, as evidenced in Tables 3 and 4, increases in the cost of education at public and private institutions were not occurring at the same rates.
Table 1
Average (mean) Cost of Books and Instruments
For Optometry Students

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<tr>
<td>public</td>
<td>2,475</td>
<td>1,663</td>
<td>1,006</td>
<td>459</td>
<td>5,603</td>
</tr>
<tr>
<td>overall</td>
<td>2,483</td>
<td>1,948</td>
<td>1,032</td>
<td>463</td>
<td>5,603</td>
</tr>
<tr>
<td>92/93 private</td>
<td>2,344</td>
<td>2,797</td>
<td>1,096</td>
<td>541</td>
<td>6,778</td>
</tr>
<tr>
<td>public</td>
<td>3,061</td>
<td>1,992</td>
<td>1,011</td>
<td>484</td>
<td>6,548</td>
</tr>
<tr>
<td>overall</td>
<td>2,724</td>
<td>2,370</td>
<td>1,051</td>
<td>511</td>
<td>6,656</td>
</tr>
<tr>
<td>93/94 &amp; 94/95 (data not available)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95/96 private</td>
<td>2,777</td>
<td>3,217</td>
<td>1,389</td>
<td>835</td>
<td>8,218</td>
</tr>
<tr>
<td>public</td>
<td>3,590</td>
<td>2,815</td>
<td>1,572</td>
<td>1,119</td>
<td>9,096</td>
</tr>
<tr>
<td>overall</td>
<td>3,184</td>
<td>3,016</td>
<td>1,481</td>
<td>977</td>
<td>8,638</td>
</tr>
<tr>
<td>96/97 private</td>
<td>3,159</td>
<td>3,112</td>
<td>1,548</td>
<td>735</td>
<td>8,554</td>
</tr>
<tr>
<td>public</td>
<td>3,668</td>
<td>3,017</td>
<td>1,594</td>
<td>1,170</td>
<td>9,449</td>
</tr>
<tr>
<td>overall</td>
<td>3,414</td>
<td>3,065</td>
<td>1,571</td>
<td>952</td>
<td>9,002</td>
</tr>
</tbody>
</table>

Figure 1
Average Cost of Education at
Schools and Colleges of Optometry

Financing Optometric Education

There are three main groups or entities involved in financing post-secondary education — the government...
doesn't pay, the others have to pick up their families). To the extent one group (mostly the major players that directly and/or indirectly assist students in financing their optometric education. The Federal Government: Aside from the indirect benefits associated with Federal research dollars and occasional support for buildings and plant, the majority of Federal support for optometric education is in the form of student financial aid programs flowing from the Department of Education and the Department of Health and Human Services. Most of this direct aid to students is in the form of low interest and/or subsidized loans like the Federal Stafford, Perkins and Health Professions student loan programs. These types of aid programs provide optometry students with the majority of the funds they need to assist in meeting their educational expenses. These funds also comprise the bulk of a student's debt portfolio.

The State and Local Governments: State governments provide public optometric educational institutions with direct support that assists in "under-writing" or subsidizing the students' tuition. Such state support accounts for a large portion of the differential in tuition charges at public and private optometry schools and colleges. Many states also provide support to optometric institutions through contracts and appropriations. Depending upon the state program and/or how a school treats these funds, students may realize either a direct benefit in the form of a tuition subsidy or an indirect benefit resulting from an additional income stream to the institution other than tuition. Some states also provide students with direct benefits in the form of state grants, subsidized loans, and/or loan forgiveness programs.

One form of governmental support that is often overlooked is the tax-exempt status granted to educational institutions by local governments. Without this significant indirect benefit or subsidy, tuition would have to be increased to offset the payment of property taxes to local governments.

Private and Institutional Support: Most of the private support optometry students receive is the result of philanthropic giving on the part of institutions and individuals to optometric institutions. Such support, generated through institutional fund raising, may take the form of scholarships and loans, endowed chairs or the underwriting of some educational or operational endeavor within the institution. A few optometric institutions (mostly in the private sector) have been successful in generating additional forms of institutional revenue beyond that of tuition and thus provide their stu-
Table 4
Average Cost of Education at Public Schools and Colleges of Optometry

<table>
<thead>
<tr>
<th>YR</th>
<th>TUITION</th>
<th>LIVING</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>$</td>
<td>% chg</td>
<td>$</td>
<td>% chg</td>
</tr>
<tr>
<td>$</td>
<td></td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>$</td>
<td>% change '90 to 97</td>
<td>25.57</td>
<td>42.62</td>
</tr>
<tr>
<td></td>
<td>% chg</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>1989/90</td>
<td>3,454</td>
<td>7,643</td>
<td>11,097</td>
</tr>
<tr>
<td>1990/91</td>
<td>3,859</td>
<td>6,884</td>
<td>10,743</td>
</tr>
<tr>
<td>1991/92</td>
<td>4,307</td>
<td>7,092</td>
<td>11,399</td>
</tr>
<tr>
<td>1992/93</td>
<td>5,050</td>
<td>7,367</td>
<td>12,417</td>
</tr>
<tr>
<td>1993/94</td>
<td>5,419</td>
<td>8,155</td>
<td>13,574</td>
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<tr>
<td>1994/95</td>
<td>5,787</td>
<td>8,943</td>
<td>14,730</td>
</tr>
<tr>
<td>1995/96</td>
<td>6,230</td>
<td>9,597</td>
<td>15,827</td>
</tr>
</tbody>
</table>

* estimates, no data available

Figure 3
Major Players In Financing Optometric Education

- The Federal Government
  - Department of Education
    - Family Education Loan Programs
    - Subsidized Stafford Loans
    - Un-subsidized Stafford Loans
    - Perkins Loans
    - College Work Study
  - Department of Health and Human Services
    - Health Professions Student Loans
    - Loans for Disadvantaged Students
    - Scholarships for Disadvantaged Students
    - Health Education Assistance Loans
  - Department of Defense Scholarships

- State and Local Governments
  - Direct subsidies to both public and private institutions
  - Scholarships and grants
  - Loan and loan forgiveness programs

- Private and Institutional Sources
  - Loans and scholarships
  - Assistantships and stipends

- Students and Their Families
  - Savings
  - Earnings
  - Indirect support

Students are, in theory, expected to use personal savings and any earnings they might have before acquiring student financial assistance. If a student is married, his or her spouse is expected to contribute (to the extent possible – as defined by Federal regulation) towards the student’s educational expenses. Given the fact that most professional students have already completed a four-year undergraduate degree, the role of the parents in assisting with the financing of an additional four years of professional school is, in most cases, significantly diminished. While most parents are willing to provide some limited financial assistance to assist with professional school, the amounts pale in comparison with that provided during their child’s undergraduate program. Accordingly, students, who typically have little to no real wealth at the time they are enrolled in professional school, must rely upon student financial assistance in order to obtain their optometry degree. As a general rule, 85% of all students enrolled in professional degree programs receive some form of student financial assistance.

These are the major players involved in financing optometric education. The ASCO annual surveys, while collecting data on types of direct financial assistance provided to optometry students, altered the manner in which data was both collected and reported in the mid '90s. We are, therefore, able to provide comparative data only for the years 1989/90 through 1992/93. Table 5 provides a summary of student financial assistance in the form of grants, state contracts, college work-study and loans. For the four years contained in this table it is apparent that the only financial assistance that was increasing was in the area of student loans. Although not apparent in Table 5, increases in the loan programs were and continue to be in what some refer to as non-traditional forms of financial aid, e.g., non-subsidized student loans that charge borrowers interest during the in-school years.

Figure 4 provides a look at three of the major players involved in financing optometric education — students and their families, state support in the form of contracts and appropriations and student financial assistance including scholarships, grants, college work study and loan programs. The trends present in Figure 4 are based upon a private optometry school and, no doubt, reflect financial
patterns at most health professional educational institutions.

Support from state contracts and appropriations has, in real dollars, been relatively flat, but as expressed as a percentage of the total dollars financing students' cost of education, it has been steadily decreasing over the eight years under review. The amount of support students and their families bring to the table has also, in real dollars, been relatively flat and thus has decreased as a percentage of the total cost of students' education. The only area of support that has been increasing is that of student financial aid (which as we have already seen, has been increasing in non-subsidized loans).

With two of the three main funding sources remaining flat in real dollars while the cost of education increased, it is no wonder that optometry students' educational debts, as we will see in the next section, increased at a faster pace than the cost of education.

Student Indebtedness

(Student debt levels used in this section represent weighted averages - means, for optometric graduates with educational debts, as reported in ASCO's annual surveys.) The average 1990 graduate's educational indebtedness at the time of graduation was $49,703 (including undergraduate debts). The average 1996 graduate's educational indebtedness was $81,627, or 64.23% more than his or her 1990 counterpart. Over that same time period the average cost of education (as reflected by tuition and living expenses) for all of the schools and colleges of optometry increased by 36.3%, with the average tuition charge increasing by 52% and budgeted living expenses increasing by 21.4%.

As mentioned in the last section, much of the higher rate of increase in educational indebtedness was, and continues to be, tied to the fact that two of the three major funding sources for optometric education (state support in the form of contracts/appropriations and students and their families) have not increased, in real dollars, the amount they provide for optometric education. Subsequently, increases in the cost of education translate into increased borrowing on the part of students from non-traditional forms of student aid, like the unsubsidized loan programs.

As was the case with tuition, the rate of increase in the average level of educational indebtedness for gradu-
ates of public optometric institutions was substantially greater (almost double) than the rate of increase for graduates of private institutions. Table 7 provides some additional insight into the borrowing patterns of public and private optometry students.

By combining the average cost of education for the four-year period beginning 1992/93 and ending in 1995/96 with the average total cost of books and instruments effective for the 1992/93 academic year, we can generate a good estimate of the total cost of education for the average 1996 graduate. By comparing the average level of educational indebtedness with the average total cost of education we can see that the average 1996 graduate’s level of educational indebtedness represented close to 96% of his or her total cost of education. The average private graduate’s educational indebtedness equaled 85% of his or her total cost of education, while public graduates borrowed an amount equal to 100% of their total costs. While not the focus of this discussion, one must question why students at public optometric institutions appear to borrow proportionally more than those enrolled at private optometric institutions. Absent this data, most observers would have expected the differential in the average level of student indebtedness between graduates of public and private optometric institutions to be greater than it appears to be, i.e., one would have guessed that public graduates would have lower levels of indebtedness. Clearly this is an area that deserves additional attention.

### The Relationship of Debt and Income

Any discussion of the impact of educational debt must take place within the context of projected earnings. While the previous section presented average levels of educational indebtedness for recent graduates of both public and private optometric institutions, this section will focus on the relationship of recent graduates’ educational indebtedness and their projected incomes.

Table 8 contains the average (mean) net income of optometrists from 1990 through 1998. The data within this table was taken from two sources — the Review of Optometry’s Annual Income Survey (second column) and the American Optometric Association’s Income Survey Data (third column - figures in parentheses). While there are few regular surveys that provide income information for optometrists, 1996 represents the most recent year in which both the AOA and the Review of Optometry published income data.

![Table 8](image)

<table>
<thead>
<tr>
<th>YR</th>
<th>$</th>
<th>% CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>80,417 (74,845)</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>81,270</td>
<td>1.06</td>
</tr>
<tr>
<td>1992</td>
<td>85,608 (81,571)</td>
<td>5.34</td>
</tr>
<tr>
<td>1993</td>
<td>91,460</td>
<td>6.84</td>
</tr>
<tr>
<td>1994</td>
<td>95,750 (88,690)</td>
<td>4.69</td>
</tr>
<tr>
<td>1995</td>
<td>89,998</td>
<td>-6.01</td>
</tr>
<tr>
<td>1996</td>
<td>92,113 (92,937)</td>
<td>-2.35</td>
</tr>
<tr>
<td>1997</td>
<td>105,918</td>
<td>14.99</td>
</tr>
<tr>
<td>1998</td>
<td>103,532</td>
<td>-2.25</td>
</tr>
</tbody>
</table>

* Review of Optometry’s annual income survey (Amounts in parentheses are from AOA income survey data.)

When commenting on the impact, or “burden,” of educational debts, many observers have limited their analysis to graduates’ initial year of income. While technically accurate in the short run, this approach understates the income generated during the student loan repayment period, which has traditionally been ten years in length. Rather than take this narrow approach, the following discussion incorporates the average, or mean, net income earned by OD’s. As stated above, student loans are not amortized in one year. Accordingly, when calculating the percentage of income that student loan repayments consume, it is appropriate to utilize the projected, or average, income that graduates can look forward to earning during the years they will be repaying their student loans. This methodology is in no way intended to understate or mask the very real pressure graduates experience during the first three to five years of practice, wherein average incomes are not yet at the levels reflected in Table 8. But to limit a discussion of the relationship of student indebtedness and optometric income to the first three to five years of practice, while incomes are at their lowest, seems a bit too conservative and will most certainly overstate the impact of educational indebtedness.

### Estimating Manageable Levels of Educational Indebtedness

Beginning in the late 60’s a number of researchers (most notably, Daniere, Hartman, and Hortch) set about to develop economic models that would predict the upper limits of educational indebtedness; a borrower could assume, beyond which the debt burden would become unmanageable or oppressive. Dresch and Johnstone pointed out that there appeared to be general agreement with the observation that the “relevant measure of oppressiveness of a debt is the relation between future repayments and future income.” Beyond this assumption, each of the studies and researchers came up with a different prediction relative to what constitutes a manageable debt level.

While failing to agree on a specific dollar figure or percentage of income in ascertaining a manageable level of indebtedness, researchers agree that to date there have been no conclusive studies that clearly document or predict the limits of educational indebted-
Table 9
Relationship of Debt to Income For Recent Optometric Graduates

<table>
<thead>
<tr>
<th>YEAR</th>
<th>INCOME</th>
<th>DEBT</th>
<th>D/S @ 10 YR</th>
<th>D/S @ 20 YR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
<td>% OF INCOME</td>
<td>% OF INCOME</td>
</tr>
<tr>
<td>1990</td>
<td>80,417</td>
<td>56,974</td>
<td>8,293</td>
<td>10.31</td>
</tr>
<tr>
<td>1991</td>
<td>81,270</td>
<td>58,941</td>
<td>9,115</td>
<td>11.88</td>
</tr>
<tr>
<td>1992</td>
<td>85,608</td>
<td>62,255</td>
<td>12,873</td>
<td>16.57</td>
</tr>
<tr>
<td>1993</td>
<td>91,460</td>
<td>69,322</td>
<td>12,873</td>
<td>16.57</td>
</tr>
<tr>
<td>1994</td>
<td>95,750</td>
<td>77,933</td>
<td>10,165</td>
<td>11.85</td>
</tr>
<tr>
<td>1995</td>
<td>89,998</td>
<td>81,915</td>
<td>10,742</td>
<td>12.90</td>
</tr>
<tr>
<td>1996</td>
<td>92,113</td>
<td>88,438</td>
<td>11,882</td>
<td>14.89</td>
</tr>
</tbody>
</table>

- income from Review of Optometry's annual income survey
- educational debts are for students with debt (approx. 80 to 85% of all grads)
- debt service assumes an 8% simple interest charge.

Table 10
Relationship of Debt to Income For Graduates of Private Schools and Colleges

<table>
<thead>
<tr>
<th>YEAR</th>
<th>INCOME</th>
<th>DEBT</th>
<th>D/S @ 10 YR</th>
<th>D/S @ 20 YR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
<td>% OF INCOME</td>
<td>% OF INCOME</td>
</tr>
<tr>
<td>1990</td>
<td>80,417</td>
<td>56,974</td>
<td>8,293</td>
<td>10.31</td>
</tr>
<tr>
<td>1991</td>
<td>81,270</td>
<td>58,941</td>
<td>9,115</td>
<td>11.88</td>
</tr>
<tr>
<td>1992</td>
<td>85,608</td>
<td>62,255</td>
<td>12,873</td>
<td>16.57</td>
</tr>
<tr>
<td>1993</td>
<td>91,460</td>
<td>69,322</td>
<td>12,873</td>
<td>16.57</td>
</tr>
<tr>
<td>1994</td>
<td>95,750</td>
<td>77,933</td>
<td>10,165</td>
<td>11.85</td>
</tr>
<tr>
<td>1995</td>
<td>89,998</td>
<td>81,915</td>
<td>10,742</td>
<td>12.90</td>
</tr>
<tr>
<td>1996</td>
<td>92,113</td>
<td>88,438</td>
<td>11,882</td>
<td>14.89</td>
</tr>
</tbody>
</table>

- income from Review of Optometry's annual income survey
- educational debts are for students with debt (approx. 80 to 85% of all grads)
- debt service assumes an 8% simple interest charge.

Table 11
Relationship of Debt to Income For Graduates of Public Schools and Colleges

<table>
<thead>
<tr>
<th>YEAR</th>
<th>INCOME</th>
<th>DEBT</th>
<th>D/S @ 10 YR</th>
<th>D/S @ 20 YR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
<td>% OF INCOME</td>
<td>% OF INCOME</td>
</tr>
<tr>
<td>1990</td>
<td>80,417</td>
<td>30,355</td>
<td>4,418</td>
<td>5.49</td>
</tr>
<tr>
<td>1991</td>
<td>81,270</td>
<td>34,953</td>
<td>4,418</td>
<td>5.49</td>
</tr>
<tr>
<td>1992</td>
<td>85,608</td>
<td>40,547</td>
<td>5,902</td>
<td>6.89</td>
</tr>
<tr>
<td>1993</td>
<td>91,460</td>
<td>45,960</td>
<td>6,690</td>
<td>7.31</td>
</tr>
<tr>
<td>1994</td>
<td>95,750</td>
<td>49,347</td>
<td>7,183</td>
<td>7.50</td>
</tr>
<tr>
<td>1995</td>
<td>89,998</td>
<td>52,733</td>
<td>7,676</td>
<td>8.53</td>
</tr>
<tr>
<td>1996</td>
<td>92,113</td>
<td>62,619</td>
<td>9,115</td>
<td>9.90</td>
</tr>
</tbody>
</table>

- income from Review of Optometry's annual income survey
- educational debts are for students with debt (approx. 80 to 85% of all grads)
- debt service assumes an 8% simple interest charge.

Table 12
Relationship of Debt to Income Initial Year of Practice

<table>
<thead>
<tr>
<th>YEAR</th>
<th>INCOME</th>
<th>DEBT</th>
<th>D/S @ 10 YR</th>
<th>D/S @ 20 YR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
<td>% OF INCOME</td>
<td>% OF INCOME</td>
</tr>
<tr>
<td>Overall</td>
<td>55,000</td>
<td>81,627</td>
<td>11,882</td>
<td>11.88</td>
</tr>
<tr>
<td>Private</td>
<td>55,000</td>
<td>88,438</td>
<td>12,873</td>
<td>16.13</td>
</tr>
<tr>
<td>Public</td>
<td>55,000</td>
<td>62,619</td>
<td>9,115</td>
<td>11.42</td>
</tr>
</tbody>
</table>

- debt service assumes an 8% simple interest charge.
dent debts. This is not to say that the decision to become an optometrist is not a good one (as we will see in the next section, it remains one of the best investments individuals can make in their lifetimes). Rather, student indebtedness is increasing faster than optometric income and thus the issue of how to limit student borrowing to a minimum has become a critical issue within optometric education.

Prior to leaving this section we must take a moment to address the early, or initial, years of practice as they relate to income and educational indebtedness. While not much reliable data exists regarding incomes earned during the first year of optometric practice, most observers would agree that $55,000 represents a reasonable level of income for recent graduates. Table 12 provides an estimate of the relationship of educational debt to income for the initial year of optometric practice for 1996 graduates. Graduates (1996) earning $55,000 would use approximately 22% of their net income to make student loan payments if they selected a ten-year repayment schedule. Those same graduates would reduce the percentage of income necessary to amortize their $81,627 in student indebtedness to 14.9% if they consolidated their loans and extended the repayment period to twenty years. The data contained in this Table clearly demonstrate why more and more recent graduates are using the Federal Consolidation Loan program.

### Figure 5
1997 Average Incomes
Adults 18 Yrs and Older

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>W/O High School Diploma</td>
<td>$16,124</td>
</tr>
<tr>
<td>W/ High School Diploma</td>
<td>22,895</td>
</tr>
<tr>
<td>W/ Bachelor’s Degree</td>
<td>40,478</td>
</tr>
<tr>
<td>W/ Advanced Degree</td>
<td>63,229</td>
</tr>
<tr>
<td>W/ Optometric Degree*</td>
<td>105,918</td>
</tr>
</tbody>
</table>

*The first four figures are from the U.S. Commerce Department’s Census Bureau. The last figure is from the Review of Optometry’s 1997 Annual Income Survey.

### The Impact of an Optometric Degree on Income

With all this talk of increasing student loan indebtedness in the face of managed care and depressed optometric incomes, one might conclude that the decision to acquire a professional or optometric degree is not a wise one. As stated in the last section, the decision to acquire an optometric education represents one of the best investments individuals can make in their lifetimes. Consider the following.

Figure 5 lists the 1997 average incomes for adults 18 years and older by level of education. According to the U.S. Census Bureau, in 1997 individuals who held a bachelor’s degree, on average, earned $40,478. That $40,478 represents the base earning potential optometry students have prior to acquiring their professional degree. According to the Review of Optometry’s Annual Income Survey, the average optometrist earned $105,918 in 1997, or $64,440 more than an individual would have earned with just an undergraduate degree. That $64,440 of marginal income represents the impact an OD degree has on earnings over and above an undergraduate degree. Let us now turn our attention to the impact an optometric degree has on income earned during the student loan repayment years.

Figure 6 begins with a review of the average 1997 income for individuals holding BA’s and OD’s — $40,478 and $105,918, respectively. The difference between these two figures represents the marginal gross income generated by the OD degree — $65,440. Assuming one “loses” approximately one third of this marginal gross income to taxes, the “average” optometrist should end up with an additional $42,900 in cash over and above what he or she would have earned with merely an undergraduate degree. By deducting the annual debt service on $81,627 (the average educational indebtedness for a 1996 optometric graduate) from the marginal net income, we can observe that, in 1997, the average optometrist enjoyed an additional $31,018 to $34,711 in annual net income (cash), even after making student loan payments.

Another interesting way of looking at the relationship between income and indebtedness during the loan repayment years is to consider the number of months it would take to completely amortize educational indebtedness if one were to dedicate all of the marginal net (cash) income derived from the OD degree, up to and above that generated by an undergraduate degree. (For simplicity we will utilize both the average level of educational indebtedness for 1996 graduates and the average income earned by optometrists in 1997. Additional interest charges will not be factored into this calculation.) Based upon the data contained in Figure 6, the average 1996 graduate could, using purely marginal net income, pay off $81,627 in principal in just 22.8 months — less than two years of employment at the average income earned by an optometrist in 1997.

There are several obvious limitations to the preceding analyses. Foremost is the fact that the analyses, as well as the data included in Figure...
practice years present some pressures relative to the percentage of recent graduates’ income utilized to amortize student loans, the income-to-debt burden during the overall loan repayment period does not appear to be unreasonable given graduates’ earning potential. However, we have yet to address the impact of additional debts resulting from the acquisition of a private practice (the preferred mode of professional practice by both students and organized optometry).

All too often the discussion and debate on student indebtedness takes place along a single dimension, e.g., the average level of educational debt for a 1996 graduate was slightly over $81,000. Throughout this article we have attempted to place student indebtedness into a broader context wherein educational costs, financial assistance, student borrowing, loan repayment, projected incomes, and individual choices all interact to reveal a complex and dynamic environment. As was stated at the outset of this article, while anecdotal observations abound, there remains a rather limited amount of information available that relates to educational indebtedness and its impact on optometry students and practitioners. The need for quality research on student indebtedness remains an important agenda item for the profession.

With these points in mind, the challenge confronting optometric education is how to assist students with the development of a personal and professional financial strategy or plan that minimizes student indebtedness and integrates loan repayment into their post-graduate lives. Today’s students and tomorrow’s graduates will have to be much more sophisticated in their approach to personal and professional financing than were past graduates, if they want to enjoy the lifestyle and rewards that a career in optometry has provided to past graduates. That is the challenge of financing an optometric education.

References

Educational Debt and Professional School Students

Sandy Baum, Ph.D.

This paper was originally presented as the keynote address at the March 1999 Critical Issues Seminar.

The debts facing students in colleges and universities around the country have skyrocketed in recent years and no obvious limit to this borrowing is in sight. Students pursuing graduate study in the professions, including optometry, are most likely to accumulate high levels of indebtedness because of the combination of high levels of tuition and long years of study. It is no wonder that those representing professional schools are concerned about both the fate of their students who must manage this debt and, in the longer run, their institutions, which depend on the ability and willingness of students to undertake these financial obligations.

Who Should Pay?

Rising debt levels are an unavoidable reality. There are a limited number of ways in which this borrowing could be diminished. Institutions could cut their costs. While it is imperative that schools examine their structures and practices carefully with an eye to cost containment and there is some evidence that many schools are, in fact, attempting to do this, it is unreasonable to think that tuition levels will actually decline, instead of just rising more slowly. This means that someone must pay these rising costs. The only possibilities are philanthropists, taxpayers, parents and students. Endowment earnings and annual giving are important resources, but few institutions are or will be in a position to depend on this source of funding to solve the tuition problem. Many people have the urge to turn to the government as a solution to this seemingly unfair situation.

The government does play a significant role in improving access to higher education. This role for the government is grounded in both equity and efficiency considerations. College has become almost a necessity for the attainment of a comfortable standard of living in this country, and there is a consensus that this is not an opportunity that should depend on one’s parents’ ability to pay. Students from low-income families would have no opportunities for upward mobility if the postsecondary education system were not subsidized for them. The equity argument for graduate professional education is somewhat harder to make. The population in question, those for whom access to, for example, schools of optometry, is an issue, consists of people who already hold undergraduate degrees. Whatever the circumstances of their families of origin, it is difficult to argue that this is the group in our society most in need of assistance.

Similarly, the efficiency arguments supporting a government role in financing higher education are weaker in the case of graduate professional school than in other segments of the educational system. Most economists would agree that there is a potential role for the government when there is a market failure. One example of a market failure is an externality - a case where a market transaction affects third parties. There are positive externalities to elementary and secondary education because we are all better off if other people can read and behave like informed citizens. There are probably smaller externalities to college education, and the externalities argument extends to graduate education only in occupations where workers are not fully compensated for their economic contributions to society. We all agree that we need doctors and lawyers. But only a fraction of doctors and lawyers are significantly underpaid for their professional activities. While it is difficult to measure these social benefits, it is not unreasonable to suggest that the publicly subsidized loan programs available for graduate professional students are both justified on the grounds of efficiency because of these externalities and adequate to account for them.

Without stronger arguments in terms of equity and efficiency, it is difficult to argue for larger subsidies from taxpayers in general to doctors, MBA’s, lawyers - or optometrists - all of whom have earnings far above those of the average taxpayer.

That leaves us with parents and students. Many of us would like to be able to help our children finance graduate study. But the reality is that there is a disturbing resistance even among parents of undergraduates to sacrificing their own consumption in the interests of their children’s education. Moreover, many young people for whom access to professional education is an issue don’t have parents with the resources to assist them.
Table 1

Income and Debt Levels by Graduate Field of Study

<table>
<thead>
<tr>
<th>Field</th>
<th>Number of Borrowers</th>
<th>Median income (mean)</th>
<th>Percent with grad debt</th>
<th>Median grad debt (mean)**</th>
<th>Median total debt (mean)</th>
<th>Median monthly payment/income (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social sci</td>
<td>36</td>
<td>$30,000</td>
<td>75%</td>
<td>$8,200</td>
<td>$16,300</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($30,600)</td>
<td></td>
<td>($12,400)</td>
<td>($20,100)</td>
<td>(12%)</td>
</tr>
<tr>
<td>Education</td>
<td>72</td>
<td>$27,600</td>
<td>72%</td>
<td>$5,900</td>
<td>$15,600</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($27,400)</td>
<td></td>
<td>($8,800)</td>
<td>($19,500)</td>
<td>(11%)</td>
</tr>
<tr>
<td>Humanities</td>
<td>22</td>
<td>$22,900</td>
<td>73%</td>
<td>$10,000</td>
<td>$15,000</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($24,500)</td>
<td></td>
<td>($10,500)</td>
<td>($21,600)</td>
<td>(14%)</td>
</tr>
<tr>
<td>Arts</td>
<td>13</td>
<td>$16,700</td>
<td>77%</td>
<td>$15,000</td>
<td>$19,400</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($18,300)</td>
<td></td>
<td>($14,600)</td>
<td>($22,700)</td>
<td>(23%)</td>
</tr>
<tr>
<td>Natural sci</td>
<td>14</td>
<td>$27,000</td>
<td>93%</td>
<td>$7,500</td>
<td>$11,300</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($27,000)</td>
<td></td>
<td>($8,300)</td>
<td>($17,200)</td>
<td>(8%)</td>
</tr>
<tr>
<td>Technical sci</td>
<td>35</td>
<td>$43,000</td>
<td>66%</td>
<td>$3,400</td>
<td>$16,900</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($40,300)</td>
<td></td>
<td>($5,300)</td>
<td>($19,500)</td>
<td>(8%)</td>
</tr>
<tr>
<td>Business</td>
<td>55</td>
<td>$41,200</td>
<td>87%</td>
<td>$12,300</td>
<td>$20,600</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($39,300)</td>
<td></td>
<td>($17,000)</td>
<td>($28,900)</td>
<td>(10%)</td>
</tr>
<tr>
<td>Law</td>
<td>37</td>
<td>$41,400</td>
<td>95%</td>
<td>$40,600</td>
<td>$50,600</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($37,200)</td>
<td></td>
<td>($41,200)</td>
<td>($52,600)</td>
<td>(21%)</td>
</tr>
<tr>
<td>Health/medical</td>
<td>60</td>
<td>$37,100</td>
<td>85%</td>
<td>$16,700</td>
<td>$25,900</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($36,200)</td>
<td></td>
<td>($33,900)</td>
<td>($43,300)</td>
<td>(13%)</td>
</tr>
<tr>
<td>Total</td>
<td>378*</td>
<td>$35,000</td>
<td>80%</td>
<td>$5,000</td>
<td>$17,500</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($32,700)</td>
<td></td>
<td>($9,800)</td>
<td>($28,100)</td>
<td>(13%)</td>
</tr>
</tbody>
</table>

*Field of study is missing for 44 respondents

**Mean and median graduate debt levels include those who did not borrow at all for graduate study.

On average, graduate professional study pays off quite well. Median income of individuals with a professional degree is about 60% higher than median income for individuals with a BA. Over a third of those families headed by people with professional degrees are in the top 5% of families in terms of income. Two-thirds are in the top 20%. While this is certainly not true for every individual, for most people facing the choice, the investment in a professional education is likely to be a good one, and one worth borrowing for.

Debt financing of physical investments is relatively uncontroversial. No one suggests that start-up companies should buy all of their equipment outright. Rather, they should make a considered decision about the prospective pay-off and borrow and invest accordingly. For some reason, this rational approach is not yet totally accepted for the investment in human capital. It is perfectly sensible for most graduate professional students to borrow a significant fraction of the funds required to pay their costs of attendance and pay back their debt out of future earnings.

We should not, in this context, ignore the role of family background in influencing the willingness to incur debt. Those from less affluent backgrounds are likely to be more hesitant to accumulate debt and to perceive the high-paying professions that require expensive training to be out of reach. Financial aid programs should take this reality into account.

In addition to the impact of family background on attitudes towards debt, uncertainty about the pay-off to graduate training creates the need for caution in terms of borrowing and makes the individual circumstances of the students relevant. Average incomes and rates of return are an important foundation for general policy, but few individuals fit the average. Unlike the law graduate entering a large law firm who earns almost three times as much...
professional training.

As a general rule, making credit available and providing loan counseling is probably the most important aspect of helping students to finance professional training.

The National Student Loan Survey

A 1998 study of student debt provided some insight into the particular circumstances that make those who borrow for graduate study more vulnerable to debt problems. For this study, Nellie Mae, a national student loan originator and secondary market for federal and private education loans, surveyed 2500 borrowers currently in repayment. I recently analyzed the responses of the 378 respondents (out of a total of 1098 usable responses) who went on to graduate study. Most of these students borrowed much less than the $80,000 typical for optometry students. In fact, only 28% accumulated total undergraduate and graduate debt exceeding $30,000. On the other hand, 22% reported 1996 earnings below $20,000 and only 17% earned over $50,000 a year. Still, a subset of the group is similar to optometry students, and the data can help us to understand patterns that are likely to create problems.

Table 1 shows income and debt levels by graduate field of study for borrowers in the NASLS study. Not surprisingly, among the 17% who were in health/medical sciences, borrowing is prevalent and income levels are relatively high. Debt levels are much lower than for those who studied law, but debt-to-income ratios are higher than for most other fields.

Table 2 isolates students who studied either law or health/medicine and compares them to other graduate borrowers. Business students were not included in this group because their average incomes are high enough to render their debt burdens relatively low compared to the other professional students. Law and health/medical borrowers had mean graduate debt of $35,700 and median graduate debt of $24,200. Their combined undergraduate and graduate debt averaged $45,700, with a median of $37,500. Even with these high average levels of borrowing, it is important to note that half of the borrowers had graduate debt of $25,000 or less.

Despite their average earnings of $38,500, those who pursued graduate studies in these fields use a median of 12% (mean = 16%) of their current monthly income to repay their student loans and 22% have ratios exceeding 20%. Other graduate borrowers use a median of only 8% of their incomes for loan repayment, with a mean of 11%.

Sixty-three percent of the graduate law and health/medical borrowers said they felt extremely or very burdened by their loans, compared to 50% of those in other disciplines. Law and medical graduate borrowers were as likely as other graduate students (about three-quarters) to be satisfied with the career opportunities resulting from their education investment, but fewer in these fields gave a positive response regarding personal growth (78% vs. 84%).

($72,000/yr) as someone with a social science B.A. ($24,000/yr), generating almost $4000 a month of earnings premium, legal services lawyers earn a premium of only about 10%, or $200 a month ($26,400/yr). Clearly, there will be students who take on large amounts of debt and find it unmanageable. Moreover, the uncertainty about future earnings can act as a deterrent to investment in graduate study.

For most people with BA's, the problem is one of liquidity, not one of long-term capacity to pay for education. As a general rule, making credit available and providing loan counseling is probably the most important aspect of helping students to finance professional training.

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Many of these borrowers feel very burdened by their student loan payments, but because of their high incomes, most of them are not at risk. Their high incomes make it possible for them to use a relatively high por-
Fields of Graduate Study — High Payment-to-Income Ratios

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Percentage in total sample</th>
<th>Percentage of those with high payment-to-income ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social science</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>Education</td>
<td>21%</td>
<td>16%</td>
</tr>
<tr>
<td>Humanities</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td>Arts</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>Natural science</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Technical science</td>
<td>10%</td>
<td>6%</td>
</tr>
<tr>
<td>Business</td>
<td>16%</td>
<td>9%</td>
</tr>
<tr>
<td>Law</td>
<td>11%</td>
<td>18%</td>
</tr>
<tr>
<td>Health/medical</td>
<td>17%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Borrowers with High Payment/Income Ratios

<table>
<thead>
<tr>
<th>Borrower Characteristics</th>
<th>Payment-to-income greater than 10%</th>
<th>Payment-to-income less than 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 30</td>
<td>55%</td>
<td>42%</td>
</tr>
<tr>
<td>30-34</td>
<td>31%</td>
<td>25%</td>
</tr>
<tr>
<td>35 or older</td>
<td>14%</td>
<td>34%</td>
</tr>
<tr>
<td>Female Borrowers</td>
<td>60%</td>
<td>57%</td>
</tr>
<tr>
<td>Median income</td>
<td>$25,000</td>
<td>$35,000</td>
</tr>
<tr>
<td>Income less than $35,000</td>
<td>63%</td>
<td>25%</td>
</tr>
<tr>
<td>Have graduate degree</td>
<td>78%</td>
<td>74%</td>
</tr>
<tr>
<td>Have professional degree</td>
<td>25%</td>
<td>7%</td>
</tr>
<tr>
<td>In humanities/arts</td>
<td>9%</td>
<td>5%</td>
</tr>
<tr>
<td>In education</td>
<td>16%</td>
<td>25%</td>
</tr>
<tr>
<td>Total debt</td>
<td>mean $42,300</td>
<td>$18,700</td>
</tr>
<tr>
<td></td>
<td>median $32,500</td>
<td>$15,000</td>
</tr>
<tr>
<td>Total graduate debt</td>
<td>mean $29,700</td>
<td>$9,600</td>
</tr>
<tr>
<td></td>
<td>median $25,000</td>
<td>$5,000</td>
</tr>
<tr>
<td>Total debt less than $20,000</td>
<td>27%</td>
<td>66%</td>
</tr>
<tr>
<td>Total debt greater than or equal to $40,000</td>
<td>40%</td>
<td>8%</td>
</tr>
<tr>
<td>Feel extremely or very burdened</td>
<td>76%</td>
<td>41%</td>
</tr>
<tr>
<td>Wish they had borrowed less</td>
<td>58%</td>
<td>41%</td>
</tr>
<tr>
<td>Would like lower monthly payments even at higher long run cost</td>
<td>22%</td>
<td>14%</td>
</tr>
<tr>
<td>Say loans have caused more hardship than anticipated</td>
<td>53%</td>
<td>23%</td>
</tr>
<tr>
<td>Think investment was worth it for personal growth</td>
<td>77%</td>
<td>86%</td>
</tr>
<tr>
<td>Think investment was worth it for career opportunities</td>
<td>68%</td>
<td>77%</td>
</tr>
<tr>
<td>Loans delayed buying car</td>
<td>45%</td>
<td>20%</td>
</tr>
<tr>
<td>Own a car</td>
<td>74%</td>
<td>92%</td>
</tr>
<tr>
<td>Loans delayed buying home</td>
<td>57%</td>
<td>38%</td>
</tr>
<tr>
<td>Own a home</td>
<td>23%</td>
<td>33%</td>
</tr>
<tr>
<td>Loans delayed having children</td>
<td>33%</td>
<td>19%</td>
</tr>
<tr>
<td>Loans delayed getting married</td>
<td>17%</td>
<td>11%</td>
</tr>
<tr>
<td>Loans delayed moving out of parents' house</td>
<td>28%</td>
<td>12%</td>
</tr>
</tbody>
</table>
ratios were much more likely to have professional degrees (25% vs. 7%).

Borrowers with high payment-to-income ratios clearly feel more burdened by repayment than other borrowers. They are more likely to believe loans have interfered with their consumption opportunities and more likely to report that loans are causing them problems. They are also less likely to own homes and cars, although it is not possible to conclude that student debt is, in fact, the explanation for this.

If there is any group of students who would be most likely to worry about the burden of their debt, it should be those who borrowed heavily to enter fields that typically pay well, but then ended up with relatively low earnings. I looked closely at those with incomes of $40,000 or lower who use at least 10% of their incomes to make loan payments and compared those in generally high-paying fields such as health/medicine and to those in generally low-paying fields such as arts, humanities and social sciences. Although their average incomes are higher, those in the higher-paying fields were more likely to feel burdened by their loan payments (86% vs. 71%). They were also somewhat more likely to say they would borrow less if they had it to do over. Perhaps most consistent with the hypothesis that earnings expectations affect the perception of loan burden is that 65% of those in the high-earnings fields said their loans were causing them more hardship than anticipated compared to 52% in the low-paying fields.

To get a more accurate test of the hypothesis about the role of earnings expectations in debt experience, I performed multivariate regression analysis to see whether the gap between the individual’s actual earnings and the median earnings in the field of graduate study has an independent effect on how burdened borrowers feel by their debt. When controlling for whether or not the borrower earned a graduate degree and for monthly pay-

ment-to-income ratios, the gap between median and personal earnings is significantly and positively related to the extent to which respondents report feeling burdened by their debts. Similarly, the gap between personal earnings and median earnings in the field makes borrowers more likely to feel that the investment they made in their education is not worth it. These results are not conclusive, but unfulfilled expectations do appear to be a contributing factor to perceived debt burdens.

Unfulfilled expectations are most likely to occur in fields where there is considerable variation in the earnings of graduates. In the NASLS sample of graduate students, the greatest inequality in earnings within fields was among those who studied arts, humanities and law. Law and humanities, one with high earnings and the other with relatively low earnings, are two fields in which borrowers have relatively high debt-to-income ratios. Perhaps those who end up at the bottom of the distribution in their field did not anticipate this outcome and therefore did not plan their financing accordingly. In the field of education, by contrast, earnings are relatively low, but so is the spread between high and low earnings. The anticipation of moderate earnings may be a factor keeping borrowing down in this field.

Another indication that it is not just objective debt burden that affects people’s perception of difficulty with student loans emerges from examining the effects of home ownership. In the NASLS study, borrowers over the age of 33 who did not own a home were much more likely to feel burdened by their debts than were homeowners, even when income and debt levels were controlled for. In other words, those who have not been able to buy their own homes blame their student debt, even though student debt plays no significant role in whether or not borrowers own homes. These results suggest that while heavier objective debt burdens certainly contribute to borrower perceptions of difficulty, other factors, including lifestyle outcomes independent of student debt, also affect the way people think about their student loans.

Overall, my findings on graduate student debt suggest that while high debt-to-income ratios are causing dissatisfaction among borrowers, it is unfulfilled expectations that are the real culprit. Low income levels seem to matter more than high debt levels. Low income levels relative to others in the field are a particular problem.

To the extent that the evolving structure of the optometry industry is creating significant variation in the earnings of graduates of your schools, it would be wise to keep the role of uncertainty and unfulfilled expectations in mind when counseling students about borrowing. That said, it is probably most important that those responsible for professional training understand the investment value of the service they are providing and help students to appreciate the rational basis for financing this investment out of future income.
Towards a New Model in Training and Delivery of Optometric Education

Kovin S. Naidoo, M.P.H., O.D.

Abstract

This paper examines optometric education and training in developing nations in the context of limited resources and enormous service delivery challenges, with particular reference to the African experience. The need for eyecare has driven many non-optometrists into the eyecare delivery network, resulting in resistance from optometrists who view this as an erosion of their profession. Despite the resistance, health authorities have recruited many non-optometrists into the eyecare delivery network to address the needs of their people.

The possible solution is redefinition of the relationships between optometry and other eyecare personnel and the creation of multiple exit points enroute to becoming an optometrist. A system in which the optometrist is the end product in training other personnel ensures the generation of personnel providing care at different levels thus meeting the refraction and screening needs of most communities. Such a system of training generates complimentary forces in eyecare that are striving to reach the same level of training rather than competing forces outside the influence of optometry. A vertical model of training corresponds to the concept of the district health system. It provides personnel with appropriate levels of skill who can be employed at the different types of health care centers ensuring a filtering of cases that reach the more advanced centers of care.

Key Words: eyecare in Africa, World Health Organization, district health system

African Needs

The African continent is characterised by an extreme lack of eyecare personnel and facilities. The state of eyecare in Africa provides an alarming contrast to the rest of the world. Poor practitioner-to-patient ratios, total absence of eyecare personnel, inadequate facilities, poor state funding and a paucity of educational programs are the hallmarks of eyecare in Africa. The prevalence of blindness in Africa is 0.8 to 1.4% compared to 0.2% in America and Europe. The tragedy of the African statistics is that much of the blindness is preventable.

A significant feature of the eyecare crisis is the lack of programs to adequately train optometrists in Africa. The entire continent has only nine optometric programs which are based in four countries: South Africa, Ghana, Nigeria and Tanzania. These programs, vary in their scope and produce far too few optometrists to meet the needs of their own countries let alone the needs of other countries. Peniste found that Ghana for example, had 10 optometrists and 14 ophthalmologists who served the needs of 15 million people.

Producing optometrists with a four-year qualification in sufficient numbers to cater to the needs of the country is a mammoth task. To follow western models of training and service delivery is to embark on an arduous, if not impossible, route.

The challenge confronting the development of eyecare in Africa is the creation of a model of training and delivery that builds on and utilizes the scarce resources that currently exist. Any approach that seeks to merely duplicate existing models of training will be overtaken by the need factor and render optometry, as we understand it, obsolete.

Existing Programs and Conditions

Currently eyecare is being provided by a whole range of personnel. These are nurses, ophthalmic assistants, refractionists, optometrists and ophthalmologists. The scope of practice of the various personnel varies tremendously. In some countries (e.g. Malawi) ophthalmic assistants are primarily responsible for cataract and other surgical procedures. These personnel are often thrust into this role after one or two years of training. For those exposed to western standards of training this may sound incredible and unbelievable; however, for many African countries the evaluation of these programs is based on outcome measures rather than on process measures. The outcome is often the alleviation of blindness and access to some care rather than no care.

Optometry also varies in the African continent. Nigeria has an OD program while the rest of Africa is modelled on the British system of a four-year undergraduate program. This program encompasses basic science and clinical courses but does not encompass therapeutic training. The scope of care also varies tremendously from just refraction to diagnostics and therapeutics. The incredible feature of eyecare in Africa is that despite the need, the politics of eyecare still dictates the role of optometrists. Despite nurses and ophthalmic assistants being utilized...
for diagnostic, therapeutic and surgical care, optometrists are still prevented from conducting therapeutic care in most cases and surgical care in all cases.

**Proprietary Models of Delivery**

With the exception of South Africa and Nigeria, private optometry practice in Africa has had limited success despite the few practitioners in some countries. This is a direct result of the economic devastation of some of the countries. Most care is provided by nurses and ophthalmic assistants who are employed in state clinics and hospitals as well as by philanthropic organizations that conduct various eyecare programs.

The World Health Organization (WHO) proposes the district health system as the model for the delivery of primary health care. It assumes responsibility for a defined geographical population usually ranging between 50,000 and 500,000. Braveman and Tarimo \(^*\) define a district health system as “A more or less self-contained segment of a national health system taking responsibility for the health care of a well defined population living within a clearly delineated geographical and administrative area. A district’s population is usually between fifty thousand and five hundred thousand persons. Usually the district health system has a general hospital with inpatient services providing support at the referral level for health care facilities (health centres and peripheral health posts) within the district.”

The challenge is for optometry to slot into the district health system model as it is the most effective means of providing health care in developing nations. In order to slot into this model it is imperative that we re-evaluate the nature of eyecare training.

**Eyecare Training**

Currently optometric training occurs independent of other eyecare professions. However, in keeping with the interdependence of different health care professions that the district health system demands, it is necessary to explore the merging of the training of different eyecare professionals.

**Proposed Model**

The major principles underlying the proposed model are:

- Utilizes a modular system;
- Allows for multiple entry and exit points from the program;
- Is vertical in nature;
- Utilizes a “funnel” approach in recruitment and progression; and
- Amalgamates different eyecare professions in the training process.

Many optometry programs utilize year credits as a means to progress to a higher level of study. The limitation of these programs is that students who fail a few courses while passing the bulk of the courses often end up leaving optometry school and joining other careers. This problem is often experienced in the African context because of the limitations of science education and resources at a high school level. A module is a smaller unit of course material than a year course. It is examined and passed or failed independently of other modules. This allows for some of the course work in basic science to be passed as separate and creditable modules despite others being failed. Furthermore clinical modules can be incorporated in the earlier years and can address basic eyecare issues.

**Multiple Entry and Exit levels**

(See Fig 1)

Students must be allowed to enter and leave the program after accumulating sufficient modular credits to engage in the provision of eyecare. This will enable a student who has level one (first year or basic) clinical module credits to leave and practice eyecare relative to his/her level of skills and return to the system later. The activities of this community eyecare worker will be at the promotive, preventive and curative level and will be available at the community clinic. Some of the activities will include screening for refractive conditions, dispensing reading glasses, identifying basic eye conditions and referring patients to a district health clinic. This person will also be responsible for educating the community about eyecare. If resources do not permit, the community eyecare worker can double up as a primary health care worker for the particular clinic or be assigned to a few clinics within the district health system.

![Figure 1: Core Courses and Competencies at Each Level Of the Multiple Exit and Entry Model](image)

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Optometric Education
The modules (level 1) that these personnel would have studied can also be offered by optometry schools to primary health care nurses.

Students who have achieved level two clinical modules as well as level one basic science modules could qualify as dispensing opticians and lab technicians, a much needed skill in the African context.

Students who have achieved higher (level three) clinical modules can qualify as refractionists and work at hospitals and the district health clinic together with the optometrist or conduct refractions alone when optometrists are unavailable. They can also conduct basic pathological screening and care.

Students who have achieved level four clinical modules as well as the basic science modules could qualify as the four-year optometrists that we are currently familiar with. They will have diagnostic and basic therapeutic skills. These optometrists can be allocated to district health hospitals or provincial hospitals (serving many districts) where more advanced care can be provided.

The level five and six modules can be offered as postgraduate modules on a full-time basis or as part-time courses leading to an OD equivalent with diagnostic, therapeutic and minor surgical skills. In countries where there is a need to use ophthalmic assistants to conduct cataract surgery, OD’s could be trained to provide this service.

"Funnel Approach"

In order for the system to work, it is important that a greater number of students are recruited initially. With fewer places available at the next level of study, some students will continually be forced into the health care system. The multiple exit and entry philosophy will ensure that they can return to their studies later on. Students who will normally drop out of optometry school due to failure could at least have access to careers in eyecare on accumulation of sufficient modules.

Conclusion

This paper provides a framework for the model. The first steps in developing the proposed model must encompass the modularization of current courses. Thereafter the compulsory modules for a student to exit need to be defined and developed. Needs of individual countries may vary, e.g., dispensers may not be needed; therefore, exit points could be defined based on the needs of individual countries.

This model is bound to be contentious. However, if optometry does not restructure the way we educate and deliver eyecare, the public health needs of African countries are bound to render optometry obsolete in some countries.

References


ASCO Meetings Calendar

ASCO EXECUTIVE COMMITTEE MEETING
March 15 — Santa Fe, New Mexico

ASCO BOARD OF DIRECTORS MEETING
March 16 — Santa Fe, New Mexico

ASCO CRITICAL ISSUES SEMINAR
March 17 - 19 — Santa Fe, New Mexico

ASCO EXECUTIVE COMMITTEE MEETING
June 20 — Las Vegas, Nevada

ASCO ANNUAL MEETING
June 20 - 21 — Las Vegas, Nevada
June 21 — Annual Luncheon
June 23 — Corporate Sponsor Breakfast

For the most up-to-date information on ASCO meetings, contact ASCO’s website at http://www.opted.org

I am delighted to see another entry into the field of neuro by an optometrist. The sub-title tells us that Neuro-Ophthalmic System stresses technique, although the preface suggests more ambitious goals. Neuro-Ophthalmic System is divided into five sections covering acquired strabismus, pupils, visual fields, systemic neurological evaluation, and additional testing. Each section discusses relevant history taking, necessary materials, problem-specific test performance, interpretation of procedures and their findings and billing and reimbursement.

Neuro-Ophthalmic System is concise and readable, has first-rate diagrams and good pictures, and is well referenced with classic as well as newer papers. I know of no other resource that covers so many different neurologic techniques.

Procedures are described in sufficient detail that one could actually do them after reading this text. The sections on pupil evaluation and on visual fields were particularly thorough and very practical (e.g., the use of neutral density filters to grade APD). The discussion of INO in the chapter on extraocular muscles is thorough enough to be very useful in that it mentioned the major etiologies leading to the condition, thus suggesting a course of action. Some of the interpretation sections provided a brief differential diagnosis, although others did not. The billing & reimbursement parts of each section are also very useful and unique; besides their obvious practical value, perhaps they will encourage ODs to get more involved in taking care of neuro patients.

Neuro-Ophthalmic System would have been greatly improved by expanding the discussions of what one should be thinking about when a neuro patient is in the chair. The sections on interpretation are concise, usually to the point of being too brief. There should have been more information on differential diagnosis and on such practical question as “How do I decide if I should refer this patient? If referral is appropriate, how fast and to what specialist?” For example, “sixth nerve palsy” is not a diagnosis, but is only an intermediate point in the interpretation. Patients with sixth nerve palsies may require referral within the hour or may be monitored over a period of weeks; this text doesn’t distinguish these patients. There seems to be an underlying assumption that our role is to detect and to refer, but often there is room for ophthalmic management or co-management of neuro patients.

Certain useful topics were omitted. There was minimal discussion of seventh nerve palsies, in which ODs have a role to play in differential diagnosis as well as in management. In addition, the author states that “Of the 12 cranial nerves, six are directly involved in sensory, motor, or autonomic input to the eye.” CN-VIII also has a rightful place on the list of ocular-relevant cranial nerves, as pathology of this nerve can lead to nystagmus, a subject touched upon only in passing in this text.

In summary, Neuro-Ophthalmic System provides clear, concise guidelines for the technical approach to neuro patients. However, the evaluation of such patients is only 10% technical, the other 90% being mental, and the primary care optometrist attempting to manage neuro patients needs to know more than is covered in this text. Thus, Neuro-Ophthalmic System does not achieve the lofty goals pertaining to evaluation and management as stated in the preface, although it does succeed in the goal suggested by its sub-title, “Clinical Procedures.” For someone already knowledgeable in the theory, this is an excellent and practical manual.

Reviewer: Dr. Daniel Kurtz
The New England College of Optometry


Nothing in the eye care field is so trying as watching a patient lose his or her vision as a result of macular disease. What makes this so frustrating is that the doctor knows what is going to happen, and, for the most part, no medical or surgical treatment makes the patient see any better.

Macular holes fall into this category. As someone who has watched a close friend fall into this abyss, I have yearned for the time that I have something more to offer my patients in addition to low vision. That time seems to have arrived.

Very recently, surgical procedures have been developed to close macular holes and restore vision in a way that would have been unthinkable only a few years ago. Having seen the results of this type of surgery in my own practice, it appears that early detection and surgical repair of macular holes offer a significant restoration of vision in the affected eye.

This text offers the most concise, up-to-date analysis of macular hole treatment. It covers the major treatment modalities, including indications and procedures, epiretinal membrane removal, and internal limiting membrane removal, gas versus silicone oil tamponade, and patient positioning after surgery. There is also an extensive discussion of the multi-center trial involving vitrectomy for macular hole.
In any discussion of maculopathies, knowledge of the underlying pathology is essential. Fully half of the book is devoted to the current understanding of this disease and this is time well spent. While there is much work to be done to identify the causative factors in macular hole formation, this book does an excellent job of identifying the key elements in the disease.

The diagrams and color photos are first rate. They add significantly to the understanding of the material in the book. There is an extensive bibliography after each chapter for those readers seeking more detailed information.

This book would be a valuable addition for anyone involved in the diagnosis and treatment of macular hole, whether as a student, teacher, primary eye practitioner, or low vision specialist. While this topic is literally a moving target, with new advances and research being published continually, this book will hold up well over time because of its emphasis on the description of the hole formation process itself. It will be useful as a reference for years to come.

Reviewer: Dr. Dennis W. Siemsen
Mayo Clinic
Rochester, Minnesota


*Differential Diagnosis in Primary Eye Care* is a comprehensive book that examines the decision-making process of primary eye care practitioners. While many texts examine a particular structure (e.g., cornea) or pathology (e.g., diabetes, or diabetic retinopathy) in detail, this book looks at how clinicians make appropriate decisions in making proper diagnoses. This constitutes knowing how to go from a patient's clinical symptoms or signs and making a differential diagnosis by identifying a set of possible diagnoses and then ruling out possible diagnoses on the list until the most likely diagnosis is identified.

The reader is reminded that a patient complaint or clinical sign may be caused by a number of clinical conditions. The practitioner must use a systematic approach to determine the possible causes, and ultimately the actual underlying cause, of a given symptom or sign. It is this systematic approach that is examined in detail in this book. In fact, the systematic approach for investigating the causes of an extensive group of signs and symptoms is examined in this book.

*Differential Diagnosis in Primary Eye Care* is composed of two parts. Part I has chapters on 13 different symptoms including blurred vision, sudden vision loss, visual field defects, nonphysiologic vision loss, color vision anomalies, night vision problems, flashes and floaters, diplopia, lid twitch, eye itch, eye pain, photophobia, and headache. Part II includes 45 chapters on different clinical signs including acute red eye, corneal anomalies, lid inflammation and lesions, iris anomalies, increased intraocular pressure, lens opacities, vitreous opacities, macular edema, fundus lesions, optic disc anomalies, nystagmus, anisocoria, as well as others.

Each chapter begins with the list of possible diagnoses to consider for the particular symptom or sign being discussed. Following the initial list, the differential diagnoses are then described in further detail. Each diagnosis is described in three sections commonly used by clinicians: subjective, objective, and plan. These sections help explain how the clinician progresses from the initial sign or symptom, to identifying the most likely diagnosis.

The "subjective" section provides details on the common patient complaints and symptoms of the chapter's topic. The "objective" section reviews clinical findings observed for the problem. The "plan" section for each diagnosis is a concise review of appropriate tests that need to be done, with recommended therapies.

*Differential Diagnosis in Primary Eye Care* includes a comprehensive set of chapters encompassing a wide range of patient symptoms and clinical signs. The process of making a correct differential diagnosis across various conditions is therefore covered impressively.

Reviewer: Dr. Ellen Richter Ettinger
Resources Editor

**Industry News**

(Continued from page 41)

Al Berg, Marchon president and chief executive officer. "With these packages, we have assembled a complete system of software solutions that can provide all the desktop needs to eyecare professionals practicing in each of the optical industry's disciplines."

OPIS (Ophthalmic Patient Information System) is a patient and professional communications program that allows for the creation of detailed patient reports and professional letters with the click of a mouse or the touch of a key. CPR (Computerized Patient Record) is an exam-side, computerized medical record program. Monitoring both exam findings for easier creation of post-exam communications and coding requirements to optimize proper reimbursement, CPR maintains accurate legal/medical patient records with virtually no typing. With the acquisition of OPIS/CPR, Marchon becomes the largest provider of optical software with a collective client base of almost 10,000.
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