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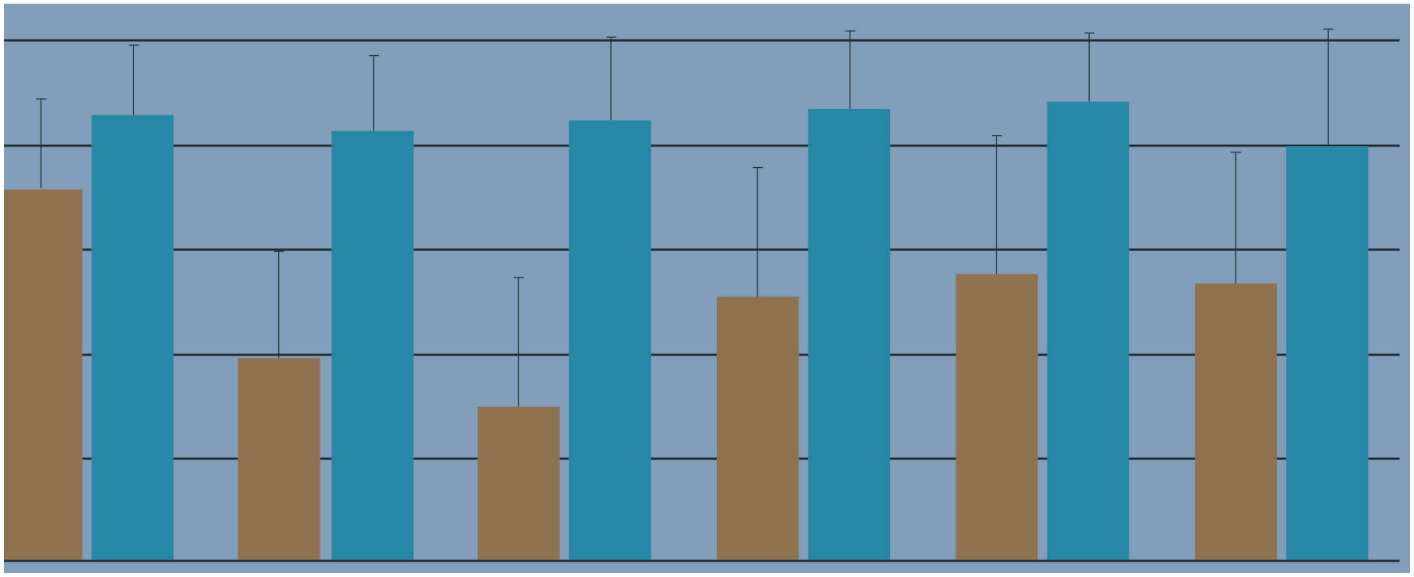

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ASCO Awards 2015 Educational Starter Grants

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The Association of Schools and Colleges of Optometry (ASCO), along with supporters The Vision Care Institute, LLC, an affiliate of Johnson & Johnson Vision Care, Inc., and Luxottica, are pleased to announce the recipients of the 2015 Educational Starter Grants. Grants were awarded to:

• William Edmondson, OD, and Jennifer Snyder, OD, Southern College of Optometry, to support their research project, "The Flipped Classroom and Team-Based Learning: A Platform to Introduce New Faculty to Didactic Teaching in an Optometry Program."

• Diane Russo, OD, FAAO, Beth Harper, OD, and Erik Weissberg, OD, New England College of Optometry, to support their research project, "Impact of Shared EHR Usage on Student Attitudes Toward Interprofessional Collaboration."

The educational research starter grants, which have been offered since 2011, serve to introduce and support the concept of the Scholarship of Teaching and Learning (SoTL); however, all types of educational research projects are considered. I applaud all faculty who submitted grant applications this year and congratulate the grant winners. Their efforts reflect their commitment to improving teaching and learning and moving the profession forward. ASCO and *Optometric Education* look forward to the completion and publication of this year's funded projects.

— Aurora Denial, OD, FAAO, Editor, *Optometric Education*

Don’t Miss It

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Stay tuned to your Inbox for the announcement that the Summer 2015 issue of ASCO’s online newsletter *Eye on Education* is available.

The issue will include a report on ASCO’s first Online Clinical Educators Forum (OCEF), which took place this spring.

For more information about the OCEF, contact ASCO’s Manager of Professional Affairs Carol Brubaker.

Topiramate-Induced Acute Bilateral Angle Closure Glaucoma and Transient Myopia: A Teaching Case Report

Vanessa Santos-Nevarez OD, Jenette Cantrell OD, FAAO, Paul Gruosso OD, Joseph Miller OD, FAAO, Tina Culotta-Glynn DO |
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Background

Topiramate is a sulfamate-substituted monosaccharide used in the treatment of epilepsy and migraines.[1] It also has an off-label use in the treatment of bipolar disorder, depression and as a weight reduction agent, among other uses.[2] With the growing off-label use of this oral medication, it is important to raise awareness within the medical community of the potentially blinding side effects of topiramate. We describe a case of a 34-year-old white male who presented to the emergency department with complaints of sudden onset bilateral vision loss and headaches after doubling the dose of topiramate and the role of an interdisciplinary team in the patient's care. This case is intended to demonstrate the role of an interdisciplinary team in maximizing patient care and the optometrist's contribution in educating fellow healthcare providers of the side effects of this widely used oral medication. This case is appropriate for more advanced optometry students who have had pharmacology courses and patient care experience. At most colleges, it would be geared toward optometry students at the end of their third year and all fourth-year students.

Case Description

A 34-year-old Caucasian male presented to the emergency room with complaints of blurry vision, itchiness and tearing in both eyes with an associated headache that occurred two hours after awakening. General and neurologic assessment at the emergency room was unremarkable. Due to the possibility of a cerebrovascular accident (CVA), computed tomography (CT) imaging of the head was ordered. The results were negative for a CVA. The optometry department was contacted for discussion of the case. We discussed the history and findings with the emergency room physician and recommended the patient be seen in the optometry department for further evaluation.

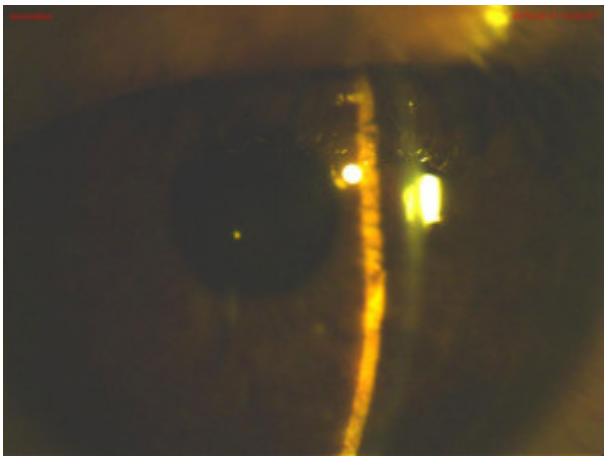
TABLE 1
Examination Findings

	OD	OS
VA without correction	20/50-2 PH: 20/50	20/200 PH: 20/40-2
Refraction	-4.50 sphere 20/20	-4.50 sphere 20/20
Pupils	PERRL, no afferent pupillary defect	PERRL, no afferent pupillary defect
IOP	28 mmHg	28 mmHg
Slit lamp	Lid edema, conjunctival chemosis, punctate keratitis, iris bowed forward, quiet and shallow a/c, narrow Von Herrick	Lid edema, conjunctival chemosis, punctate keratitis, iris bowed forward, quiet and shallow a/c, narrow Von Herrick
Gonioscopy	no visible structures	no visible structures
Fundus with undilated 90D	disc: 0.3 h/v, no edema macula: flat	disc: 0.5/0.4 h/v, no edema macula: flat

Click image to enlarge

The patient presented to our eye clinic with complaints of acute progressive decreased vision,

Figures 1A and 1B: Initial ocular exam showed a shallow anterior chamber in both eyes. Click images to enlarge



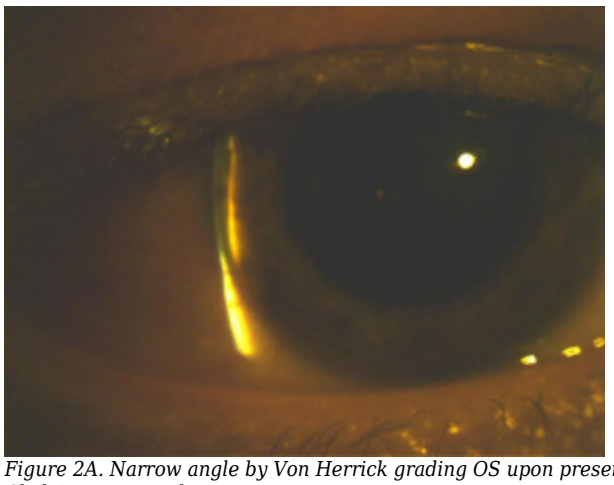


Figure 2A. Narrow angle by Von Herrick grading OS upon presentation. Click images to enlarge

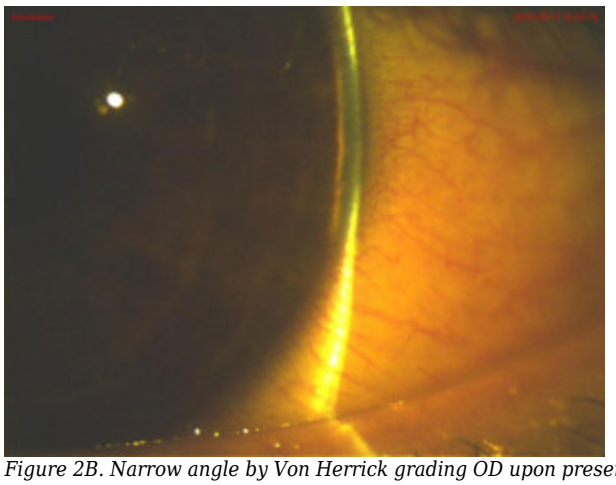


Figure 2B. Narrow angle by Von Herrick grading OD upon presentation.

foreign body sensation, pain over both eyes and an associated frontal headache. The foreign body sensation was relieved by the use of preservative-free artificial tears every 2 hours in both eyes and the headache was now resolved. The patient denied pain, photophobia and redness in either eye. The patient had no past ocular history and had never worn glasses. Social history was remarkable for anxiety, alcohol, benzodiazepine and illicit substance abuse. The patient was enrolled in a substance abuse treatment program and had recently undergone several changes in the treatment of the above conditions under the care of the psychiatry department. His medication list included suboxone 4 mg sublingual for opioid dependence, trazodone 150 mg by mouth at bedtime for sleep and topiramate 25 mg by mouth twice daily as off-label treatment for anxiety and dependence symptoms. The patient had been on suboxone and trazodone for 4 months without complications and had begun taking topiramate 10 days prior to our encounter. He reported doubling the dose of topiramate from 50 mg to 100 mg on the night prior to the onset of the symptoms in an attempt to control his anxiety and craving symptoms. The examination findings are

listed in **Table 1**. **(Figures 1A, 1B, 2A, 2B)**

Findings key to a diagnosis were bilateral narrowing of the angle structures, increased intraocular pressure and myopic shift. All are indicative of angle closure secondary to ingestion of topiramate. The case was reviewed with the ophthalmology team. We discussed the patient's chief complaint and findings and reviewed the patient's medical history including his current medication list. The ophthalmology team evaluated the patient and agreed with our findings. We discussed the management of the case and performed a unilateral trial of tropicamide 1% ophthalmic solution in the right eye. Slit lamp examination of the right eye 4 hours later revealed a deeper anterior chamber depth than previously noted, with no improvement in the left eye anterior chamber depth. The intraocular pressure was 24 mmHg in the right eye and 22 mmHg in the left eye at the time. The psychiatry department was notified of the case, and it was agreed that the patient should discontinue topiramate with follow-up at their clinic once the ocular findings resolved. The patient was given acetazolamide 250 mg by mouth and tropicamide 1% ophthalmic solution for the left eye and sent home with an appointment for follow-up the next day.

At the follow-up exam the patient reported improved vision and resolved eye pain. The uncorrected visual acuity was unchanged at 20/50 in the right eye and improved to 20/100 in the left eye. The vision was correctable to 20/20 in each eye with a decrease in myopia in the refraction, measuring -2.00D sphere in the right eye and -2.75D sphere in the left. Slit lamp examination revealed slight bowing of the iris and improved chemosis in each eye. The anterior chamber was deeper in the right eye compared to the left eye, Von Herrick grade 4 and 3 respectively. **(Figures 3 and 4)** Gonioscopy of both eyes revealed ciliary body band with a steep iris approach in all angles. At the one-week follow-up, the patient reported resolution of symptoms and normal vision. The uncorrected visual acuity was 20/20 in each eye, intraocular pressure was 14mmHg in each eye and slit lamp findings were unremarkable with deep and quiet anterior chambers and resolution of conjunctival chemosis.

A few weeks later the patient had a follow up visit with the psychiatry department for a re-evaluation after discontinuing topiramate. The patient reported improvement of his anxiety and substance abuse while on suboxone and trazadone only. The patient was doing well without topiramate treatment, had found a job, was sleeping well and reported mild alcohol use and no use of illicit substances. No further medications were recommended at the time.

Education Guidelines

Learning objectives

1. understand the role of the optometrist in an interdisciplinary setting

2. describe the signs and symptoms of secondary acute angle closure from topiramate

3. understand treatment and management of primary acute angle closure and secondary angle closure from topiramate

4. describe the physiological mechanism of action for the cause of symptoms

5. identify key diagnostic tests for an adverse reaction of topiramate

Key concepts

1. topiramate, used primarily in the treatment of migraine, can induce an ocular adverse reaction resulting in bilateral secondary acute angle closure and myopic shift

2. treatment for topiramate-induced acute angle closure differs from that of primary angle closure

3. ultrasound biomicroscopy and optical coherence tomography are useful tools in the monitoring of signs and symptoms

4. discontinuation of the medication, use of cycloplegic drops and intraocular pressure-lowering medications result in resolution of symptoms

Discussion points

1. describe and identify normal anatomy of the angle

2. signs and symptoms of acute angle closure

3. difference between primary angle glaucoma and acute angle closure

4. ocular side effects of systemic medications

5. systemic medications that can lead to angle closure

Literature review

Topiramate (Topamax, Ortho McNeal Pharmaceuticals, Raritan NJ), a sulfamate-substituted monosaccharide, was first approved by the FDA in 1996 for the treatment of epilepsy. In 2004 it received additional approval for the prevention of migraine headaches in adults.[1] Off-label uses for topiramate include weight reduction, bipolar disorder, depression and neuropathic pain.[2] In the mechanism of action for the relief of migraine headaches, topiramate acts as an enhancer for neurotransmitter y-aminobutyric acid (GABA) activity, antagonizer for a-amino-3-hydroxy-5-methyl-4-isoxazole propionic acid-kainate and sodium and calcium channel blocker, resulting in decreased neurotransmission, hyperexcitability and migraine headaches.[1]

Numerous case reports have associated anti-depressive medications and sulfa-derived drugs such as topiramate with a myopic shift and secondary acute angle closure.[2-8] There is approximately a 3% risk of developing an adverse reaction to a sulfonamide.[3] The first case report of an association of symptoms with the use of topiramate was published by Banta et al. in 2001. Subsequently, Ortho McNeal Pharmaceuticals circulated a letter indicating the reported adverse reactions of the drug. It is hypothesized that ciliochoroidal effusion and ciliary body edema cause forward rotation of the ciliary body and forward displacement of the iris-lens diaphragm, resulting in anterior chamber shallowing, myopic shift and

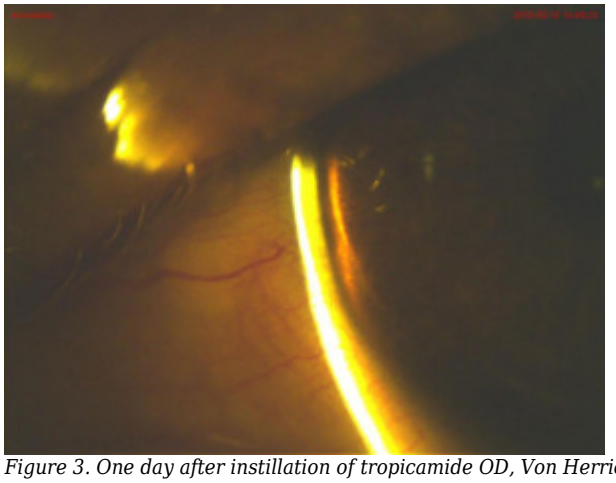


Figure 3. One day after instillation of tropicamide OD, Von Herrick grade was improved. Click image to enlarge.

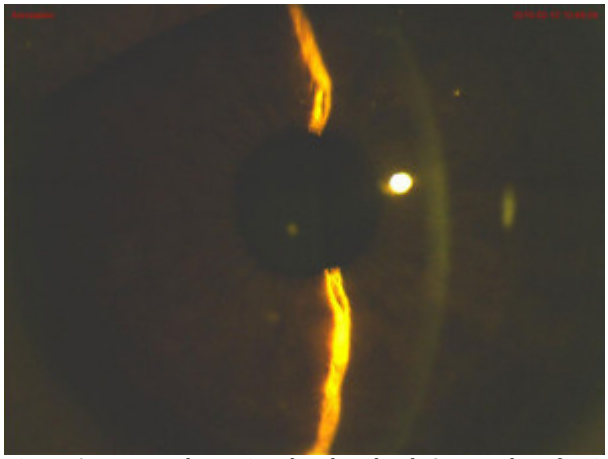


Figure 4. Deepened anterior chamber depth OD one day after instillation of tropicamide. Click image to enlarge.

increased intraocular pressure.[4-6] The mechanism of action of topiramate resulting in choroidal effusion is not well understood at this time, although its weak carbonic anhydrase inhibitor activity, elevated prostaglandin levels [5] and changes in membrane potential leading to fluid movement could be implicated.[7] The mechanism for acute myopia is the forward displacement of the lens, although it had been proposed that lens thickness changes are also responsible for the acute myopia. Lens thickness changes contribute to only 9-16% of cases of shallowing of the angle, with choroidal effusions being responsible for most of the

decrease in anterior chamber depth.[8] While some reports have postulated that the small changes in lens thickness are due to lens osmotic changes, other reports indicate that the changes in lens thickness are due to reduction of zonular tension from the choroidal effusion[4] displacing the lens-iris diaphragm forward.[8] The symptoms can occur without predilection in any patient, even in the absence of anatomic predisposing factors for acute angle closure. Therefore, ocular examination prior to beginning topiramate therapy would not identify eyes at risk of developing symptoms.

Primary acute angle-closure glaucoma and topiramate-induced secondary angle-closure glaucoma have some signs and symptoms in common, such as conjunctival hyperemia, corneal edema, shallowing of the anterior chamber, elevated intraocular pressure and visual defects, and without proper management, blindness. Careful history and examination are essential in differentiating the two conditions given the marked difference in management for each. The onset of topiramate-induced angle closure is acute, with most cases occurring in the first 2 weeks of initiation of treatment as well as within 6 hours of doubling the dose.[9] The symptoms of acute myopia may present after only a few hours of ingestion and may take several weeks to fully resolve. A reported mean age of 34 has been found, and an association with various doses ranging from 50-100 mg has been found, with about 50% of cases occurring in doses of 50 mg or less. Up to 89% of cases have been reported to occur mostly in females.[10] Other associated symptoms that have been reported include blepharospasm, myokymia, oculogyric crisis, periocular edema, paresthesia, periocular pain, scleritis, nystagmus and, with large doses, diplopia.[9] Reports have also associated reversible macular striae at the level of the internal limiting membrane, which could also be caused by vitreomacular traction or choroidal effusion.[11] Recent reports have associated visual field defects without the presence of elevated intraocular pressure with the use of topiramate.[12]

Diagnostic tools such as gonioscopy and B-scan aid in visualizing the angle structures and choroidal effusion respectively, with ultrasound biomicroscopy being one of the most available tools for providing high-resolution imaging of the anatomy for confirmation of ciliochoroidal effusion as the etiology for secondary angle closure.[13, 14] Anterior segment optical coherence tomography is an effective non-invasive method for the evaluation and monitoring of angle closure, effusion and rotation of the ciliary body.[15,16]

Treatment consists of immediate discontinuation of topiramate therapy in concert with the prescribing physician because dosing changes of at least 50 mg could have systemic complications.[9] Administration of cycloplegic agents lowers the intraocular pressure by retraction of the ciliary body. Topical and oral intraocular pressure-lowering agents are indicated. Peripheral iridotomy is not indicated in drug-induced secondary angle closure because the mechanism of action is not that of pupillary block and it would be of no therapeutic value.[4] Pilocarpine is contraindicated as it may cause further displacement of the lens-iris diagram and possibly precipitate a relative pupillary block.[17] Topical steroids may prove to be beneficial to reduce choroidal effusion by stabilizing cell membranes.

Discussion

The patient's initial complaints of sudden bilateral blurred vision and headaches at the emergency department generated a list of differential diagnoses too numerous to name. A detailed history and further examination were needed. As part of the integrated setting of a hospital, an interdisciplinary team of specialty services can be brought to work together to facilitate the patient's care. The optometrist played an important role as the primary eyecare provider in the care of this patient. Consultation from the emergency room physician directly with the optometrist for discussion of the case ensured adequate assessment of the ocular health and was essential for the delivery of prompt management and treatment.

Detailed history and review of systems played a vital part in finding the etiology for the patient's symptoms. During the initial optometric examination, the patient reported progressive blurry vision along with foreign body sensation that was relieved by the use of artificial tears. The patient reported excellent vision without spectacles prior to this episode. He also reported frontal headaches and a headache-like feeling over his orbit and brow. Entrance vision testing revealed decreased uncorrected vision in both eyes that was correctable to 20/20 with a significant myopic shift in each eye. Which conditions could result in a bilateral shift in refractive error? The main differential diagnosis with this initial information would be refractive shift due to uncontrolled diabetes. Slit lamp examination was remarkable for edematous lids, conjunctival chemosis and injection, shallow anterior chamber depth, forward bowing of the iris and narrow Von Herrick angle evaluation. The differential diagnoses included CVA, migraine headache, angle-closure glaucoma and choroidal effusion syndrome. Which other problem-focused testing could be performed to narrow down the differential diagnosis? Given the appearance of the angle structures, measurement of intraocular pressure and gonioscopy were warranted. Tonometry revealed moderately elevated intraocular pressures in both eyes.

Four-mirror gonioscopy revealed a convex iris approach and no visible angle structures in either eye. This appeared to be an atypical case of angle closure. What are the different types of angle closure? Which key elements differentiate the different classifications?

Primary acute angle closure typically presents in an older population, with the highest incidence between 55-65 years old.[18] It is more common in Southeast Asians, Chinese and Eskimos. In Caucasians, it accounts for approximately 6% of all glaucomas and affects 1:1000 over age 40. Females are affected 3 to 4 times more than males. Risk factors include hyperopia and short axial length. Signs and symptoms include blurry vision, hazy cornea, mid-dilated pupil, shallow anterior chamber, elevated intraocular pressure, vomiting, nausea and narrow and occludable angles on gonioscopy. Our patient presented with a clear corneal appearance and normal pupillary reaction, and his refraction revealed a bilateral myopic shift rather than a hyperopic refractive error. Therefore primary angle closure is unlikely in this case. Secondary angle-closure glaucoma can have several etiologies, including being medication-induced. A complete review of secondary glaucoma is beyond the scope of this paper. In the case of bilateral acute angle closure and myopic shift, drug-induced etiologies should be considered in the differential diagnosis.

Review of the medical history and critical thinking analysis of the pertinent findings were crucial in identifying the key elements in this case to make a diagnosis. Access to electronic medical records played a major part by providing additional information to guide in the search of the causative agent. The patient's record did not indicate a diagnosis of diabetes; therefore, a diabetic refractive error shift was unlikely. Review of the patient's history and medications revealed a significant history and treatment for anxiety, alcohol and substance dependence by the psychiatry department. The patient was also enrolled in a substance abuse treatment program at our facility as an adjunct to medical therapy. The patient had undergone several changes in his medical treatment for the management of anxiety without much success. A recent change included the addition of topiramate for off-label treatment of anxiety and cravings of alcohol and illicit substances.

Alcohol and substance abuse disorders have a significant impact on the nation's health, economy and welfare. In 2013, approximately 7% of adults in the United States age 18 and older had an alcohol use disorder ,[19] a medical term for a severe drinking problem, and 9.4% of persons age 12 and older reported the use of illicit drugs.[20] The annual cost of health care for alcoholism and illicit drug use in the United States totals $25 billion and $11 billion respectively.[21] In 2013, 8.6% of persons age 12 or older needed treatment for alcohol or illicit drug use, and only 0.9% of those received treatment at a substance abuse treatment facility.Treatment for alcohol and substance abuse consists of medication therapy and behavioral therapy. There are limited pharmacologic agents for treating alcohol dependence, with only three approved by the U.S. Food and Drug Administration: naltrexone, acamprosate and disulfiram. Clinical trials of topiramate have shown improvement in alcohol dependence and withdrawal symptoms, increasing the popularity of its off-label use. There is limited data on the use of topiramate for the treatment of substance abuse.[22, 23]

Alcohol and substance abuse treatment programs are an integral part of patients' success in overcoming dependencies. The optometry department is often involved in the care of these patients to assess their visual needs as their treatment includes classes geared toward rehabilitation back into the community. Ocular symptoms from medications, such as blurriness and diplopia, as well as an increase in visual demands and need for glasses are the major concerns presented at the time of the encounter. The initial ocular assessment should include a comprehensive history and a review of systemic history including current medications. Patients should be educated on their ocular health status and on the possible visual symptoms and ocular sequelae they might encounter in the course of their medical treatment. Communication with the psychologist, psychiatrist and therapist is essential due to the increase of off-label use of topiramate and the potentially devastating ocular complications, which can hinder patients' progress and success in the rehabilitation program.

In our case, the patient reported doubling of the dose of topiramate, a sulfamate-derived medication that has been linked to myopic shifts and forward rotation of the iris-lens diaphragm, prior to the onset of ocular symptoms. Once the causative agent was identified, co-management of the patient's care with an interdisciplinary team led to the discontinuation of the medication and proper ocular management. This resulted in resolution of the patient's symptoms and prevention of irreversible blindness.

Counseling of patients and their prescribing providers on the potentially blinding side effects of topiramate has become of growing importance due to the widespread off-label use of this medication. Members of the interdisciplinary team that participated in this patient's care consisted of the emergency department physician whom the patient presented to for assessment of overall health during the acute episode, the psychiatry and pharmacy departments for the ongoing management of the alcohol and substance abuse disorder, and optometry in concert with ophthalmology for treatment and management of the ocular symptoms.

Discontinuation of topiramate should be managed in conjunction with members of the interdisciplinary team due to the detrimental side effects that can occur with sudden discontinuation of the medication. An additional service that could have a significant impact on a patient's progress would be the psychology department, which could offer counseling for coping with transient vision loss and exacerbation of anxiety symptoms throughout the acute episode. Optometry should continue to monitor the ocular signs and symptoms throughout a patient's care.

Conclusion

Ocular complications from topiramate therapy appear to be rare, but with the growing popularity of the medication and frequent off-label use, it is important to create awareness among patients and healthcare providers of the possible drug-induced ocular sequelae and the importance of seeking care for appropriate treatment and follow-up. Communication and teamwork within the interdisciplinary team are important to facilitate timely care for patients. The role of the optometrist as the first point of contact and primary eyecare provider for this patient's ocular symptoms was essential in the management and eventual resolution of this patient's acute episode of bilateral secondary angle-closure glaucoma.

Acknowledgement

Imaging by Steve Derr

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The Implementation and Assessment of an Interprofessional Education Initiative at Salus University

Radhika Aravamudhan, PhD, CCC-A, FAAA, Melissa Vitek, OD, FAAO, Linda Casser, OD, FAAO, FNAP | Optometric Education: Volume 40 Number 3 (Summer 2015)

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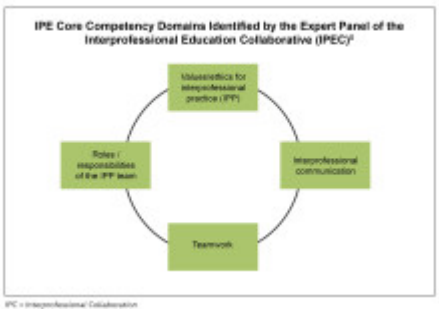
Background

FIGURE 1



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Precipitated by the evolving healthcare environment over the past decades, interprofessional education (IPE) and interprofessional practice (IPP) have gained increased prominence in professional education.[1,2] The Centre for the Advancement of Interprofessional Education defines IPE as occurring "when two or more professions learn with, from and about each other to improve collaboration and the quality of care."[3] As a result, student interaction has become a defining feature of both IPE and IPP.[4] A group comprised of leaders from the national organizations of six healthcare professions, the Interprofessional Education Collaborative Expert Panel, has identified four IPE core competency domains that all healthcare professions should include in their educational curricula.[5] **(Figure 1)** A World Health Organization study group on Interprofessional Education and Collaborative Practice defined learning objectives for IPE. The six competencies defined are: teamwork, roles/responsibilities, communication, learning/reflection, ethics/attitudes and the patient.[6] The quantity, quality, environmental factors and ultimate goals of student interaction in this context have been the subject of many publications. Specifically, surveys have been utilized to measure the impact of interprofessional interaction on student perceptions and attitudes. While there is broad agreement on the importance of enhancing teamwork, there remains little consensus on how to most appropriately measure it.[7] Parsell and Bligh developed a questionnaire and associated Readiness for Interprofessional Learning Scale, which includes subscales.[8] The teamwork and collaboration subscale measures students' beliefs about the benefits of shared learning, and the professional identity subscale focuses on assessing role relationships and professional identity.[6] McFayden and Maclaren developed the Interdisciplinary Education Perception Scale, which measures how students perceive their profession.[9] The University of West England developed an Interprofessional Questionnaire to evaluate teamwork and communication skills.[10] All three measurement tools were utilized in this IPE-CPS pilot study.

Salus University, named for a Latin word meaning health and well-being, is a diversified, globally recognized, professional academic center of learning that offers a wide range of accredited postgraduate degree programs in optometry, audiology, physician assistant studies, public health, education and rehabilitation of the blind and visually impaired, biomedicine, occupational therapy and speech-language pathology (anticipated launch in 2015). In September 2012, the Salus University Office of Academic Affairs established the Salus University Interprofessional Education Committee comprised of representatives from all on-campus colleges. The Salus University IPE Committee facilitated the development and launch of an IPE-CPS pilot, which was launched early in 2014. The pilot program involved students from the optometry, audiology and physician assistant programs. These students were chosen because the core didactic curricula of their respective programs include CPS courses. The format of these courses emphasizes small group case-based or problem-based learning. This learning setting provides an opportunity for students to synthesize and apply the theoretical and practical aspects of critical thinking in the process of clinical problem-solving — history-taking, diagnostic data collection, patient assessment and patient management — utilizing prepared clinical cases. An important additional goal of the CPS courses is to effectively serve as an

integrated educational bridge between the didactic and clinical courses within a health professions curriculum. Selecting this type of small group-based activity for this IPE initiative was important due to the interactive nature of the CPS environment.

Prior to this pilot study, Salus' first-year students in optometry, audiology and physician assistant studies had an opportunity to work in IPE teams in their fall semester core curriculum Evidence-Based Practice course, while the second-year students did not have a similar opportunity. Thus, this pilot project compares data from two student cohorts, first- and second-year students, who had different IPE experiences in their respective core curricula prior to the pilot.

The purpose of this IPE-CPS pilot was to investigate the following:

1) Does exposure to IPE increase student understanding of other healthcare professions?

2) Do the standardized questionnaires utilized in this study to assess IPE perceptions and attitudes deliver meaningful information?

3) Does early exposure to IPE increase student understanding of the significance of IPE environments?

Methods

Participant recruitment

Following Institutional Review Board approval, student participants from the optometry, audiology and physician assistant programs were recruited via e-mail announcements on a first-come basis. Students provided signed informed consent to participate in this five-week IPE-CPS pilot study. These specific professions were chosen to participate in the study because their educational programs at Salus University have CPS courses as a component of their core curricula.

This study was conducted utilizing two cohorts, one comprised of first-year students (n=9) and the other of the second-year students in the aforementioned professional programs (n=10). Because the first-year students had previous exposure to IPE teamwork in their fall term as a part of their Evidence-Based Practice course that was modified for this cohort to include team-based work, while the second-year students did not, students participated in the IPE-CPS sessions as two separate cohorts. This study was conducted in the spring term for both cohorts and these were student volunteers.

Study design and data analysis

The study used a mixed-methods approach involving pre- and post-questionnaires and qualitative comments to gain a deeper understanding from the students about their experience in the IPE-CPS pilot project. The study evaluated students' attitudes relative to interprofessional collaboration before and after exposure to the IPE-CPS experience. The pre-experience and post-experience mean scores were compared using a parametric analysis with t-test to evaluate whether there was a significant difference within and/or between cohorts ($p<0.001$).

IPE-CPS session format

A modified problem-based learning approach was utilized to facilitate the IPE-CPS sessions. A case of a patient diagnosed with type 2 diabetes mellitus was chosen for this study because of the relevance of this disease to all of the three participating professions. The IPE-CPS sessions were conducted for five weeks. Each cohort met for two hours per week in the evenings with three faculty facilitators. Faculty members from Salus University's audiology, optometry, physician assistant and public health programs served as the facilitators. The goal was to ensure that at least one faculty member from each program was involved to cover discipline-specific content areas of the patient case.

Weeks 1 and 2: Pre-assessments were performed utilizing three standardized IPE questionnaires. Following the pre-assessments, the patient case details were presented by the facilitator in a problem-based learning format such that the information about the case was presented as the students requested the information. Weeks 1 and 2 focused on discussions surrounding the diagnosis of the patient case.

Weeks 3 and 4: The discussions and facilitation were focused on the interprofessional management, treatment and rehabilitation of the patient case.

Week 5: The discussions and facilitation were focused on generalizing the recommendations for this patient case to a population, including how the results from this patient case relate to public health. Post- assessments were conducted utilizing three standardized IPE questionnaires.

Questionnaires

In order to assess the student impact of interprofessional education, the following questionnaires were utilized to evaluate student perceptions, values and attitudes toward IPE: 1) the Readiness for Interprofessional Learning Scale (RIPLS),[8] 2) the Interdisciplinary Education Perception Scale (IEPS),[9] and 3) the University of West England Interprofessional Questionnaire (UWE-IPQ).[10] These survey tools were used in this pilot project because the validity and reliability of all three questionnaires have been established.[8,9,10]

Results

Quantitative Findings

Pre-post comparisons of the UWE-IPQ mean scores

Table 1 represents the mean scores and p values for the UWE-IP questionnaire. The questionnaire is divided into four categories:

communication and teamwork; interprofessional learning; interprofessional interaction; and interprofessional relationships.

Within cohort comparisons: A paired t-test was applied for each category to both cohorts separately for pre- and post-scores to test for significance, and none of the differences was found to be statistically significant.

Between cohort comparisons: The mean difference between the pre- and post-scores of the two cohorts was compared using a t-test, and none of the categories showed any significant difference between the two cohorts.

TABLE 1
University of West England Interprofessional Questionnaire (UWE-IPQ)

	Second-Year Students		P value (pre-post second-year students within cohort)	First-Year Students		P value (pre-post first-year students within cohort)	P value (between cohorts difference score comparisons)
	PRE	POST		PRE	POST		
Communication and Teamwork	20.4	18.8	0.284	17.1	17.3	0.384	0.112
Interprofessional Learning	17.1	16.1	0.808	14.4	13	0.121	0.345
Interprofessional Interaction	22.1	21.4	0.293	17.8	17.6	0.718	0.652
Interprofessional Relationships	16.5	16.6	0.289	15.7	14.7	0.808	0.442

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Mean scores for each category utilizing the University of West England Interprofessional Questionnaire. Scores interpretation: None of the differences was statistically significant between pre and post based on the p values. Communication and Teamwork: 9-20 (Positive) 21-25 (Neutral) and 26-36 (Negative); Interprofessional Learning: 9-22 (Positive) 23-31 (Neutral) and 32-45 (Negative); Interprofessional Interaction: 9-22 (Positive) 23-31 (Neutral) and 32-45 (Negative); Interprofessional relationship: 8-20 (Positive) 21-27 (Neutral) and 28-40 (Negative).

Pre-post comparisons of the IEPS mean scores

Table 2 presents the mean scores and p values obtained on each of the categories represented in the IEPS questionnaire. This questionnaire is divided into three categories: competency and autonomy; perceived need for cooperation; and perception of actual cooperation. Both within and between cohort comparisons failed to show any significant differences ($p<0.001$).

TABLE 2
Interprofessional Education Perceptions Scale (IEPS)

	Second-Year Students		P value (pre-post second-year students within cohort)	First-Year Students		P value (pre-post first-year students within cohort)	P value (between cohorts difference score comparisons)
	PRE	POST		PRE	POST		
Competency & Autonomy	7.1	8.2	0.681	8.1	8.8	0.388	0.128
Perceived need for cooperation	3.0	3	0.289	2.8	2.7	0.483	0.336
Perception of actual cooperation	8.7	8.5	0.289	9.2	8.9	0.388	0.405

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Mean scores in each of the areas from the Interdisciplinary Education Perception Scale. Scores Interpretation: None of the differences was statistically significant based on the p values. Competency and Autonomy: 7-9 mean scores=strongly agree/agree (positive perception); Perceived Need for Cooperation: 2-4 mean scores=strongly agree/agree (positive perception); Perception of Actual Cooperation: 6-12 mean scores=strongly agree/agree (positive perception).

Pre-post comparisons of RIPLS mean scores

Table 3 represents the mean percentage response for each question on the RIPLS questionnaire. Each of the 100% mean scores represents a strong positive perception of the IPE learning environment.

Even though there was no significant difference between the pre- and post-survey data, the overall data as well as the qualitative student comments (below) confirmed a positive student perception and understanding of both the need and value of interprofessional education. The results indicate that the students entered the study with a positive attitude toward the significance of IPE and concluded the study with the same positive perception.

Qualitative student comments

• “I learned a lot more about other professions.”
• “I loved thinking with students from other professions.”
• “This experience motivated me to research areas that I did not know a lot about and may not have done it on my own if not for this project.”
• “I learned how important co-management is to patients.”
• “I learned that I do not need to know everything.”
• “An excellent learning experience that allowed personal growth in a challenging, engaging and exciting environment.”
• “I benefited greatly by gaining insight into the decision-making process of those from the other professions.”

Discussion

The data collected in our pilot study indicate strong positive attitudes, perception of, and need for interprofessional education among the students participating in this study. However, there are limitations to the data collected. There was no statistically significant difference between the pre- and post-survey data within each cohort. This could be due to several factors including the small sample size and the fact that participants were

TABLE 3
Readiness for Interprofessional Learning Scale (RIPLS)

	Second-year students				First-year students			
	PRE		POST		PRE		POST	
	SA/A	SD/D	SA/A	SD/D	SA/A	SD/D	SA/A	SD/D
1. Learning with other students / professionals will make me a more effective member of a health and social care team	100%		100%		100%		100%	
2. Patients would ultimately benefit if health and social care students / professionals worked together	100%		100%		100%		100%	
3. Shared learning with other health and social care students / professionals will increase my ability to understand clinical problems	100%		100%		100%		100%	
4. Communication skills should be learned with other health and social care students / professionals	100%		100%		100%		100%	
5. Teamwork skills are vital for all health and social care students / professionals to learn	100%		100%		100%		100%	
6. Shared learning will help me to understand my own professional limitations.	88.8%	11.1%	100%		100%		90%	10%
7. Learning between health and social care students before qualification and for professionals after qualification would improve working relationships after qualification / collaborative practice	100%		100%		100%		100%	
8. Shared learning will help me think positively about other health and social care professionals.	100%		100%		100%		100%	
9. For small-group learning to work, students / professionals need to respect and trust each other	100%		88.8%	11.1 %	100%		100%	
10. I don't want to waste time learning with other health and social care students / professionals		100%		100%		100%		100%
11. It is not necessary for undergraduate / postgraduate health and social care students / professionals to learn together		100%	11.1 %	88.8%		100%		100%
12. Clinical problem-solving can only be learned effectively with students / professionals from my own school / organization		100%		100%		100%		100%
13. Shared learning with other health and social care professionals will help me to communicate better with patients and other professionals	100%		88.8 %	11.1%	100%		100%	
14. I would welcome the opportunity to work on small-group projects with other health and social care students / professionals	100%		100%		100%		100%	
15. I would welcome the opportunity to share some generic lectures, tutorials or workshops with other health and social care students / professionals	100%		100%		100%		100%	
16. Shared learning and practice will help me clarify the nature of patients' or clients' problems	100%		89%	11%	100%		100%	
17. Shared learning before and after qualification will help me become a better team worker	100%		89%	11%	100%		100%	
18. I am not sure what my professional role will be / is		100%	11.1%	88.8%		100%		100%
19. I have to acquire much more knowledge and skill than other students / professionals in my own faculty / organization	33.3%	66.6 %	44.4 %	55.5%	22.2%	77.75%	22.20%	77.75%

SA/A = strongly agree/agree; SD/D = strongly disagree/disagree

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Mean percentages obtained from the Readiness for Interprofessional Learning Scale.

student volunteers. Student volunteers are inherently more likely to have a positive attitude toward interprofessional team work.[11] The outcome shown by the data could also be due to limitations in the surveys utilized in the data collection. It is possible that the questions included in the surveys do not include a level of specificity needed to adequately quantify small differences between students and/or small changes within students. The UEW-IPQ reversed the response ratings in between categories, which may have confused some of the participants. Using a similar rating scale throughout may have facilitated consistent ratings from the participants.

Early IPE exposure is thought to diminish the development of negative stereotypes and positively impact the development of positive professional attitudes.[11] Therefore, it was anticipated that the first-year students’ exposure to IPE teamwork in the Evidence-Based Practice course would have resulted in a difference in their data when compared to the second-year students as the latter did not have similar prior experience. Specifically, it was expected that the first-year students would have higher pre-survey scores than the second-year students with regard to positive attitudes, values and perceptions. In addition, it was theorized that the post-survey data may also be higher in positive attitudes, values and perceptions as this cohort of students would be more experienced in an IPE setting. Again, the lack of difference between these cohorts may also be due to the small sample size as well as the fact that the student participants were all self-selected volunteers.[4, 11]

The qualitative student comments indicate that the IPE-CPS experience differed from their respective core curriculum CPS experiences in important ways. Specifically, it appears that the foundation for respectful interprofessional communication and effective co-management of patients is a promising potential outcome of IPE initiatives such as this IPE-CPS. Although evidence suggests that effective teamwork should provide patients with better outcomes, most studies conducted thus far do not directly measure the link between these two variables.[7] The lessons learned from this pilot study regarding implementation and assessment will serve as a catalyst for future IPE and IPP initiatives at Salus University in which larger groups of students can participate and more meaningful data can be collected.

Conclusions

The health professions/provider community has recognized the critical importance of interprofessional education and practice, and has responded with a variety of initiatives, projects and events aimed at improving communication, addressing challenges and barriers, and improving the effectiveness of teams.[12] Salus University students are learning to become members of health/rehabilitation teams, and they are getting to know each other for their discipline-specific knowledge and skills.

The data collected in this IPE-CPS pilot project indicated that the baseline level of student commitment to and readiness for

IPE was high and remained high throughout the pilot project. Consistent with experiences on other campuses,[1] the efforts and activities of the Salus University IPE Committee to date, including this pilot project, have fostered a very positive attitude toward IPE experience among participants that is undiminished at the time of post-test. Following the positive feedback from the participating students, we have continued to conduct volunteer IPE-CPS sessions to obtain a larger sample size and evaluate effectiveness.

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Evaluation of Interprofessional Education and Collaboration in Optometry

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PDF of Article

Background

Interprofessional collaboration (IPC) encourages integration of healthcare services and has shown positive impact on professional practice, quality of care and health outcomes.[1,2,3] IPC between optometry and ophthalmology is well-established; however, collaboration between optometry and other health professions is not standard practice.[4,5] With both the aging population and the chronic disease population increasing, the risk of vision loss also increases. The most common causes of vision loss are diabetic retinopathy, macular degeneration, glaucoma and cataracts. These causes are often co-morbid with common chronic diseases such as diabetes, hypertension and cardiovascular disease.[6,7,8] An integrated model of primary care optometry in IPC teams with health professions such as family medicine, nursing, pharmacy and social work, may reduce health threats to older individuals and augment chronic disease management.[6, 9, 10]

D'Amour and colleagues have described interprofessional teams as groups of professionals that work collaboratively to enhance patient-centered care.[11] This organization of different health professionals aims to better meet population needs and provide improved service integration and coordination. In order to effectively develop collaborative skills, health professionals need to work outside the scope of their own professional identity and learn about the expertise and values of other health disciplines.[11,12] While many health professions have adopted the IPC model, Canadian optometry has not readily engaged in this type of practice.[13]

The literature suggests IPC is fostered by improved interprofessional education (IPE).[14] To date, IPE has been established as a mandatory component in health professional programs such as medicine, nursing, social work, pharmacy and dietitian/nutrition but is not so in the optometry curriculum.[14] It is thought that if learners are trainedto be competent as a member of an interprofessional team, more collaborative practice opportunities will arise, increasing the opportunities for learning and teaching.[14,15] The hope is that introducing IPE to optometry learners will yield the same results.

To explore the potential of IPC in Canadian optometry, the University of Waterloo School of Optometry and Vision Science along with the Centre for Family Medicine (CFFM) in Kitchener, Ontario, Canada, developed an IPE teaching methodology to educate healthcare providers and optometry learners on the potential role optometry can play within interprofessional health care. The purpose of this study was to evaluate interprofessional collaboration and education in optometry learners and explore the benefit to patient care when optometry is integrated into a family health team (FHT) focused on diabetes managed care.

Methods

Ninety fourth-year optometry learners were offered a voluntary one day in total placement with the CFFM FHT's Diabetes Clinic between January 2011 and June 2012. Only 50 placements were available and participation was determined on a first-come, first-served basis. The Diabetes Clinic included physicians, physician assistants, dietitians, pharmacists, nurses and learners from each represented health profession. Optometry's role was to educate patients with diabetes on the importance of annual eye examinations, to review the date of their last eye examination, and to provide input on patient management where appropriate. Prior to the on-site placement, all learners attended a two-hour IPC lecture that focused on optometry's role within an IPC diabetes team and highlighted multidisciplinary knowledge exchange between optometry, pharmacy, nutrition and family medicine. Immediately following the lecture, an opinion questionnaire was given to the students to complete.

The questionnaire was derived from established studies on IPC,[11,12,14,15] and questions were adjusted to be specific to final-year optometry learners. The focus of the questionnaire was on three areas: 1) the optometry learners' understanding of IPC (knowledge), 2) the perceived need for collaboration between optometry and other health professionals (attitude), and 3) the competency and ability of optometrists to practice in interprofessional teams (skills).[16,17] The questions were self-reflective, and the respondents were asked to rate how they agreed with each statement on a seven-level Likert response scale **(Appendix A)**. Likert responses with values of 1 (strongly disagree) to 3 were recorded as negative responses; responses with values of 5 to 7

(strongly agree) were recorded as positive responses; and responses of 4 were recorded as neutral.

Following the IPC Diabetes Clinic, a post-IPC online survey **(Appendix B)** was offered to the 50 optometry learners as well as the 15 health professionals and interprofessional learners to evaluate the intensity of collaboration between optometry and the interprofessional team in the Diabetes Clinic. The survey was adapted from D'Amour's[12] "A model and typology of collaboration between professional healthcare organizations."

Ethics approval for this study was received from the University of Waterloo Research Ethics Board. The participants were given a cover letter outlining the study, and informed consent was assumed if the participants chose to fill out the questionnaire.

Results

A total of 81 fourth-year optometry learners filled out the opinion questionnaire based on the knowledge, attitude and skill of an IPC approach to patient care. This was done prior to participating in the IPC Diabetes Clinic. Twelve optometry learners and seven members of the IPC (Diabetes) FHT completed the same post-IPC survey to assess the intensity of the collaboration between the two groups.

Prior to IPC exposure: knowledge

To evaluate optometry learners' knowledge of IPC we divided this section into IPC in health care **(Figure 1)** and self-assessment of how to utilize IPC in clinical practice **(Figure 2)**.

Figure 1 illustrates the optometry learners' primary understanding of IPC in health care. When asked, the majority of learners felt there was an existing patient need for health professionals to practice IPC (93%; Q1), and a better understanding of IPC was needed (98%; Q2). Learners also agreed collaborative practice was an important component in improving the quality of patient care (91%; Q19) and that IPC was the standard for patient care (90%; Q3).

FIGURE 1

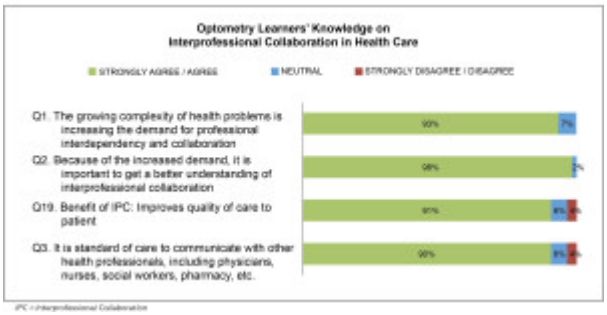

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Figure 2 depicts the learners' understanding of the utilization of IPC in clinical practice. The majority (>90%) of optometry learners believed the greatest benefit of IPC was enhanced patient care (93%; Q16) and the collaborative development of ideas and management plans by a team of healthcare professionals (94%; Q15). However, only half of the learners were clear about which patients (52%; Q26) and which patient care situations (46%; Q28) would benefit from an IPC team, and only slightly more than a third felt they understood the process of coordinating IPC in clinical practice (37%; Q31).

Prior to IPC exposure: attitude

Responses involving the learners' attitudes toward their readiness and toward optometry's role were variable **(Figure 3)**. Although the majority of learners felt their optometric education promoted an intercollaborative approach to patient care (65%; Q63), they also felt they needed additional training in IPC to feel more comfortable with it (79%; Q42). In addition, while learners expressed the patient benefit of an IPC team (Figure 1: 91%; Q19), most felt more comfortable working within optometry than collaborating with other health professionals (64%; Q45). However, they indicated that further expertise outside the optometry arena would increase their level of comfort (85%; Q52).

FIGURE 2

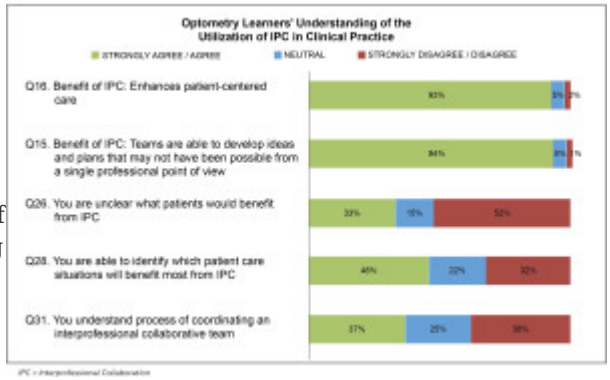

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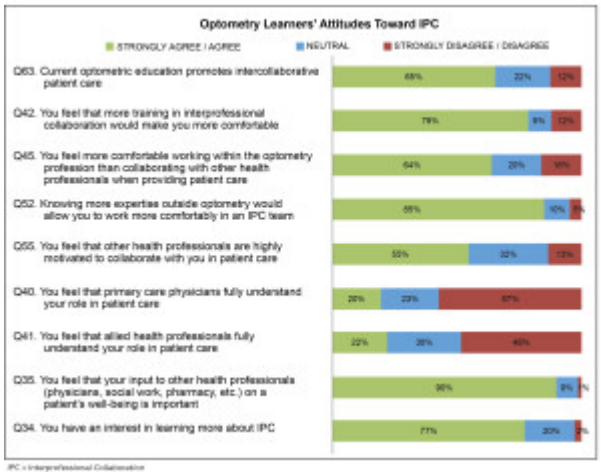
FIGURE 3



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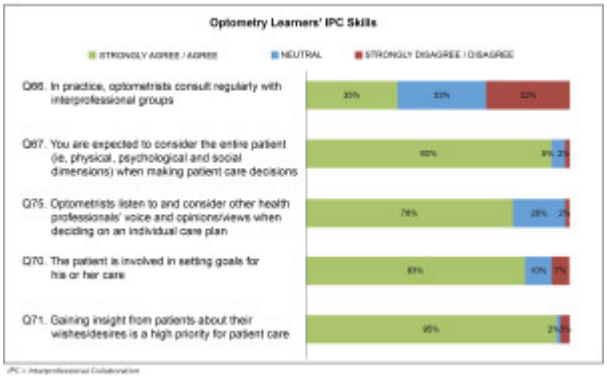
Slightly more than half of the learners felt other health professionals are highly motivated to work with optometrists (56%; Q55) but fewer than a quarter felt that other health professionals understand the role optometry has in patient care (20%; Q40 and 22%; 41). A large majority of the learners felt that an optometrist's input on a patient's well-being would be valuable to other health professionals (90%; Q35) and identified an interest in learning more about professional collaborations (77%; Q34).

Prior to IPC exposure: skills

Optometry learners were asked to evaluate how they currently practice IPC within their clinical education **(Figure 4)**. Only a third of the learners admitted to consulting regularly with other health practitioners (35%; Q66); however, most did feel an expectation to consider the entire patient history (physical, psychological, social) when making patient care decisions (93%; Q67). The majority of optometry learners felt optometrists listened to and considered the opinions/views of other health professionals (78%; Q75) and felt the patient was included in management decisions (83%; Q70)

FIGURE 4



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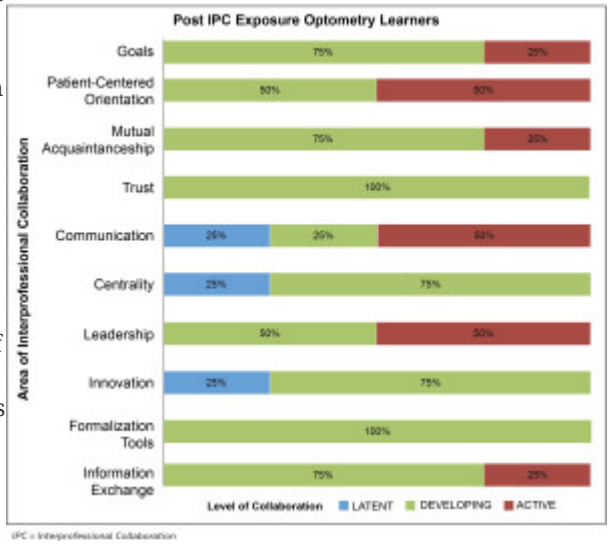
and that this was a high priority (95%; Q71) for patient care.

Post-IPC exposure

A comparison of post-IPC exposure results between optometry learners and the IPC diabetes FHT can be seen in **Figures 5 and 6** respectively. While the number of post-IPC responses was low, the FHT responses appeared to consider the intensity of collaboration with optometry more active than the optometry learners. Similarly, optometry learners did not always feel included within the IPC team (Figure 5; mutual acquaintanceship), while the FHT felt that all members contributed equally (Figure 6; mutual acquaintanceship). Survey results also revealed a positive shift in attitude from the optometry learners about communicating and engaging in interprofessional care with other members of the healthcare team. Overall, the majority of the optometry learners felt that the intensity of collaboration in the identified areas of IPC was developing, while the FHT members felt that the intensity of collaboration in those areas was already active between optometry and the team.

FIGURE 5



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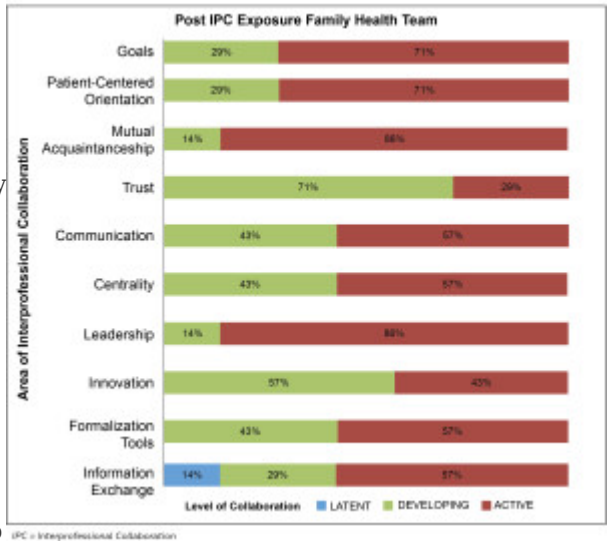
Discussion

Interprofessional collaboration is the process of individual health professionals working together to positively impact patient-centered care.[12,15] In recent years, the literature has reported on the benefits of IPC as it continues to become increasingly prominent in primary health care.[13] Interprofessional education in a clinical setting has also been shown to offer valuable learning opportunities and establish a greater understanding of IPC within each profession.[14,18] IPE is necessary to help prepare learners from various professions to develop the competencies needed to work together and understand the individual skill set each profession carries. To date, there has been no literature on IPE within Canadian optometry, which remains one of the only health professions in Canada that does not (formally) include a component of IPE in the curriculum.

The literature documenting the benefit of IPC between optometry and ophthalmology is well-established.[4,5] While this collaborative relationship is important for optimum eye care, optometry also has an important and expanding role in interprofessional collaboration with other primary care providers, such as family medicine, pharmacy, nursing, social work and nutrition, to improve interdisciplinary collaboration and patient-centered care in practice.[1,14,17] To successfully establish this model of health care, it has been suggested that IPC should be included in each profession's curriculum.[18]

Before developing a model for IPE within the optometry curriculum, we wanted to evaluate final-year optometry learners' knowledge, skills and attitudes toward optometry's current role in IPC. To do so, we assessed the learners' understanding of IPC via a questionnaire.[16, 17] Overall, our findings were very positive toward the benefit of optometry in IPC. Optometry learners indicated they were interested in gaining knowledge about IPC and felt IPC was an important component in providing optimal patient care. However, the survey also identified barriers to implementing IPC, which were similar to those

FIGURE 6



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reported by other health professions.[16,19] One of the identified barriers was the lack of understanding regarding the role that optometry would have in an IPC clinical setting. In addition, the survey found that learners had a level of discomfort in working and communicating with other healthcare practitioners. Results indicated a need to improve IPE in the optometry curriculum in order to foster a better understanding of optometry's role in IPC and improve the comfort level of working with other healthcare practitioners. IPE ideally occurs within collaborative practice settings where learnerscan be exposed to practical educational experiences. The creation of more IPC opportunities is therefore required between optometry and other health professionals.[14]

Prior to this study, optometry had not been part of the diabetes management team, and no role had been established for optometrists at the time of participation. There was no set expectation on the optometry learner about the level of involvement because the purpose was to investigate the role of the learner within an IPC team.

A post-IPC survey was distributed evaluating the intensity of the collaboration between optometry and the other health professionals. Although the participation in this part of the investigation was low, our findings showed that the optometry learners' felt there was either a developing or active level of collaboration in all areas surveyed. The evaluation of the experience showed that IPC with optometry could exist from the perspectives of the optometry learners and the FHT members. While the FHT members felt a high intensity of collaboration with optometry (Figure 6; information exchange), the optometry learners felt that the intensity was still developing (Figure 5; information exchange). This area of discrepancy should be further explored among the participants surveyed. Overall, the post-IPC survey results suggested a value for optometry being present in a FHT setting and that there is an ongoing need for optometry to part of a FHT to better develop and strengthen collaboration.

Where to Go from Here: Culture Shift

A primary care IPC team with optometry integration may be a valuable model for risk reduction of vision loss in high-risk individuals. We would like to further develop and evaluate this model. As part of this, we want to strengthen the IPE component in the optometry curriculum at the University of Waterloo. The literature supports that increased collaborative opportunities lead to increased understanding of optimal optometry integration.[6,9,10] Other health professions need exposure to the scope of practice of optometry, as this will create a demand for optometry to be embedded within healthcare settings, e.g., primary care. We have continued to incorporate optometry into other IPC primary care clinics at CFFM, such as the mobility clinic for persons with severe physical challenges, the C5-75 clinic for patients older than 75 with frailty, and the Healthy Futures clinic, a clinic to ensure 3-year-olds are healthy. By providing optometry learners clinical training in these clinics, we are helping them build practice skills for use in similar environments after graduation. The integration fosters trust and acknowledgment of skills among all professions, including optometry.[14]

The published literature supports collaborative efforts in health care and the positive impact they have on improving patient satisfaction, coordinated access to resources and reduction of costs associated with redundant medical examinations and clinical errors.[1,21] We believe that optometry working in a collaborative team effort will have the same positive effects by improving access to care for patients at high-risk for vision loss and reducing associated costs to the healthcare system by limiting unnecessary referrals to tertiary care providers (i.e., ophthalmology). By doing so, we hope to create a model where we can demonstrate that benefits exist from both the optometry and primary healthcare perspective. Further research is therefore needed to investigate how to improve the level of comfort between optometry learners and other health professionals.

Limitations

Although this was a demonstration project and the goal was to evaluate if the interprofessional collaboration of optometry in a family health team is beneficial in the optometry curriculum, there were a few limitations to the study. First, while this study was based on validated studies, a validated questionnaire was not used. Second, the small number of respondents to the post-IPC survey from among both the optometry learners and the FHT limited the conclusions that could be drawn. For future studies, a validated questionnaire should be used and repeated after participation in the collaborative clinic to determine whether there was an improvement in knowledge, skill and/or attitude.

Conclusion

There is a need for optometry to become embedded into interprofessional primary care, if the goal of optimal patient care is to be achieved. Optometry has seen recent gains in its scope of practice, allowing the profession to utilize all of its skills. The profession is best equipped in the primary healthcare system to manage primary vision care needs that go beyond prescribing glasses and involve the prevention and management of many eye conditions. IPC has been gaining recognition as a preferred model for primary healthcare delivery; however, Canadian optometry has not yet explored the potential role in this model. This qualitative investigation helps to recognize that there is a role for optometry in IPC acknowledged both by the optometry profession and the members of an IPC team. This study also demonstrates the need for optometry to include IPE in its curriculum to help cultivate the development of optometry-integrated IPC. We hope to further develop the preliminary models explored in this study to help better understand how interprofessional interventions in optometry affect patient care and outcomes.

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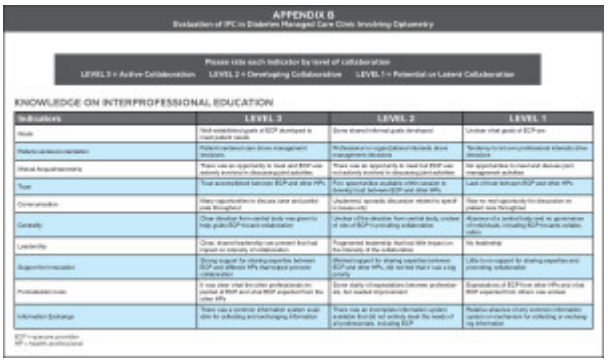

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Shaping Student Attitudes Toward Healthcare Teams Through a Hybrid and an Online Interprofessional Education Course: Results from a Pilot Study

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PDF of Article

Introduction

Interprofessional education (IPE) occurs when students from two or more professions learn about, from and with each other in a collaborative environment: "all together for better health."[1] The ultimate goal of IPE is to prepare healthcare professionals who can practice collaboratively as a member of a team to improve patient outcomes by providing integrated and holistic patient-centered care and by promoting a collaborative teamwork environment.[2,3]

Patient safety and issues of quality health care are driving forces in the transformation of health professions education and the need for redesigned systems of care.[3,4] In 2011, six professions came together to develop a set of core competencies considered essential for preparing healthcare professionals and to address policy and accreditation issues. Representatives from the six accrediting organizations — American Association of Colleges of Nursing, American Association of Colleges of Osteopathic Medicine, American Association of Colleges of Pharmacy, American Dental Education Association, Association of American Medical Colleges, and the Association of Schools of Public Health — served as the Interprofessional Education Collaborative Expert Panel.[5] Since the publication of the essential competencies document, a number of the professions have developed curriculum guidelines containing evidence of the principles and practice of interprofessional collaboration.

Although the 2011 report from the Association of Schools and Colleges of Optometry states that an attribute of students graduating from schools and colleges of optometry is "the commitment to work as an integral member of the larger interprofessional healthcare team to improve patient care outcomes,"[6] interprofessional initiatives in the field of optometry are in their infancy.

Interprofessional education and collaborative practice (IPECP) initiatives are expanding, and their positive outcomes both from the student and patient perspective are encouraging. For instance, using a three-year longitudinal study, Curran et al. reported positive attitude changes in professional students who participated in IPE.[7] Further, Reeves et al., in their systematic review of the effectiveness of IPE interventions, found improvements in diabetes care, collaborative team behavior and patient satisfaction as well as reduction in the number of clinical errors.[8] Still, IPECP initiatives may face some resistance within the community of healthcare providers that have not been trained in interprofessional programs. Resistant behaviors, which may reflect a lack of understanding, pre-existing rivalries and negative stereotypes, hinder the benefits of working collaboratively within a team of healthcare professionals, which implies the sharing of knowledge and skills among members of the team.[9,10] Consequently, training of the post-licensure professional becomes an essential aspect under the scope of IPECP plans.[11] One of the main challenges when designing IPE curricula is class scheduling.[12] Creating an IPE calendar that accommodates student schedules from several specific healthcare programs is difficult. This can be even more problematic if the involved professional programs are located on different campuses. Little is known about the effectiveness of online education in meeting the goal of preparing students to function effectively in interprofessional teams, but it seems that online education might offer an effective alternative to conventional face-to-face courses.[13-15] An online IPE course may enable students and faculty with busy schedules and from distant campuses to participate and sustain IPE initiatives. In this regard, the effectiveness of face-to-face, hybrid and online courses needs to be further evaluated.

The purpose of this study was to determine the effect of a hybrid IPE course vs. an online IPE course on student attitudes toward healthcare teams using the Attitudes Toward Health Care Teams Scale (ATHCTS)[16] as a pre- and post-test measurement.

Methods

This study was part of an IPECP grant funded by the Health Resources and Services Administration (HRSA) of the U.S.

Department of Health and Human Services in which faculty and students from the following five health professional schools of the University of the Incarnate Word participated: nursing, pharmacy, health administration (MHA), physical therapy and optometry.

Sample

Twenty students enrolled in the fall 2012 IPE activities using hybrid teaching strategies. Thirty-one students enrolled in the summer 2013 activities using online-only teaching strategies. All 20 students enrolled in the hybrid course completed the pre- and post-participation measurements. Of the 31 students who enrolled in the online-only course, 14 completed pre- and post-participation measurements. Seven students did not complete the online course, and 10 did not return the post-participation measurement for a participation rate of 45% among online students. Physical therapy students participated in the summer online course but not in the fall hybrid. Because the physical therapy program was new and only included first-year students, the IPE faculty from the school of physical therapy thought it would be more beneficial to select students who had already completed their first professional year, which is why they only participated in the (summer) online cohort. **(Table 1)**

Student and faculty recruitment

TABLE 1
Demographic Characteristics of IPE Students (N=34)

	Hybrid (n=20)	Online (n=14)	Total (N=34)
Age (*)	X=29 yrs SD=8 Range= 22-46	X=26 yrs SD=5 Range=22-38	X=28.18 yrs SD=7.130 Range=22-46
Sex			
Male	5 (25%)	--	5 (14.7%)
Female	15 (75%)	14 (100%)	29 (85.3%)
Race/Ethnicity			
African American	3 (15%)	2 (14%)	5 (14.7%)
Asian/Pacific Islander	6 (30%)	2 (14%)	8 (23.5%)
Caucasian	6 (30%)	4 (29%)	10 (29.4%)
Hispanic	4 (20%)	5 (36%)	9 (26.5)
Other	1 (5%)	1 (7%)	2 (5.9%)
Degree Program			
Healthcare Administration	5 (25%)	4 (29%)	9 (26%)
Nursing	5 (25%)	1 (7%)	6 (17.6)
Optometry	5 (25%)	2 (14%)	7 (20.6)
Pharmacy	5 (25%)	4 (29%)	9 (26.5%)
Physical Therapy	--	3 (21%)	3 (8.8%)

(*) X=average; SD=standard deviation

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IPE faculty members were selected by the Deans of each school. Faculty development in IPE and collaborative practice was supported through a combination of intramural and extramural funding. Completed coursework and clinical experience were two main factors taken into consideration for student recruitment. A proposal with the process of student recruitment along with the IPE course content was sent for approval to The Health Professions Deans Council at our university. The IPE activities were not part of the official Doctor of Optometry and Master of Healthcare Administration curricula; however, since the IPE course was part of the nursing, pharmacy and physical therapy curricula, this proposal was also approved by the curriculum committees at these schools. Once the IPE course was approved, a series of recruitment visits was organized by IPE faculty to address the target classes at each school (i.e., students already in clinic or in the semester just before entering the clinic) and to inform the students about IPE and the IPE course. At each school, one faculty of the IPE team was assigned as the liaison for student recruitment purposes. Volunteer students were recruited for participation in the study as follows: Optometry students from the third- and fourth-year classes; pharmacy students from the third-year class; undergraduate nursing students from their fourth semester of a five-semester nursing program; physical therapy students from the second-year class; and healthcare administration students from both first- and second-year classes. The IPE activities were completely voluntary and no incentives were provided to either the students who consented to participate in this study or those students who were ultimately enrolled in the IPE.

Educational environment and intervention

The didactic component of the interprofessional course focused on the four core competencies of IPE: values and ethics, roles and responsibilities, communication, and teams and team work.[2, 5] A general statement of each IPE core competency and the learning outcomes of the IPE course were developed. (**Appendix A**) Both the hybrid and online courses were completed within a mini-semester (eight-week period) and both combined teacher-centered (e.g., mini-lectures) and student-centered (e.g., case-based exercises, group discussions and assignments) approaches. Also, to minimize schedule conflicts affecting students or faculty, face-to-face meetings and synchronous online sessions were held during weekday evenings or on Saturday mornings. The specifics of the hybrid and online courses are described below.

Hybrid course design

The fall 2012 IPE didactic course was offered in a hybrid format with four face-to-face sessions and two online sessions. **(Appendix D)** The last face-to-face session consisted of a simulation with professional actors as patients. The two online modules contained open access course materials developed by the Institute for Healthcare Improvement (IHI).[17] A team of IPE

faculty members also developed two complex clinical scenarios representative of the type of patients encountered at the university IPECP clinic: “Mrs. Jones’” and “Mrs. Johnson.” These clinical cases were used as vehicles to foster team discussions around the four core competencies of IPE. **(Appendices B and C)** Briefly, at the beginning of the first IPE face-to-face session, an activity was used to break the ice and to help the 20 students form five interprofessional teams. Each of the IPE teams formed had to have one student from each healthcare profession (health administration, nursing, pharmacy and optometry). An IPE faculty member was assigned to each student IPE team to act as facilitator during the face-to-face activities.

Online course design

Using the hybrid IPE course as an initial template and with the assistance of the university instructional designer, the faculty team developed a completely online IPE course that was offered during the summer semester of 2013. **(Appendix E)** The online IPE course was accessible through the Blackboard learning management system and contained the following sections: (1) course information interface with a welcome message, an overview of the course learning objectives, the course outline with the schedule, and an electronic version of the consent form to participate in this study; (2) the five course modules; and (3) group discussion boards. Limited computer skills were not identified to be an issue for the participating students. All students were very familiar with Blackboard and all students received e-mail reminders with deadlines and step-by-step instructions for completing the assignments in each module.

Similar to the hybrid course, IPE student teams were formed at the beginning of the course but, this time, the 31 students (five healthcare administration, five physical therapy, six optometry, five pharmacy and 10 nursing) were randomly distributed into six IPE teams consisting of at least one student from each healthcare profession. However, seven students (six from nursing and one from optometry) did not complete the online course and 10 did not return the ATHCTS surveys or consent forms; therefore, the total number of students participating in the online IPE portion of the study was reduced to 14 by the end of the course **(Table 1).** As in the hybrid course, an IPE faculty member was assigned to each student team as facilitator for the team discussion boards and for the two synchronous Blackboard Collaborate sessions. The face-to-face simulation from the hybrid course was replaced by a faculty-facilitated synchronous group discussion based on an IPE home visit simulation video.

Data collection

This study was approved by the University of the Incarnate Word Institutional Review Board for Protection of Human Subjects prior to data collection. Two instruments were used to collect data. A researcher-designed demographic inventory collected information on age, race/ethnicity and program participation. Perceptions regarding attitudes toward interprofessional teams were obtained through the use of the ATHCTS. The ATHCTS is a validated psychometric tool that measures healthcare team members’ perceptions regarding the quality and the efficiency of care delivered by a team of healthcare professionals.[18] The ATHCTS tool used in this study is a six-point Likert-type scale that consists of 21 items divided into three subscales: “team value” (11 items, maximum possible score 66 points), “team efficiency” and “shared leadership” (five items each, maximum possible score 30 points each).[16] Team value and team efficiency subscales can be combined into a single “quality/cost of care” subscale. A higher score corresponds to a more positive attitude toward healthcare teams. Using SurveyMonkey we created an electronic version of the ATHCTS[18] to measure student attitudes before and after completion of the hybrid and online IPE courses.

ATHCTS alpha reliability test

A Cronbach’s alpha reliability analysis was performed with our data using the SPSS statistical software (IBM). The alpha reliability test evaluates the stability (i.e., internal consistency) of the measure and indicates how robust the measure is. The larger the alpha value, the more reliable the internal consistency of the instrument. An alpha value larger than 0.6 ($\alpha > 0.6$) was used as the cutoff to determine acceptable reliability.[19] Internal consistency reliability for the total score of the ATHCTS ranged from 0.71 to 0.87 for pre- and post-measurement for each cohort. Subscale analyses of pre- and post-measurements by cohort revealed that internal consistency reliability ranged from 0.50 to 0.82 for the team efficiency subscale, from 0.82 to 0.94 for the team value subscale, and from 0.31 to 0.56 for the shared leadership subscale.

Statistical analyses

Descriptive statistics were used to describe demographic characteristics of the sample. Changes in student attitudes were evaluated post-intervention using paired t-tests. Differences in student attitudes between the hybrid and the online course and across the different professions were measured using one-way ANOVA tests. All statistical analyses were performed with the SPSS software. Results were considered statistically significant when the p-value was less than or equal to 0.05 ($p \leq 0.05$).

Results

Demographic data and baseline attitudes in hybrid and online cohorts

Table 1 describes the demographic characteristics of the sample. There were no significant differences in age and ethnicity between cohorts. Participants in the hybrid course were ethnically diverse, averaged 29 years in age, and had a 3:1 female to male ratio. Average age for the online course participants was 26 years and, like the hybrid cohort, the group was ethnically diverse. All fourteen of the participants who completed the requirements of the online course were female.

A one-way ANOVA was conducted to determine whether attitudes of students at baseline were comparable for the online and hybrid cohorts. There were no statistically significant pre-didactic differences between groups in any of the three subscales {F(1,32)}: team value (F=0.845, p=0.365), team efficiency (F =0.451, p=0.507) and shared leadership (F=0.240, p=0.627). The baseline test showed that, in general, all students had a positive attitude toward team value (mean 59.15±5.547 in the hybrid cohort and 60.79±4.388 in the online cohort; maximum possible score is 66). However, team efficiency and shared leadership showed relatively low pre-didactic scores in the two cohorts (hybrid cohort means were 22.30±4 and 14.45±4.097, and means for the online cohort were 23.21±3.766 and 15.07±2.841 respectively; maximum possible score in both subscales is 30). There were no significant differences between professions in baseline ATHCTS total scores (F(4,29)=1.899, p=0.137) or post-test scores (F(4,29)=0.373, p=0.826).

Effect of hybrid vs. online IPE course on student attitudes toward healthcare teams

Table 2 presents pre- and post-didactic means for the ATHCTS scores. Students in the online course had significantly higher scores on the team efficiency subscale compared with students in the hybrid course (F(1,32)=6.135, p=0.019). No other significant differences between groups were found.

Within-group differences for hybrid and online IPE course on student attitudes toward healthcare teams

Students participating in the hybrid course had significantly higher shared leadership post-didactic subscale scores (t(19)=-3.209, p=0.05), while students participating in the online course had significantly higher scores on the team efficiency subscale at the end of the program (t(13)=-2.801, p=0.015).

TABLE 2
Pre-Post Mean ATHCTS Student Subscale Scores for Hybrid and Online Strategies

	Hybrid (n=20)	Online (n=14)	Total (N=34)
Baseline	*x (SD)*	*x (SD)*	*x (SD)*
Team Value†	59.15 (5.6)	60.79 (4.4)	59.82 (5.1)
Team Efficiency†	22.3 (4)	23.2 (3.8)	22.7 (3.9)
Shared Leadership†	14.45 (4.1)	15.1 (2.8)	14.71 (3.6)
Quality/Cost of Care†	81.45 (7.2)	84 (7.4)	82.5 (7.3)
Total ATHCTS Score	95.9 (7.9)	99.07 (8)	97.21 (8)
Post-Didactic			
Team Value	58.8 (6.8)	60.71 (7.6)	59.6 (7.1)
Team Efficiency[a]	22 (5.3)	**25.93 (3.2)[a]**	23.6 (4.9)
Shared Leadership	**16.6 (4.3)[b]**	15.57 (3.4)	16.2 (3.9)
Quality/Cost of Care	80.8 (10.9)	86.6 (10.1)	83.2 (10.8)
Total ATHCTS Score	97.4 (12.1)	102.21 (10.5)	99.4 (11.5)

ATHCTS = Attitudes Toward Health Care Teams Scale
X = average; SD = standard deviation

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No statistically significant pre-didactic differences were found between the hybrid and online groups in any of the three subscales (ANOVA test results; F(1,32), p>0.05 for all three subscales). Post-intervention, students in the online-only course scored statistically higher on the team efficiency subscale compared with students in the hybrid course ("a" in the table). After course completion, students in the hybrid course scored significantly higher in "shared leadership" ("b" in the table); whereas, online-only students scored significantly higher on the "team efficiency" subscale ("c" in the table).
†Subscale maximum scores. Team Value: 66 points; Team Efficiency and Shared Leadership: 30 points each. Quality/Cost of Care = Team Value + Team Efficiency.
a F=6.135; df=1,32; p=0.019; one-way ANOVA test
b t(19 =-3.209, p=0.05; paired t-test
c t(13)=-2.801, p=0.015; paired t-test

Discussion

In this study we used the ATHCTS as both the pre- and post-intervention survey to assess the attitude changes of health administration, nursing, pharmacy, physical therapy and optometry students toward healthcare teams depending on whether the students participated in a hybrid or an online IPE course. All students in the hybrid cohort completed the IPE, consented to participate in this study, and completed the ATHCTS survey. However, more than half of the 31 students in the online cohort either failed to complete the IPE or failed to return the ATHCTS survey or consent form. Seven of the 31 online students did not complete the IPE course. Ten of the online students completed all course assignments but did not return the ATHCTS surveys or consent forms. Six of the online students were registered nurses who had come back to school to obtain their Bachelor's in Nursing degree. They were thus non-traditional students with possible work-related time constraints that might have prevented

them from completing the IPE assignments. The reason why one optometry student dropped out is unknown. Adequate Cronbach's alpha reliability values ($\alpha > 0.7$) were obtained for the total ATHCTS score, team value and team efficiency subscales. The reliability for shared leadership was below 0.60. This low reliability may be due to the combination of different factors, such as a small sample size, a small number of items in the subscale and wide distribution of the student responses. Nevertheless, low reliabilities can be acceptable in pilot measures.[19]

Students participating in the two courses had a positive attitude toward healthcare teams at baseline, and though there was a modest increase in the total ATHCTS score at the end of the course, it was not statistically significant. **(Table 2)** Although there were some differences in the effects of the IPE course among professions, they were not statistically significant either (data not shown). Failure to reach statistical significance could be due to our relatively small sample size.

The statistically significant higher post-IPE score in the team efficiency subscale for those students in the online cohort was intriguing. Also intriguing was the statistically significant higher score in this subscale when comparing the attitudes of the online participants with those in the hybrid course, again post-IPE. These findings may be due to the fact that online students had more flexibility with respect to time in order to complete their course assignments. They may also have had more time to reflect on the comments other team members shared through the online discussion boards. These hypotheses require further investigation.

As anticipated, our main challenge was coordinating the face-to-face meetings in the hybrid course. In contrast, scheduling of the synchronous Blackboard Collaborate sessions did not seem to be an issue in the case of the online course.

According to the Center for the Advancement of Interprofessional Education and the Institute of Medicine recommendations, all students in every healthcare professional program should be trained to practice as part of an interprofessional collaborative team.[2,3] Online education can potentially overcome scheduling conflicts, a major barrier to interprofessional education in academic settings. Evidence from qualitative and quantitative studies demonstrates that online, face-to-face and hybrid IPE courses can improve attitudes toward healthcare teams in students and practitioners.[11-15,20] To our knowledge, this is the first study that compares the effects of a hybrid and an online IPE course on attitudes toward healthcare teams that involves optometry students.

From this experience, we hypothesize that an online interprofessional education course might have similar effects on student attitudes toward collaborative teamwork when compared to a hybrid course offering similar content. The relatively low shared leadership attitudes at baseline might suggest an association with a culture of "siloism" where healthcare providers work in isolation[21] and could be triggered by trust issues within the team. The statistically significant increase in shared leadership post-didactic scores among the students in the hybrid course suggests the need for further study of how IPE experiences may assist students to identify their roles and responsibilities within their team and to develop a culture of trust. A small sample size with a relatively low survey return rate in the online cohort, the limited reliability of the shared leadership subscale, gender bias and the fact that physical therapy students were not part of the hybrid cohort were some of the limitations of this study. Also, this study described volunteer students who likely were already interested in learning about interprofessional collaboration. As such, the results may not be generalizable to all healthcare professional students or to post-licensure professionals who might not have been trained in an IPE curriculum.

Conclusions

Though the hybrid and online groups had statistically similar pre-IPE attitudes toward interprofessional health teams, shared leadership and team efficiency subscale attitude scores were significantly improved in the hybrid and online cohorts respectively upon completion of the IPE. Further, the online group's perceptions toward team efficiency were statistically more favorable than those of the hybrid group after the IPE experience. The findings of our pilot study provide preliminary evidence that online education may become a valid approach in the didactic component of IPE as it can ease scheduling conflicts, a significant challenge in interprofessional education.

For the next phase of this study, we plan to conduct a longitudinal study that includes more subjects and professional students who have not been previously exposed to IPE (i.e., acting as negative controls). Additionally, we plan to collect information about conflict management style from each student pre- and post-IPE intervention to evaluate whether IPE may change the way they approach conflict. An increase in assertive and/or collaborative styles along with a decrease in avoiding styles would suggest positive outcomes regarding teamwork and communication, which are two of the core competencies of IPE. We hope

such data would allow a more accurate determination of the effects an online IPE course has on student attitudes toward healthcare teams in comparison to a hybrid course format.

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APPENDIX A
IPE Core Competencies[1] and IPE Course Outcomes

Core Competency	General Statement
Values and Ethics (VE)	*Work with individuals of other professions to maintain a climate of mutual respect and shared value*
Roles and Responsibilities (RR)	*Use the knowledge of one's own role and those of other professions to appropriately assess and address the healthcare needs of the patients and populations served*
Communication (CC)	*Communicate with patients, families, communities and other health professionals in a responsive and responsible manner that supports a team approach to the maintenance of health and the treatment of disease*
Teams and Teamwork (TT)	*Apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan and deliver patient-/population-centered care that is safe, timely, efficient, effective and equitable*
	IPE Course Outcome
TT, CC	*Effectively collaborate with other healthcare professionals in clinical settings*
RR, TT, VE	*Demonstrate receptiveness for the ambiguity and unpredictability of the world and its effect on healthcare systems*
RR, TT, VE	*Understand, respect and support the roles of other professionals involved in assessing and addressing the healthcare needs of patients and populations served*
RR, TT, CC, VE	*Demonstrate knowledge, skills and abilities that are common to all healthcare professions and that underpin the delivery of quality patient and population services*

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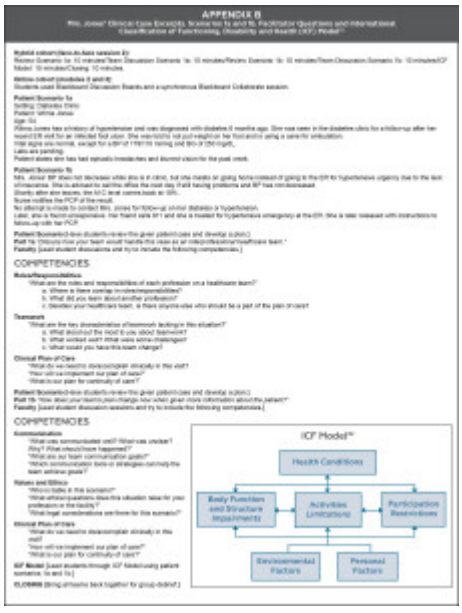

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APPENDIX C
Mrs. Johnson's Case and Facilitator Questions

Hybrid cohort (face-to-face session 2):
Review Scenario 2a: 10 minutes/Team Discussion Scenario 2a: 10 minutes/Review Scenario 2b: 10 minutes/Team Discussion Scenario 2b: 10 minutes/ICF Model[1]: 15 minutes/Closing: 10 minutes

Online cohort (module 4): Students used Blackboard Discussion Boards.

Patient Scenario 2a:
Mrs. Johnson, a 75-year-old Caucasian female with macular degeneration is presenting for an eye exam because she failed her vision test when renewing her driver's license. Upon examination you find that she DOES meet the vision requirements for a restricted driver's license but you are concerned with her inability to follow simple commands. You then perform a mini mental status questionnaire to evaluate her mental state and find she has a severe cognitive impairment.

Patient Scenario 2b:
State law does not require the clinician to report patients who may be a danger to themselves or those around them. Mrs. Johnson is widowed and lives alone. Driving is her only way to get to and from church, the grocery store and her hair salon.
Mrs. Johnson's daughter is outside and did not observe the test. Mrs. Johnson already feels her daughter is trying to keep her from driving and has asked that you not share this information with her daughter.
You inform Mrs. Johnson that based on today's findings you will sign off on her papers but are also recommending she follows up with her primary care doctor regarding her cognitive state. She nods her head as if she understands.

Patient Scenario [Have students review the given patient case and develop a plan.]
Faculty [Lead student discussions and try to include the following competencies.]

COMPETENCIES

Values and Ethics
- "Who is liable in this scenario?"
- "What ethical questions does this situation raise for your profession or the facility?"
- "What legal considerations are there for this scenario?"
- "What would be the appropriate actions in this situation?
- "How would an IPE approach improve this patient's outcome?"

Clinical Plan of Care
- "What do we need to do/accomplish clinically in this visit?
- "How will we implement our plan of care?"
- "What is our plan for continuity of care?"

ICF Model [Lead students through ICF Model using patient scenarios 2a and 2b.]

CLOSING [Bring all teams back together for group debriefing.]

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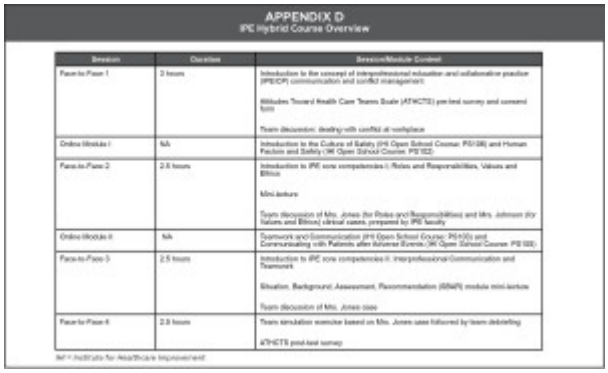
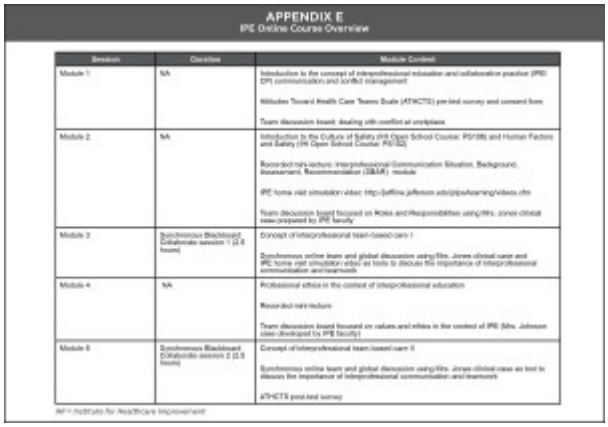


APPENDIX D
IPE Hybrid Course Overview

Session	Duration	Session/Module Content
Face-to-Face 1	2 hours	Introduction to the concept of interprofessional education and collaborative practice (IPE/CP) communication and conflict management Attitudes Toward Health Care Teams Scale (ATHCTS) pre-test survey and consent form Team discussion: dealing with conflict at workplace
Online Module I	NA	Introduction to the Culture of Safety (IHI Open School Course: PS108) and Human Factors and Safety (IHI Open School Course: PS102)
Face-to-Face 2	2.5 hours	Introduction to IPE core competencies I: Roles and Responsibilities, Values and Ethics Mini-lecture Team discussion of Mrs. Jones (for Roles and Responsibilities) and Mrs. Johnson (for Values and Ethics) clinical cases, prepared by IPE faculty
Online Module II	NA	Teamwork and Communication (IHI Open School Course: PS103) and Communicating with Patients after Adverse Events (IHI Open School Course: PS105)
Face-to-Face 3	2.5 hours	Introduction to IPE core competencies II: Interprofessional Communication and Teamwork Situation, Background, Assessment, Recommendation (SBAR) module mini-lecture Team discussion of Mrs. Jones case
Face-to-Face 4	2.5 hours	Team simulation exercise based on Mrs. Jones case followed by team debriefing ATHCTS post-test survey

IHI = Institute for Healthcare Improvement

Click image to enlarge



APPENDIX E
IPE Online Course Overview

Session	Duration	Module Content
Module 1	NA	Introduction to the concept of interprofessional education and collaborative practice (IPE/CP) communication and conflict management Attitudes Toward Health Care Teams Scale (ATHCTS) pre-test survey and consent form Team discussion board: dealing with conflict at workplace
Module 2	NA	Introduction to the Culture of Safety (IHI Open School Course: PS108) and Human Factors and Safety (IHI Open School Course: PS102) Recorded mini-lecture: Interprofessional Communication Situation, Background, Assessment, Recommendation (SBAR) module IPE home visit simulation video: http://jeffline.jefferson.edu/ipe/elearning/Videos.cfm Team discussion board focused on Roles and Responsibilities using Mrs. Jones clinical case prepared by IPE faculty
Module 3	Synchronous Blackboard Collaborate session 1 (2.5 hours)	Concept of interprofessional team-based care I Synchronous online team and global discussion using Mrs. Jones clinical case and IPE home visit simulation video as tools to discuss the importance of interprofessional communication and teamwork
Module 4	NA	Professional ethics in the context of interprofessional education Recorded mini-lecture Team discussion board focused on values and ethics in the context of IPE (Mrs. Johnson case—developed by IPE faculty)
Module 5	Synchronous Blackboard Collaborate session 2 (2.5 hours)	Concept of interprofessional team-based care II Synchronous online team and global discussion using Mrs. Jones clinical case as tool to discuss the importance of interprofessional communication and teamwork ATHCTS post-test survey

IHI = Institute for Healthcare Improvement

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Optometry Students' Knowledge-Based Performance within Interprofessional Education Courses

Jasmine W. Yumori, OD, FAAO, David N. Dickter, PhD, Kierstyn Napier-Dovorany, OD, FAAO, Valerie Q. Wren, OD, FAAO, John H. Tegzes, MA, VMD, Dipl. ABVT, Sorrel Stielstra, PhD | Optometric Education: Volume 40 Number 3 (Summer 2015)

PDF of Article

Background

Introduction

The World Health Organization has emphasized the importance of preparing the healthcare workforce for teamwork and collaboration between healthcare providers and between providers and patients.[1] According to the Institute of Medicine (IOM), there are as many as 98,000 deaths annually due to medical errors in hospitals,[2] including preventable errors caused by failure of communication.[3] The IOM has emphasized the importance of interdisciplinary training for improving healthcare delivery.[4] In the United States, a number of factors have set the stage for the IOM's calls for interprofessional, community-based programs and health professions curricula.[5] These include an aging population and a growing number of patients with chronic diseases and conditions[1]as well as a shift in focus to community-based health and medical homes for disease prevention and health promotion associated with the Affordable Care Act of 2010.[5] Interprofessional teams can reduce medical errors, enhance quality of care and patient satisfaction, lower cost, and decrease the length of stay in patient care facilities.[6, 7] In order to fulfill these expectations, interprofessional experiences are needed to provide students with the skills and opportunities to communicate, negotiate, employ shared leadership and decision-making, and engage in conflict resolution when needed.[7]

Interprofessional education and optometry

Interprofessional education (IPE) takes place when "two or more professions learn with, from, and about each other to improve collaboration and the quality of care."[8] Optometry is essential to the healthcare team for its unique scope of practice, relationship with patients and ability to diagnose and treat ocular and visual disorders as well as detect systemic diseases that affect the eye.[9] Opportunities for collaborative education and practice within optometry have grown, with 19 of 21 members of the Association of Schools and Colleges of Optometry (ASCO) reporting participation in IPE activities and nine reporting IPE as a program requirement.[10] All optometry programs may take advantage of fourth-year clinical rotations at multidisciplinary settings such as Veterans Affairs medical facilities offering interactions with medicine, nursing, pharmacy, dentistry and other professions.[11]

Interprofessional education figures prominently in the ASCO report on the expectations for optometry curricula.[12] As quoted from ASCO's "Attributes of Graduates of the Schools and Colleges of Optometry (2011)," graduates are expected to:

● have the ability to appropriately use all resources, including ancillary personnel, intraprofessional and interprofessional collaboration, co-management and referral, in ensuring the best quality patient care

● manage their practices in a manner that is appropriate within the healthcare delivery system and that promotes patient access to eye and vision care

● have the ability to recognize personal limitations regarding optimal patient care and to work with the broader healthcare community in providing the best care possible

● have a commitment to work as an integral member of the larger interprofessional healthcare team to improve patient care outcomes

● have the ability to recognize and initiate the coordination of patient care requiring advanced medical, systemic, interprofessional or specialty care

● have the ability to work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services.

TABLE 1
Core Competencies for Interprofessional Collaborative Practice from the Interprofessional Education Collaborative Expert Panel[13]

Interprofessional Communication: Communicate with patients, families, communities and other health professionals in a responsive and responsible manner that supports a team approach to the maintenance of health and the treatment of disease
Roles/Responsibilities: Use the knowledge of one's own role and those of other professions to appropriately assess and address the healthcare needs of the patients and populations served
Teams and Teamwork: Apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan and deliver patient-/population-centered care that is safe, timely, efficient, effective and equitable
Values/Ethics for Interprofessional Practice: Work with individuals of other professions to maintain a climate of mutual respect and shared values

Click image to enlarge

TABLE 2
Western University of Health Sciences IPE Program Competencies

Scope of Practice: Utilize knowledge of the roles and unique contributions of various health professions when choosing whom/how to involve other professions in a case
Communication: Demonstrate effective communication and interpersonal skills for collaborative, team-based patient-centered care
Collaboration: Form working relationships/partnerships with patients and with other health professionals to develop an interdependent, shared vision and plan of care
Teams and Teamwork in Health Care: Utilize specific team-based actions and skills to deliver care with other health professionals and the patient
One Health: Form interprofessional teams to address the interconnections between animal/zoonotic health and individual/population human health

Click image to enlarge

The above expectations are in alignment with the Core Competencies outlined by the Interprofessional Education Collaborative (IPEC), a coalition of health professions education organizations and associations, of which ASCO was the first supporting organization."[11] The Core Competencies for Interprofessional Collaborative Practice[13] from the Collaborative are seen in **Table 1**. These competencies apply to the practice of all health professions and shed light on the requirements for IPE that can help guide optometric education.

Interprofessional education at Western University of Health Sciences

Western University of Health Sciences is a fully accredited non-profit private graduate school focused on the health professions that offers 22 academic programs in nine health sciences colleges: optometry, dental medicine, nursing, osteopathic medicine, pharmacy, physician assistant studies, physical therapy, podiatric medicine and veterinary medicine.[14]

The mission of the IPE program at Western University of Health Sciences is to "produce humanistic healthcare professionals who provide and promote collaborative patient-centered care and coordinated healthcare management."[15] Graduates are expected to demonstrate an understanding of the roles and responsibilities of other health professionals.[16] They must also demonstrate a realization that each healthcare profession possesses unique skills and perspectives that can improve the quality and safety of health care. These expectations are highlighted in the IPE program competencies, which are outlined in **Table 2**. These overlap with and augment the IPEC competencies listed in **Table 1**.

All students across the nine health sciences colleges are required to participate in the IPE program; 947 students participated in the Phase I IPE courses during the 2013-2014 academic year. The IPE curriculum also includes Phases II and III. To date, every Western University of Health Sciences College of Optometry student has completed all three phases with students from other health professions.

Phase I

Currently delivered as a required two-semester course, Phase I launched in January 2010 and involves all first-year students in the nine colleges at Western University of Health Sciences. While Phase I introduces students to all of the IPE program competencies seen in **Table 2**, the main foci are to introduce students to other professions and their respective scopes of practice and to help students understand the concepts of team-based, collaborative communication and care. Knowledge and understanding of the healthcare team, patient-centered care, teamwork, and interspecies similarities, differences and interactions are also explored. The IPE program competencies are shared and practiced while the students interactively and collaboratively review a case scenario featuring general health issues of significant medical relevance. The health issues for the 2013-2014 academic year that all of the students covered were:

- diabetes / obesity
- infectious disease / one health
- neurodegenerative disease
- neurodevelopment / autism
- cancer / end-of-life care

TABLE 3
Sequence of Events for Each Case in the First-Year IPE Course

Week 1	Large group, intra-professional meeting led by faculty members from the students' corresponding college. For example, the intra-professional meeting for optometry students is led by College of Optometry faculty members
Week 2	Interprofessional small group meeting led by a trained facilitator
Week 3	

Click image to enlarge

Each case scenario is covered over three 90-minute group meetings held one week apart **(Table 3)**.

Photograph 1. An interprofessional small group meeting from IPE Phase I.

During the first week, students participate in an intraprofessional meeting on the health issue, focusing on aspects most relevant to their profession. In the second and third weeks, the students meet in pre-assigned interprofessional groups of approximately 10 students plus a trained facilitator **(Photograph 1)** to work through each case scenario, focusing on patient safety and quality of care issues. An excerpt from a previous Phase I case is found in the **Appendix**.

The interprofessional small group meetings are designed for students to interact and thus develop and practice interprofessional collaboration skills and behaviors. To ensure that facilitators are able to appropriately provide feedback and guidance to students, facilitator training is mandatory for involvement in Phase I.

College of Optometry student involvement

Optometry students participate in Phase I in the same way that all other students do. They participate in all aspects of the program and are equal members of the team. The first of the three sessions is the intraprofessional session, which is delivered by a College of Optometry faculty member who is also a practicing optometrist. She provides profession-specific background information for each case, focusing particular attention on the visual and ocular effects of the disease process. For example, in the obesity and diabetes case, information and resources regarding diabetic eye disease is shared. In the second and third sessions, optometry students participate as equal members of the small group interprofessional teams along with students from the other programs.

College of Optometry faculty involvement

Complementing the extensive student involvement in the IPE curriculum, all of the faculty members and administrators at the College of Optometry have been trained in IPE facilitation to support Phase I. Out of the entire College of Optometry faculty, 94% of faculty members have participated in at least one phase of the IPE curriculum. Development of facilitation skills is continuously supported, as exemplified by session briefings before each case and written facilitator information provided prior to each case session. In addition to facilitating for Phase I, College of Optometry faculty members also serve as case authors for Phase II, help design and evaluate case simulation sessions from Phase III **(Photograph 2)**, and provide guidance for the development beyond Phase III.

Three optometry faculty members have additional responsibilities within the IPE curriculum as liaisons to the IPE department for the college. These faculty members act as representatives of the college and provide input on curriculum development, implementation and assessment. These faculty members lead the intraprofessional sessions for optometry students during Phases I and II and provide support for optometry students during Phase III. They also actively participate in the monthly IPE design team meetings with liaisons from the other colleges and IPE department faculty, and act as contacts for optometry students and faculty who are involved in each phase of the program. Another optometry faculty member, Dr. Jasmine Yumori, has a joint appointment between the College of Optometry and the IPE department. Within the IPE department Dr. Yumori serves as one of the Co-Directors of IPE Phases I and II at the university level.

Photograph 2. A re-enactment of a standardized patient simulation from IPE Phase III.

In addition to providing an overview of IPE at Western University of Health Sciences and its relevance to optometry, we also investigated whether optometry students participating in Phase I of the IPE program during the 2013-2014 academic year

acquired knowledge based on IPE competencies compared with students from other health professions.

Methods

In the IPE Phase 1 courses, students were evaluated in part by their performance on a multiple-choice question (MCQ) examination given at the start of the course and again at the end of the course (identical items). Taking both the pre- and post-course examinations was not mandatory; however, 86% (811 of 947) completed both.

A MCQ examination based on the Western University of Health Sciences IPE program competencies was constructed. The examination consisted of 30 multiple-choice questions split between the five competencies: Scope of Practice (primary focus of examination; 17 items), Communication (3 items), Collaboration (4 items), Team Skills (4 items) and One Health (2 items). The following MCQ types were used:

● A-type: Students are provided with a clinical scenario, lead-in questions and a list of possible responses with one correct answer.

● X-type: Students are provided with a short introductory stem and one or more correct answers.

Examination design was led by Dr. John Tegzes, Director of IPE at Western University of Health Sciences, and Dr. David Dickter, IPE Research Director at Western University of Health Sciences, with faculty members from all nine of the health professions colleges providing input and feedback on the examination.

Students individually completed the MCQ examination at the beginning of the course. Feedback was not provided to students after the pre-course examination since students also completed the same examination at the end of the course. Once students completed the post-course examination they were invited to individually discuss and receive feedback on the content.

Data were analyzed using IBM SPSS version 12.0 to conduct descriptive statistics (mean, standard deviation, range) and analytical statistics (paired and two-sample t-tests).

Results

The MCQ examination was administered to all students enrolled in the Phase I courses of the IPE program during the 2013-2014 academic year at Western University of Health Sciences. A total of 811 students completed all items on both the pre-course and post-course MCQ examinations (85 from the College of Optometry and 726 from the other programs combined). Note that it was possible to pass the course without completing the examinations (e.g., students could remediate through other assignments).

The pre-course mean performance on the MCQ exam for optometry students was 35±9 (17-53) percent; the pre-course mean performance for all other students combined was 38±10 (3-83) percent. This difference in overall MCQ scores was statistically significant ($t(809)=2.1$, $p<.05$). **Table 4** displays the results by competency. Results were similar across the competencies, with the students answering approximately 30-40% of the questions correctly.

TABLE 4
Optometry Students' (N=85) vs. All Other Students' (N=726) Pre-Course Performance on the MCQ Examination

Competency	Optometry Students' Pre-Course [%]	All Other Students' Pre-Course [%]
Scope of Practice (17 items)	34	38
Communication (3 items)	36	37
Collaboration (4 items)	34	36
Team Skills (4 items)	37	37
One Health (2 items)	39	40
Mean Overall Pre-Course Performance	35	38

MCQ = multiple-choice question

Click image to enlarge

The post-course mean performance on the MCQ exam for optometry students was not statistically different from those of all other students combined. On average, optometry students answered 71±15 (33-90) percent correctly; the other students answered 70±14 (3-90) percent correctly. Total MCQ exam pre-post course scores increased significantly for both optometry students (from 35% to 71%; paired-sample $t(84)=20.7$, $p<.001$) and all other students combined (from 38% to 70%; paired-sample $t(725)=48.0$, $p<.001$). Students demonstrated the strongest post-course performance on questions related to Team Skills and Communication **(Table 5)**.

As shown in **Table 6**, improvement was evident across all five competency domains for optometry and all students. Due to the relatively small number of items measuring each competency, we limited our analysis to trends observed rather than statistical difference tests. Team Skills questions were associated with the highest pre- vs. post-course improvement trends. Moderate to strong improvement trends (25 to 53 absolute percentage point increases) were seen for all competencies for optometry students.

TABLE 5
Optometry Students' (N=85) vs. All Other Students' (N=726) Post-Course Performance on the MCQ Examination

Competency	Optometry Students' Post-Course [%]	All Other Students' Post-Course [%]
Scope of Practice (17 items)	61	59
Communication (3 items)	84	86
Collaboration (4 items)	84	83
Team Skills (4 items)	90	88
One Health (2 items)	64	83
Mean Overall Post-Course Performance	77	78

MCQ = multiple-choice question

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Discussion

The mean pre-course MCQ examination scores for all students suggest that students from all graduate health professions can benefit from participation in IPE courses. The somewhat lower (35% vs. 38%) baseline (pre-course) differences in knowledge between optometry and other students might stem from differences in pre-course exposures to other health professions for students interested in optometry, which is traditionally more outpatient-focused. Interestingly, the performance of optometry students on the post-course MCQ examination was comparable to the performance seen for all students.

TABLE 6
Optometry Students' (N=85) vs. All Other Students' (N=726) Pre- and Post-Course Improvement on the MCQ Examination

Competency	Optometry Students' Pre- vs. Post-Course Improvement [absolute % increase]	All Other Students' Pre- vs. Post-Course Improvement [absolute % increase]
Scope of Practice	27	21
Communication	48	49
Collaboration	50	47
Team Skills	53	51
One Health	25	43

MCQ = multiple-choice question

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Based on the pre- vs. post-course MCQ examination scores, optometry students benefit from and perform comparably to students from other health professions and should be included in IPE courses. As student scores increased the most on Team Skills and Communication competencies, it may be that these are among the most trainable for IPE students at the introductory graduate level. More investigation is needed to confirm these findings and determine possible implications.

One of the limitations of the pre- and post-course MCQ examinations was lack of a control group. It would be interesting to examine students' performance on the MCQ examinations taken at the same time interval and environment but without exposure to our IPE courses to determine whether the improvements may be attributable to the effectiveness of the program vs. other causes such as natural maturation and/or improved readiness during the post-test due to knowledge absorption from the pre-test. Further development of the MCQ examination is also needed, as is the collection of reliability and validity data.

Conclusion

Education on team-based health care is important for improving patient safety and addressing quality of care issues. The profession of optometry plays an important role on the healthcare team. Optometry students benefit from and can comparably perform in IPE courses alongside students from other health professions.

The development of additional opportunities for students to further develop an understanding of and application of IPE competencies is crucial. Similarly, the creation of additional tools to better assess student performance associated with IPE competencies is also needed. Developers of optometry and IPE curricula should collect information on skills acquisition, for example, based on simulated patient encounters and clinical performance ratings from multiple sources (e.g., self, peer and clinical supervisors). Further research is needed to understand how knowledge acquisition translates into the ability to demonstrate the skills and behaviors needed to function successfully in interprofessional team settings.

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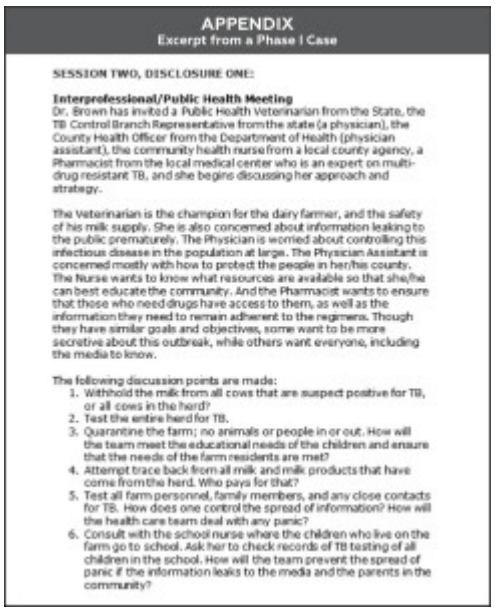

APPENDIX
Excerpt from a Phase I Case

SESSION TWO, DISCLOSURE ONE:

Interprofessional/Public Health Meeting
Dr. Brown has invited a Public Health Veterinarian from the State, the TB Control Branch Representative from the state (a physician), the County Health Officer from the Department of Health (physician assistant), the community health nurse from a local county agency, a Pharmacist from the local medical center who is an expert on multi-drug resistant TB, and she begins discussing her approach and strategy.

The Veterinarian is the champion for the dairy farmer, and the safety of his milk supply. She is also concerned about information leaking to the public prematurely. The Physician is worried about controlling this infectious disease in the population at large. The Physician Assistant is concerned mostly with how to protect the people in her/his county. The Nurse wants to know what resources are available so that she/he can best educate the community. And the Pharmacist wants to ensure that those who need drugs have access to them, as well as the information they need to remain adherent to the regimens. Though they have similar goals and objectives, some want to be more secretive about this outbreak, while others want everyone, including the media to know.

The following discussion points are made:
1. Withhold the milk from all cows that are suspect positive for TB, or all cows in the herd?
2. Test the entire herd for TB.
3. Quarantine the farm; no animals or people in or out. How will the team meet the educational needs of the children and ensure that the needs of the farm residents are met?
4. Attempt trace back from all milk and milk products that have come from the herd. Who pays for that?
5. Test all farm personnel, family members, and any close contacts for TB. How does one control the spread of information? How will the health care team deal with any panic?
6. Consult with the school nurse where the children who live on the farm go to school. Ask her to check records of TB testing of all children in the school. How will the team prevent the spread of panic if the information leaks to the media and the parents in the community?

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Incorporating Interprofessional Education into a VA Optometric Residency

Laura Dowd, OD, FAAO, James Patrick Smith, OD, MS, FAAO | Optometric Education: Volume 40 Number 3 (Summer 2015)

PDF of Article

Background

According to the World Health Organization, interprofessional education (IPE) occurs when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes.[1] A primary goal of IPE is to produce healthcare providers capable of providing team-based care that meets the health needs of an aging population with a rising incidence of long-term chronic and complex conditions.[2] Over the past 30 years IPE has steadily grown and is now a common element in many health and social care training programs across the country.

The incorporation of IPE into healthcare professional training has been shown to lead to improvements in several areas, including patient safety, health outcomes and interdisciplinary team functioning. [3] Further research is needed to augment the evidence base and to identify key components and best practices for IPE. Education and training on IPE principles for healthcare providers are integral to the development of attitudes, knowledge and skills needed for effective collaboration.[3] Optometry is responsible for more than two-thirds of the primary eye care delivered in the United States, and the involvement of optometry in IPE is important for all healthcare professions.[4] Currently, nearly all the schools and colleges of optometry have implemented IPE into their curriculum.[5] In this paper, the components, approach, barriers and future plans for IPE in a primary care and ocular disease-based U.S Department of Veterans Affairs (VA) residency are discussed.

Interprofessional Education in the VA

The VA is the largest integrated healthcare system in the United States. One of the statutory missions of VA is to conduct an education and training program for health professions students and residents that helps meet its own needs and those of the nation.[6] Most healthcare providers spend a portion of their training rotating through at least one of the more than 1,500 VA Medical Centers and Community Based Outpatient Clinics located throughout the country. At VA Maine, more than 750 trainees in disciplines including medicine, dentistry, nursing, optometry, pharmacy, physical therapy, psychology and occupational therapy rotate through the medical center annually. This setting provides an inclusive forum where health providers can learn together.

Incorporating IPE into the Optometry Residency

During the Primary Care and Ocular Disease residency at VA Maine, residents spend a significant portion of the academic year participating in various IPE activities. The commitment to IPE is reflected in two of the program goals: 1) residents are integrated into an interdisciplinary, hospital-based healthcare team and 2) the clinical and didactic skills of the residents are enhanced by working with trainees from other healthcare disciplines.

In the clinical setting, optometry residents work alongside second- and third-year ophthalmology residents on a daily basis in a high volume outpatient clinic providing comprehensive surgical and nonsurgical eye care. The clinical work environment involves trainees coordinating care for patients seen independently who require care from both disciplines, as well as trainees from both disciplines working side by side seeing patients jointly in ophthalmology subspecialty clinics. Residents in both disciplines also present weekly didactic seminars for eye clinic staff and other hospital personnel. These IPE interactions help establish identities and roles for the respective trainees, improve their communication skills and foster teamwork and team-based care. Exposure to IPE in the clinical and didactic settings during training for residents in optometry and ophthalmology helps prepare them to provide effective team-based care post-training, which has long been the norm for these professions.

Another integral IPE experience for optometry residents at VA Maine is regular rotations by medical, nurse practitioner and physician assistant students through the optometry clinic. Visiting trainees are paired with optometry residents for several days. During this period, they see patients presenting for eye care as a team. Prior to the rotation, visiting trainees are provided an outline of learning objectives to be covered. On rotation days, patient charts are jointly reviewed in advance by faculty and trainees to identify topics for further discussion. This preparation provides a framework for the interprofessional interaction and primes the trainees for the experience.

In this IPE activity, trainees act as both pupil and educator. Visiting trainees are taught basic eye examination techniques by the optometry residents, including entrance testing, the core components of an eye exam, how to read eye records and the essentials of commonly encountered eye diseases. They also gain a better understanding of optometry and how optometric care relates to a patient's overall health. In exchange, they educate the optometry residents about their respective professions and many of the systemic considerations of the patients that are seen in clinic. The goals of these interactions are for the trainees to gain knowledge and to improve communication skills with providers from different disciplines. These abilities will be used throughout their careers to optimize patient care and to foster healthy working relationships, whether they practice in a multidisciplinary setting or in stand-alone practices located in the community.

Outside the clinic environment, optometry residents participate either in person or by teleconference in biweekly didactic IPE seminars with pharmacy residents, psychology post-doctoral fellows and students in medicine, nursing and social work. The goals of these seminars are for trainees to gain a better understanding of various healthcare professions, to improve interprofessional communication and to explore the challenges of providing patient-centered interdisciplinary health care to veterans living in a rural setting. The optometry residents lead approximately eight seminars during the academic year. Eye-specific presentations on topics such as cataracts, dry eyes, diabetic retinopathy, macular degeneration and herpetic eye disease are tailored to engage the diverse group of participants to offer multidisciplinary perspectives on care considerations that cannot be replicated in a single-profession educational setting.

Elements of Effective IPE at VA Maine

IPE has been linked to the provision of better health services and a range of positive outcomes, including improvements in patient clinical outcomes,[7] interdisciplinary clinical collaboration,[8] provider communication[9] and patient safety.[10] As IPE has evolved at VA Maine and in the optometric residency program, we have identified several keys to program development.

Strong institutional support both at the national and local level has greatly assisted IPE at VA Maine and the optometric residency program. VA Maine is one of seven rural and highly rural institutions participating in the Rural Health Training Initiative (RHTI), a joint program sponsored by the Veterans Health Administration Office of Rural Health and the VA Office of Academic Affiliations. The goal of RHTI is to establish training programs in the VA system dedicated to educating health professions trainees in rural health delivery. IPE occupies a central role in RHTI with trainees from medicine and nurse practitioner, optometry, psychology, pharmacy and social work programs regularly collaborating to learn about effective team-based healthcare delivery. Program funding has provided invaluable IPE infrastructure, including clinic and didactic equipment, faculty IPE training and salaries for trainees and administrative support staff.

TABLE 1
IPE Seminar Outline: Age-Related Macular Degeneration

1. Background
a. anatomy
b. epidemiology
c. manifestations of disease
d. visual impairment and legal blindness
2. Management and Treatment
a. Age-Related Eye Disease Studies
b. AREDS vitamins (with pharmacy residents)
i. AREDS1 vs. AREDS2 studies
ii. evidence for efficacy
iii. pharmaceutical considerations
1. contraindications for use
2. drug interactions (Coumadin, other)
3. implications of high dosages (USPSTA)
4. vitamin E and beta carotene
c. anti-VEGF (with pharmacy residents)
i. evidence for efficacy
ii. Lucentis vs. Avastin
1. compounding medicines
2. off-label use
3. medication cost
3. Psychological Implications of Disease (with psychology fellows)
a. loss of independence (activities of daily living, driving, etc.)
b. impact on family/caregivers
c. depression, other
d. hallucinations (Charles Bonnet)
4. Rehabilitation and Support (with social work students)
a. visual impairment services
b. consultation and service delivery processes
c. other resources

Click image to enlarge

Time must be protected for IPE. The typical resident schedule is very busy at VA Maine. There are a number of activities in the program that compete for resident time, not the least of which is direct patient care. In the absence of dedicated time, other aspects of the residency can interfere with scheduled IPE learning activities. Designating time and schedule carve-outs guarantee residents will be available to participate in IPE. Resident schedules, posted in a shared calendar accessible by both staff and trainees, are reviewed at least weekly to ensure potential conflicts are identified and resolved before IPE learning activities take place.

Faculty must be actively involved and cultivate an environment that promotes IPE. In the clinical setting, learning opportunities may not be readily apparent to healthcare trainees, so involvement of staff is essential to ensure learning topics are identified and explored. In multidisciplinary didactic IPE seminars, team facilitation guides the learning process. Experienced clinicians from diverse backgrounds provide their perspectives during seminars that both further the IPE learning experience of trainees and serve as a demonstration of effective interdisciplinary collaboration.

IPE is more effective when educators define the learning outcomes expected from activities.[11] At VA Maine, faculty discuss didactic seminar topics in advance to identify educational opportunities. Topics are shared with trainees from the various disciplines prior to presentation so that learning material can be prepared to share for a seminar. As an example, an outline from a recent didactic seminar on macular degeneration describing the contributions of the various disciplines in attendance is provided in **Table 1**. When the subject matter experts (both faculty and trainees) are prepared for the seminar, the discussion and learning opportunities for everyone in attendance are enhanced. These activities require advanced planning by faculty and trainees.

Challenges with IPE and Avenues for Growth

A well-defined curriculum with measurable goals and objectives is important in academic program design. Periodic review of these goals and objectives is used to guide program improvement and plan future activities. In their current state, learning goals and objectives for the optometry residency and RHTI at VA Maine do not fully measure competencies considered essential for effective IPE, such as interprofessional communication, patient-centered care, role clarification and team functioning. Current program measures, including the number of patient encounters and lectures attended, need to be expanded if better assessment of IPE competence is to occur and the program is to foster trainee attributes that will enable them to be effective members of healthcare teams in their future careers.

A significant hindrance to optimizing IPE is the lack of a cohesive evidence base to guide program design, assessment and regulation. Due to highly variable study designs and methodological limitations in the literature, the effectiveness of IPE remains unclear. The number of studies examining IPE has expanded significantly over the past 10 years, but long-term investigations utilizing large sample sizes and strong randomization are needed to measure IPE's effects on teamwork, healthcare patient processes and well-defined health outcomes.[12] The 2011 report "Attributes of Graduates of the Schools and Colleges of Optometry" by the Association of Schools and Colleges of Optometry offers an overview of IPE competencies for the profession. According to this report, graduates of schools and colleges of optometry are expected to be able to appropriately use interprofessional collaboration and become integral members of larger interprofessional healthcare teams to improve patient care outcomes and ensure the best quality patient care. This skill set includes the ability to recognize, initiate and coordinate patient care requiring advanced medical, systemic, interprofessional or specialty care, and the ability to work in cooperation with those who receive care, those who provide care and others who contribute to or support the delivery of prevention and health services.[13]

While the goals of IPE have been defined, how to best achieve them has not. There is a lack of information regarding IPE syntheses and how learning outcomes can be successfully accomplished.[14] At VA Maine, the resident activity and patient logs are reviewed monthly for participation in multidisciplinary activities and residents are asked to self-reflect on their experiences. RHTI staff meets quarterly to review program performance and plan future activities. Annual reviews for both programs are also conducted. The results of analyses help identify best program practices and are used to modify goals and objectives for IPE.

Another practical challenge to IPE at VA Maine is geographic separation between training sites. The medical center is one of only two VA hospitals in the country located in a rural setting according to U.S. Census Bureau statistics. Additional outpatient clinics are also found in rural locations scattered throughout the state. RHTI trainees are typically working in at least four of these sites with several hundred miles collectively separating them. In this environment, traveling for face-to-face meetings is not feasible, so video teleconferencing is used to bridge the distance. VA has a robust teleconferencing system available at any time to attendees both on and off VA campuses. Telecasts providing both audio and video feeds allow attendees to interact during didactic IPE meetings. While teleconferencing promotes participation and allows for broader interdisciplinary involvement in IPE, it can also present unanticipated challenges when the technology is not functioning properly.

Early incorporation of IPE into educational curriculums impacts learner attitudes, knowledge and ability to collaborate.[15] At VA Maine, fourth-year optometry externs have begun to be incorporated into the IPE setting. This exposes trainees to IPE principles and may serve as the only exposure for those who do not pursue residency training. Earlier exposure to IPE would be advantageous but this is not possible at VA Maine because our first interaction with trainees does not occur until the fourth year of optometry school. Outside the VA, many optometry schools operate as stand-alone institutions, which may limit regular opportunities for interaction with healthcare trainees in other disciplines and serve as a barrier to IPE.

The IPE experience is more stimulating and interesting when different interactive learning methods are employed.[3] IPE strategies for optometry residents at VA Maine currently involve embedded multidisciplinary clinical placements with ophthalmology residents and observation-based, problem-based and exchanged-based learning formats in both clinical and didactic settings with non-eyecare professionals. We are looking at ways to incorporate additional IPE learning opportunities, including interprofessional clinical placements with non-eyecare providers, simulation-based learning and informal activities, into the trainee experience to increase the depth of learning for those participating.

Conclusion

Interprofessional education in the optometric residency program at VA Maine is designed to help residents develop the skills and knowledge needed to work in a collaborative manner to promote patient-centered care and improve patient outcomes. Through IPE, residents gain a better understanding of their own professional identity and of other providers that make up a healthcare team. A large, multidisciplinary training environment and a patient population dealing with complex medical issues

create an ideal environment for IPE. Program goals and objectives for IPE at VA Maine continue to evolve based on internal results and the incorporation of advances in learning principles. The IPE process is challenging from both logistical and conceptual standpoints. Institutional support, dedicated time and resources for IPE, and the involvement of trained and committed faculty from a wide variety of disciplines are critical for IPE to be effective.

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Pilot Assessment of Teaching Anterior Segment Evaluation to Develop Interprofessional Education Programs

Andrew McLeod OD, MS, FAAO, Sara Bush, OD | Optometric Education: Volume 40 Number 3 (Summer 2015)

PDF of Article

Background

In medically based practice, frustration and confusion can occur during communication between specialty services and more general or diverse services. In most of these instances, the generalist is trying to receive a consultation in his or her department or trying to refer a patient to a specialized service. It can be difficult for the specialist to triage the patient if the referring providers are unable to supply the information requested or simply unsure what testing is necessary. In the case of optometry and ophthalmology, this often occurs when we request specialized testing such as visual acuity, intraocular pressure measurement, slit-lamp examination or retinal evaluation from referring doctors in order to better triage the patient.

Many health professions, including optometry, have traditionally educated their students in isolation. The assumption was the professions would somehow all learn to interact with each other upon entering the workplace. The four newest optometric programs are within multidisciplinary health science universities (Western University of Health Sciences in Pomona, Calif.; Midwestern University in Glendale, Ariz.; University of the Incarnate Word in San Antonio, Texas; and MCPHS University in Worcester, Mass.). Other programs, such as Pennsylvania College of Optometry and Southern California College of Optometry, have expanded to form multidisciplinary institutions (Salus University in Elkins Park, Pa., and Marshall B. Ketchum University in Fullerton, Calif., respectively). While the vast majority of these programs are still conducted in isolation, the multidisciplinary setup allows possible bridges between the programs to be formed.

Within health care, the variety, role and privileges of each health professional are continuing to expand and overlap. Some professionals prefer to keep skill sets within their specialty and to be taught only by individuals from their profession. The current trend, however, is toward an interprofessional approach to education, which is defined slightly differently by organizations. The Centre for the Advancement of Interprofessional Education states that interprofessional education (IPE) occurs when two or more professions learn with, from and about each other to improve collaboration and the quality of care.[1] The World Health Organization defines IPE as when *students* from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes.[2] Although these definitions can be interpreted in different ways, the end goal of IPE should allow for discussion on how the professions will interact. IPE is not simply sharing a joint lecture or being taught by a different healthcare professional without discussion on how it will impact future collaborative care. IPE is an active learning process *with* other interprofessional students, not simply a passive learning process *among* other interprofessional students. In 2008, the Interprofessional Education Collaborative developed Core Competencies for Interprofessional Collaborative Practice.[3] This Collaborative had representation from major organizations in nursing, osteopathic medicine, pharmacy, dental education, medical colleges and public health. Although it did not have optometry representation, it is a valuable framework for developing programs. In 2005, Oandasan and Reeves also reviewed the literature and provided a valid framework for the success of future IPE programs.[4,5]

The main initiative behind converting to an IPE environment is that it will lead to better learner outcomes that, in turn, will lead to a collaborative practice environment and better patient outcomes.[2] The hope is to provide safer, timelier, more cost effective and more collaborative patient-centered care. A 2008 Cochrane Collaboration review of the effectiveness of IPE on health outcomes reviewed and assessed a series of IPE intervention studies published between 1999 and 2006. Of the 1,801 abstracts found, the review found only six intervention studies that met the inclusion criteria. Although four resulted in positive outcomes, the general conclusion was that it was not possible to draw generalizable inferences about the key elements of IPE and its effectiveness.[6]

Although IPE has been under discussion for years, there have been very few articles that deal with the profession of optometry. In April 2012, Michigan College of Optometry reviewed its Interprofessional Wellness Clinic, which also focuses on diabetes. The program integrates nursing, pharmacy and optometry services and has been in existence since 2004.[7] In July 2012, a review of the Western University design and outcomes was published. It describes the university's three-phase approach to IPE through didactic, online simulations and clinical care in the Western Diabetes Institute.[8] Diabetes is a logical entry point for

IPE as it is a relatively common condition and the patients typically visit multiple providers for care of the same condition. In August 2014, University of Alabama at Birmingham Geriatric Education Center created an Interprofessional Clinical Experience in nursing homes that included optometry students. The investigation found health professions trainees' attitudes toward IPE and team care were positive after participating in the program.[9]

The American Optometric Association defines an optometrist as an independent primary healthcare professional for the eye. Since the expansion of optometry's scope of practice to a more medical model, more optometrists are practicing in interprofessional settings such as nursing homes, community health centers and hospital-based practices. Therefore, optometry graduates could be more well-served and prepared for these practice settings through curricula that include IPE.

MCPHS University offers multiple professional healthcare programs, but the majority of each program is taught in isolation. The pilot workshop design was an attempt to initiate the move toward IPE between the School of Optometry and the School of Physician Assistant Studies. The objective of this pilot was not to create expertise in the area of ocular examination for the physician assistant (PA) students, but to introduce basic concepts and techniques. While interprofessional collaboration was introduced, a future workshop was proposed with students from both schools focusing on improved communication and more efficient and appropriate referrals to optometry. It is very important for the PA students to know how to complete an ocular assessment and determine what is normal vs. abnormal in order to foster such referrals. Therefore, it is appropriate for the person educating these students to be an optometrist, the professional to whom they would be making a referral. Additionally, the PA faculty may have also had limited exposure to these techniques in school, leading to some level of discomfort in teaching the skills. Again, it would make sense to recruit faculty members from other programs who are experts in the area and are more comfortable and experienced teaching the techniques.

The logical first step to facilitating future collaborations between the PA and optometry students would be to introduce the techniques to both groups to make sure that the terminology used is familiar to both groups. This can be a difficult task when both groups need to know the material in different depths. For the optometry program, there are multiple lectures that cover all aspects of anterior segment evaluation because it will be done on almost every patient. For the PA students, while this is one of the many skills they may cover in clinical rotations, they will likely not cover it in as much depth or have multiple opportunities to perform it. Therefore, technical use of the slit lamp and completion of a general assessment of the eye was one goal of the program. Common techniques were selected that would aid in assessment and give pertinent information for a referral. Slit-lamp examination (Topcon Medical Systems Inc., Oakland N.J.) including sodium fluorescein staining and lid eversion, intraocular pressure by Tonopen AVIA (Reichert Technologies, Depew, N.Y.) and ocular irrigation were selected.

While this workshop did not have students from both programs participating, the faculty from the optometry program taught a condensed workshop-style curriculum reflective of the courses from the optometric curriculum on the same topics. This workshop provided the foundation to start further discussions or workshops on referral communication, other pertinent techniques or diagnosis/treatment/management.

Methods

Developing the workshop was divided into three main stages: pre-workshop organization, the workshop itself and post-workshop feedback analysis. Before the workshop began there was significant correspondence between the physician assistant and optometry programs in the form of meetings and e-mail. The only disclosure received was that the participants were introduced to the eye and ocular examination, but could have had varied experience on their clinical rotations. This possible variability in the target audience made planning the workshop slightly more difficult and forced the instructors to start at a basic level of ocular anatomy and simple slit-lamp mechanics.

As stated, the techniques focused on were ocular anatomy, slit-lamp examination, sodium fluorescein staining, lid eversion, drop instillation, intraocular pressure measurement and ocular irrigation. Participants were also given alternative ways to assess ocular health without specialty equipment. For example, a demonstration on how to use the 20D lens, with or without cobalt blue filter, in the direct ophthalmoscope in lieu of a slit lamp was included. This cohort of tests was chosen to maximize the use of the specialty equipment in the lab and focus on techniques that would be more challenging to teach in a non-optometry lab setting. These are also the most likely needed tests in an emergency or primary care type setting along with visual acuity. The introduction lecture was created to outline basic anatomy, slit-lamp description and technique, lid eversion and common normal and abnormal findings. The next segment included drop instillation, sodium fluorescein evaluation and ocular irrigation. After each lecture section, there was designated, immediate practice time for those techniques with supervision from optometry faculty. All materials, diagrams and videos were uploaded to the learning management system for future reference. Because the workshop was held in a short time frame of approximately two-hour sessions, more optometry faculty were recruited to keep the ratio 1 faculty:2 lanes, with each lane holding two to three PA students. Extra handheld equipment was borrowed to ensure time was not wasted waiting for equipment.

In order to obtain feedback and assess the effectiveness of the workshop, an exit survey was developed in which the students rated their didactic knowledge and actual experience with each of the six topics (ocular anatomy, slit-lamp examination, tonometry, fluorescein staining, drop instillation and ocular irrigation). A 0-5 scale (0=Never heard of the topic, 3=Moderate, 5= Thoroughly understood the topic) was used to allow the participants to rate their assessments. Five additional statements were presented, and the students rated their agreement with those based on the scale (5-Strongly Agree, 4-Somewhat Agree, 3-Neutral, 2-Somewhat Disagree and 1-Disagree). The statements were:

1) I feel interprofessional education (between different disciplines) enhances my educational experience

2) I feel there is adequate interprofessional education at MCPHS University

3) I feel the topics covered today are relevant to my postgraduate career

4) I feel the format of the workshop was appropriate for covering the topics

5) I feel it was more beneficial to my education to learn these techniques from optometrists rather than an educator in my discipline.

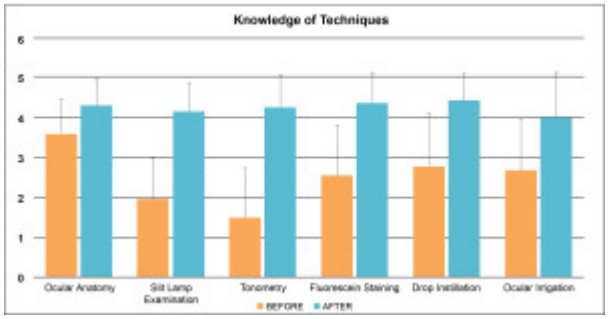
An open section for comments and suggestions was also added to obtain any other information the participants were willing to share. The project was approved (IRB011014M) by the MCPHS Institutional Review Board.

The workshop was part of the Physician Assistant Studies Professional Seminar Series. This is a periodic day for final-year students (n=116) to return from clinical rotations to campus to learn and refresh their knowledge of different skills. This particular seminar included four workshops: Optometry, Wound Care, Oral Health, and Spirometry. The seminar day included four sessions of each workshop each lasting two hours, thus each workshop was conducted four times during the day. The MCPHS University optometry facility includes two separate eight-lane pre-clinic spaces. Having one student act as the examiner and one as the patient, accommodations were available for up to 32 students per session. Three optometry faculty circulated each room along with any available PA faculty. Because of the separate rooms, the lecture was conducted in one pre-clinic area and web conferenced live to the other pre-clinic area via Blackboard Collaborate (Blackboard Inc., Washington D.C.) to ensure both labs had a more uniform experience. In addition to the main projection screens, the lecture was broadcast to each individual lane in both rooms. At the end of the workshop the surveys were distributed with the caveat that their participation in filling them out was optional.

Results

Prior to the workshop, 116 students were scheduled to attend the workshop and 108 students actually attended a workshop session. Of these, 99 filled out the optional survey, but only 88 had complete surveys (n=88). The 11 incomplete surveys were missing responses to the five statements regarding opinions on IPE, and were likely missed because they were on the back of the survey sheet. All surveys were completed at the end of the workshop, meaning the before and after responses were entered at the same time.

FIGURE 1



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Survey results (n=88) pertaining to self-reported knowledge level with techniques before and after the workshop. The 0-5 scale used was 0=Never heard of the topic, 3=Moderate, 5=Thoroughly understood the topic. The increase in knowledge level with each technique is

Knowledge and experience were compared from before to after the workshop using paired t-test and Bonferroni correction (k=12). **Figure 1** outlines the responses for the self-rated amount of knowledge with ocular anatomy and the five techniques before and after the workshop. Statistical analysis shows a significant difference in responses from before to after (all ps<0.0001 after Bonferroni correction). **Figure 2** outlines the responses for the self-rated amount of experience with each technique before and after the workshop. Statistical analysis again shows a significant difference from before to after (all ps<0.0001 after Bonferroni correction). Both knowledge and experience levels correlated in that ocular anatomy was the most familiar, while tonometry was the least familiar. After the workshop, the average response for knowledge and experience was raised to between 4 and 5, just below a thorough understanding level. The only exception was experience with ocular irrigation, which is most likely due to time limitations at the end of the session preventing many students from being able to attempt that technique.

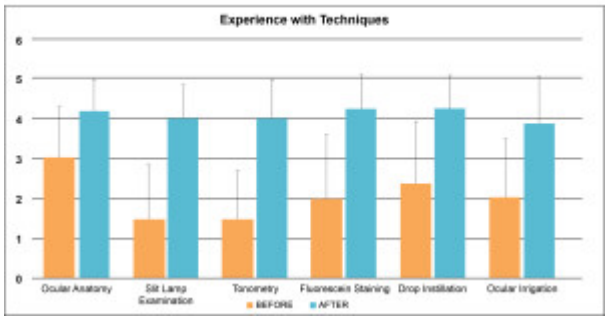
Figure 3 outlines the average responses to questions pertaining to IPE

statistically significant in each category (p<0.0001).

and the workshop format. Responses indicate a positive attitude toward IPE and the level of IPE at MCPHS University. The students also had a positive response to the hands-on workshop format to enhance their education and appreciated being taught by instructors from other professions.

The majority of the responses in the comment section were to express their gratitude for the School of Optometry for conducting the workshop and satisfaction with the format. Several suggestions were made to have the optometrists conduct the introduction lecture(s) in the students' didactic year, learn the techniques prior to rotations, repeat the workshops annually, and expand the topics to include fundoscopy or foreign body removal.

FIGURE 2



Click image to enlarge

Survey results (n=88) pertaining to self-reported experience level with techniques before and after the workshop. The 0-5 scale used was 0=Never heard of the topic, 3=Moderate, 5=Thoroughly understood the topic. The increase in experience level with each technique is statistically significant in each category (p<0.0001).

Discussion

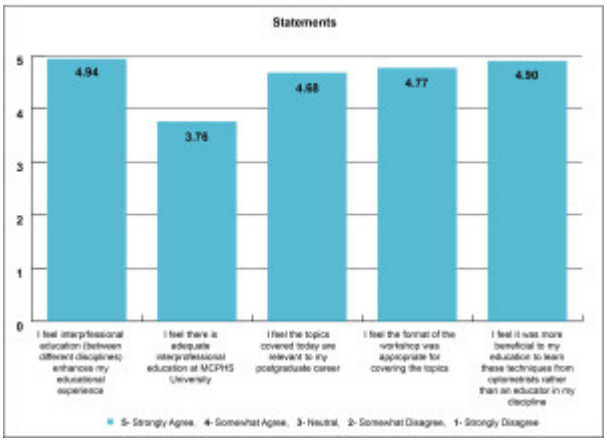
Data analysis indicated that of the topics covered, the PA students had the most optometrically relevant knowledge and experience in ocular anatomy prior to the workshop. One would anticipate this because anatomy is part of the curriculum of all programs at MCPHS University. In addition, the terms discussed were basic anterior segment anatomy, of which many terms are used in lay conversation. Drop instillation, ocular irrigation and fluorescein staining were the next most familiar. This could be a result of teaching within their program or use in everyday life. These techniques can be taught without the use of highly specialized equipment and are probably done in a variety of clinical settings (primary care office, emergency room or hospital). The least amount of knowledge and experience was reported with slit lamp and tonometry. These procedures are most often utilized by eyecare professionals and require specialized equipment, so the limited exposure is understandable.

The reported amount of knowledge and experience increased in all categories after the workshop. The post-workshop experience and knowledge in ocular irrigation had a slightly lower result compared with the other tests. This can be attributed to the fact that in one session the lecture portion covering this material was not completed due to time constraints. In several sessions some of the students reported that they ran out of practice time for this technique. The higher results also indicate that the lecture coverage of the materials provided a thorough understanding of the topics. The hands-on workshop gave participants enough experience to feel more comfortable with performing techniques. This anecdotal response does not ensure proper or safe technique. A traditional proficiency-style practical exam or requirement to perform the technique a given amount of times under supervision may be better options.

The responses for statements 1 (I feel interprofessional education [between different disciplines] enhances my educational experience) and 5 (I feel it was more beneficial to my education to learn these techniques from optometrists rather than an educator in my discipline) indicate that the students like the idea of IPE and prefer being taught by professionals from the specialty area. This is probably true of professions, like physician assistant, which are cross-trained in many areas of health care. Statement 2 (I feel there is adequate interprofessional education at MCPHS University) had a wide variety of responses and the lowest overall average. A lower average response was anticipated, but perhaps some feel the amount of IPE is adequate while others wish there was more IPE. One of the survey responses indicated that PA students receive pharmacy education from pharmacists and pathology from pathologists, so why not eye care from optometrists. In addition, the complete, full-day seminar also included education from nursing, dental hygiene, physician assistant and optometry. The question 3 (I feel the topics covered today are relevant to my postgraduate career) results indicate the students feel the topics are relevant to their profession and would be useful after graduation. The average response to question 4 (I feel the format of the workshop was appropriate for covering the topics) indicates that the lecture/hands-on workshop format is successful for the students' learning styles.

This initial pilot design and investigation has limitations, but obtained a starting point for future collaborations. Due to the two-hour time constraint of the workshop, the short survey was developed, but is not validated. Because the initial assessment sought to look for a change from before to after the workshop, it is acceptable. Instead of asking students to rate their knowledge and experience, a written quiz could have been administered to grade their knowledge. A numerical estimation could have been gathered from participants or patient logs to gauge experience. In this study, the survey was administered at the end of the workshop, filling before and after responses simultaneously. This could lead to data bias in that the workshop experience could have altered participants' actual entry response. For example, a participant could have realized how much they did not know before or concluded this was repetition.

FIGURE 3



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Average responses to the statements surveyed regarding interprofessional education and workshop format (n=88).

Although this workshop fits the definition of educators and learners from two or more professions working together, the goal of the initial workshop was primarily skill-based with reference to future referrals. The overlying goal was to encourage a better understanding of optometry and to help with the referral process discussion at the next workshop. Actual integration of the classroom with students of both disciplines would be difficult for this subject matter due to the fact that the two disciplines require a different level of depth of understanding of the material. Additionally, in the case of MCPHS University, the size of the physician assistant program is much larger than the optometry program. Therefore, accommodating both programs would require space for approximately 190 students. At the time of this workshop, the inaugural class of optometry students had not begun anterior segment evaluation in their curriculum. Taking that into consideration, upper-level optometry students could be utilized in future workshops as patients or mentors.

The current PA seminar program has multiple sessions throughout the year, which allows for different optometric topics at each. Mastery of skills such as drop instillation is much easier to accomplish in a single workshop. Slit-lamp examination, on the other hand, is a skill that takes time to develop and may be best introduced and reviewed in a format of multiple workshops. The intended direction is toward progressive programs that transition from didactic to technical/laboratory and ultimately to clinical/integrative. This correlated with other suggested formats.[8] It would also be beneficial to incorporate the PA program into the teaching component of the optometry program for vital signs, including blood pressure measurement, cranial nerve assessment or injections.

Conclusion

Overall, the workshop was successful and enjoyed by both the students and the faculty. The relevance and format were appropriate and could be used for these topics or other topics in the future. The survey data showed a significant increase in knowledge and experience level with each topic and technique. Although this was an initial pilot, it provided a foundation from which to build future workshop programs.

The goals for future programs include:

1) Having the optometry program conduct the introductory lectures in the physician assistant didactic year

2) Utilizing a validated survey, such as the Readiness for Interprofessional Learning Scale (RIPLS),[10] to determine student readiness for IPE

3) Posting review content prior to the workshops to maximize hands-on time

4) Developing and implementing a pre-workshop quiz to better assess entry-level knowledge

5) Developing and implementing a post-workshop quiz that could be done immediately after the workshop (Another quiz could also be given later in the curriculum to assess retention.)

6) Modifying the physician assistant program patient logs to tally eye-related procedures to more accurately monitor actual clinical experience

7) Developing and implementing a proficiency exam to ensure technical aptitude

8) Exploring areas in the optometry program that could be taught by physician assistant program faculty

9) Developing communication strategies to discuss pertinent findings between professions

10) Adapting the curriculum in both programs to bring students together to discuss patient care, referral process and how they can manage patients together.

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Student Award in Clinical Ethics

| Optometric Education: Volume 40 Number 3 (Summer 2015)

PDF of Article

The Association of Schools and Colleges of Optometry and its Ethics Educators Special Interest Group are pleased to announce Molly Spatcher, OD, as the winner of the 2015 Student Award in

Clinical Ethics. This annual national award, sponsored by International Vision Expo, provides the winner with $1,000 and a commemorative plaque.

Dr. Spatcher wrote her winning essay, "Going Nuclear: An Ethical Dilemma in Optometric Care," while she was a fourth-year student (Class of 2015) at New England College of Optometry.

Molly Spatcher, OD

A Season of Change in Optometric Education

Aurora Denial, OD, FAAO | Optometric Education: Volume 40 Number 3 (Summer 2015)

PDF of Article

Aurora Denial, OD, FAAO

While change can be beneficial, it can also be a challenge. This edition of the journal reflects that thought, as it highlights three major changes, each affecting either the Association of Schools and Colleges of Optometry (ASCO), this journal, optometric education as a whole, or all of the above.

Leadership Change at ASCO; Longtime Executive Director Will Be Missed

Over the past 25 years, Marty Wall has served admirably as the Executive Director of ASCO. During that time, his responsibilities spanned many areas, including the Association's publications and a role in establishing and managing the Partnership Foundation for Optometric Education (now known as the Partnership Endowment). When I became editor of the journal in 2010, Marty provided support and encouragement. He was always available to answer questions and brainstorm. With his support, we improved the distribution of the journal, implemented the Educational Stater Grant program, digitalized the journal and reached out to individual institutions and faculty. His list of financial, organizational, managerial and development accomplishments in relation to running the organization is overwhelming. I was fortunate to work with someone who was genuinely interested in supporting the mission of the journal and the profession of optometric education. I would like to personally thank Marty for all his hard work and dedication to the journal and ASCO. Marty, I wish you all the best in your retirement. Enjoy the change to a new and exciting time of life.

Journal Changes Bring a More Technologically Advanced and User-Friendly Publication

With this edition, we introduce a new format for *Optometric Education*. All content is now available as a web page, which eliminates the need to open or download a PDF file and enables new capabilities.

Prior to 2008, the journal was printed and distributed by U.S. mail. Subsequently it became available only electronically, distributed as a PDF file via a link e-mailed to faculty. While the quality of the journal and the peer-review process remained unchanged, the move to digital provided a more cost-effective way to produce the journal, removed size limitations, eased distribution and allowed access anywhere and anytime an Internet connection was available. However, a PDF file couldn't provide the technical advantages that are now available to us with the new journal format. It provides the potential for digital capabilities that will carry the journal into the future. Just a few of these capabilities are immediate feedback to and from authors, hyperlinks, blogs, discussion forums, sound and graphics embedded into articles and greater ease and capability in indexing.[1] Although some faculty still miss the print copy of the journal, most are adapting and embracing the change, which allows for new technological opportunities and advancements in information dissemination and professional interaction.

This Edition Explores How We Will Implement the IPE Culture Change

The concept of interprofessional education (IPE) represents a change in the way we educate students. This change involves working and educating in teams with other professionals, away from isolated silos. Although the concept of IPE has been around for more than 30 years, it is only in the past 10-15 years that healthcare educators have recognized and instituted innovative policies to change the culture. As defined by the World Health Organization, IPE occurs when "students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes."[2] Overall, there is a plethora of information, journals and conferences dedicated to this topic. However, in the profession of optometry there is much less information and evidence on the implementation of IPE programs and outcomes, which is why we dedicated this edition of the journal to the topic.

Identifying desired goals and objectives as well as reliable methods of outcomes assessment provides an essential component to evidence-based teaching and learning. IPE initiatives should include outcomes assessment and be directed by evidence-based research. It is irresponsible to dedicate time, effort and resources to implementing programs that have not proven to be valuable within a profession. Faculty and administrators who are involved in IPE should be dedicated to increasing the published evidence on this important change in the culture of optometric education.

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Interprofessional Education on a Mission

Leon Nehmad, OD, MSW, FAAO, Sherrol A. Reynolds, OD, FAAO, Paula Anderson-Worts, DO, MPH | Optometric Education: Volume 40 Number 3 (Summer 2015)

PDF of Article

Interprofessional education is becoming an increasingly vital part of the optometric curriculum. The Association of Schools and Colleges of Optometry (ASCO), citing the World Health Organization (2010), defines interprofessional education as that which "occurs when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes."[1]

Optometry is an important component of a patient's health care. The fact that optometric patient care overlaps with that of other professions and the resulting patient gain through interprofessional collaboration has long been recognized.[2] The significance of this has been reinforced recently in ASCO's 2011 document "Attributes of Students Graduating from Schools and Colleges of Optometry." The document states that optometry school graduates are expected to be able to "work as an integral member of the larger interprofessional healthcare team to improve patient care outcomes" through "collaboration, co-management and referral" with other professions.[3] With the implementation of healthcare reform and the expanding scope of optometric practice, it becomes essential for optometrists to collaborate with other professionals in delivering effective and comprehensive patient health care.

Competency to practice within the interprofessional environment can be developed through a number of educational modalities. In the classroom setting this involves taking courses in common with students of other disciplines. A number of optometry schools are part of a health professions-specific campus. For example, the Health Professions Division (HPD) of Nova Southeastern University (NSU) includes optometry, osteopathic medicine, dentistry, nursing, health care sciences and pharmacy all housed within the same complex.

In the clinical setting, interprofessional education most commonly takes place at multidisciplinary healthcare sites such as community health centers and Veterans Affairs hospitals. At NSU, fourth-year optometry externs, under faculty supervision, learn to coordinate care with healthcare providers from other professions. Yet this education may not be sufficient for providing the student with the necessary skills to operate in an interprofessional setting that is less structured, more intensive, and with only limited tools at one's disposal. The annual NSU HPD medical mission trip to Jamaica provides this type of environment.

The History and Composition of the Mission Trip

The trip has taken place for the past 14 years and serves a number of locations on the island of Jamaica. The overall trip is sponsored by NSU HPD and the not-for-profit organization Women of H.O.P.E. The trip has been organized by Dr. Paula Anderson-Worts, an Associate Professor at the College of Osteopathic Medicine, and Jamaican-born philanthropist and radio personality Mr. Don Daly, to address the need for quality health care to underserved populations in Jamaica. The most recent trip, June 4-13, 2014, was to the areas of Kingston and St. Mary. The optometry unit participated in the St. Mary portion, from June 7-13. The overall team consisted of approximately 160 volunteers, faculty and students from HPD, including dentistry, medicine, pharmacy, occupational therapy, physical therapy and nursing. In total, there were 40 volunteers, 89 students and 31 faculty. Optometric care was provided by eight students, all in their third year, two faculty and one NSU alumni optometrist who grew up in Jamaica, along with three volunteers in St. Mary. Over the course of the full 10-day mission, more than 3,000 patient encounters took place, including nearly 400 by optometry.

The optometry unit was organized by the National Optometric Student Association (NOSA) at the university. NOSA, along with its faculty advisor, has been dedicated to assisting with this endeavor by providing eye care to the underserved communities in Jamaica. The association has participated in the mission trip for the full 14 years. The students coordinate the collection of donated prescription glasses, sunglasses, supplies and topical medications such as anti-glaucoma drops, antibiotics and artificial tears. They work with the local Lions Club in collecting donated glasses and sunglasses as well as hold various fundraisers to support the mission trip. Over the years, the students have helped thousands of patients improve their vision. They have also diagnosed eye diseases and educated patients and other health professions about visual health.

A Chronicle of the Mission Trip

Interprofessional collaboration began before the trip. Planning meetings to discuss the operational aspects were held months before. One of the most important things done at these meetings was the design of a T-shirt that represented all professions. Students submitted designs, which were voted on by the entire group. The shirt, with symbols from the different professions, helped to establish a team identity. It also identified the group to our host country. The entire group wore the T-shirts throughout the first day, from the airport to arrival at the hotel.

A meeting was held for the entire group the first night to go over the procedures and protocol for the mission. Patients were seen at several locations within the St. Mary region. Most of these were churches located approximately an hour's ride from the hotel. The equipment for all the professions was transported on one truck that shuttled between sites. At the beginning and end of the day, everyone pitched in to load the equipment on and off the truck. Minibuses transported the interprofessional teams to their site of the day.

Prior to reaching the site, the entire group stopped for breakfast at a large restaurant. Each day, students from a different profession made a short presentation about their profession to the group at large. In the case of optometry, the student described what optometrists do, emphasizing the broad scope of practice and optometrists' role as primary eyecare providers within the overall healthcare system. Educating professions about one another in this manner serves to foster interdisciplinary collaboration and results in better patient care.

Figure 1. During the mission trip, a room in a church was converted into a makeshift eye, dental and medical clinic.

Following breakfast, groups were bused to each site. Teams of faculty and students representing each profession were present at every site. Because there is no clinical infrastructure at the sites, allocation of space between professions became a challenge. A hot and brightly lit church room was turned into a makeshift eye, dental and medical clinic by creative use of available space. **(Figure 1)** Professions had to work with one another regarding allocation of chairs, tables, electrical outlets and division of areas within rooms.

Eye care was provided to help the patients to the fullest extent possible: dispensing prescription glasses or sunglasses (many of which were given to patients who had none), diagnosing sight-threatening conditions such as glaucoma, advanced cataracts and diabetic retinopathy, and dispensing eye drops and educating patients about the management of their condition. Patients waited on long lines for their exam and could go to more than one service if time permitted. Students worked with enthusiasm and efficiency, performing at a very high level throughout the entire mission.

Professions worked together as needed. Referrals could be made to different disciplines. One such case was a patient diagnosed with bilateral proliferative diabetic retinopathy. The patient was immediately referred to medicine and upon testing was found to have an extremely elevated blood glucose level of 270 mg/dL. The medical team provided counseling, prescribed medications and sought to obtain follow-up within the local healthcare system.

Patients with reduced visual function also required a team approach. For example, those with end-stage glaucoma were referred to occupational therapy. Early in the mission, students required more direction from the supervisor in patient management. But over the course of days, they were able to function with increasing independence. They would walk over to the medicine, dental or pharmacy areas to collaborate in patient care as needed. **(Figure 2)** They served as gatekeepers for patients referred to optometry from other professions as well. These included patients with systemic health problems such as diabetes and hypertension that are known to affect the eyes as well as those observed to have vision problems by other providers and told to have their eyes checked.

Figure 2. Optometry students and dentistry students shared space with the other health professions, facilitating collaboration

At the end of each day, the equipment was packed up and the group proceeded to dinner at the same restaurant. Once again, the meal served as a venue for the exchange of information for the entire group. Each profession reported on an interesting case from that day.

(Figure 3) Cases including complete hyphema, band keratopathy and high myopia were shared with the group at large and served to illustrate the diversity of patients seen by the optometry students.

between provider teams.

After dinner, buses took the groups back to the hotel. Although typically people sat with individuals from their same profession, there was bound to be some interprofessional mixing. Students as well as faculty had the opportunity to mingle with those in other professions, exchanging information about each other's professions and backgrounds.

On any project such as this, it would not be unexpected to encounter some conflicts between professions. The work must be performed quickly, efficiently and without the support of the traditional clinical setting. At the outset, individuals tended to group with people of their own professions. With time, more interaction occurred. During the last night of the trip, a big party was held and the professions intermingled more than at any other time during the trip, outside of the workspace.

On a budget-conscious trip with limited resources, even conflicts over seating spaces on buses can emerge. However, such conflicts can be used as teaching tools for the beginning optometric practitioner. All professions are territorial in some respects, defining their duties and boundaries with regard to other professions. Effective interdisciplinary collaboration means working through this with compromise and resolve. A week-long intensive mission trip allows such lessons to be learned quickly.

Figure 3. Students convened for a meal at the end of each day, which allowed the interprofessional sharing of cases and the exchange of other information.

Student Feedback

After the trip, written feedback pertaining to interprofessional education was sought from students. The response was overwhelmingly positive. When asked what taking part in the trip with other professions meant, one student replied, "It allowed me to realize how important it is to communicate with other disciplines. One of the reasons I chose Nova was due to its multidisciplinary opportunities. It was great to be able to refer patients with diabetic retinopathy to medicine or patients that had back pain to occupational therapy. Just recently I sent a referral letter to a primary care practitioner in clinic." The student's response underscores the application of interdisciplinary experience gained on the mission to ordinary clinical practice.

Another student reported that the trip "validated the optometric profession to be grouped with medicine, dentistry and pharmacy" and felt satisfaction "educating them on what we do." Many expressed satisfaction with being able to refer patients to other services. As one student described, "By going over to the pharmacy area several times to get medication that the patients needed that we did not have for them, it felt good to be able to do something for patients that couldn't be helped just optometrically." Because they were new clinical interns, this was the first opportunity for many of the students to collaborate with other professions.

When asked specifically what was learned, one student reported the opportunity of "seeing the big picture of how one condition may require many practitioners to treat and how all the different disciplines are able to diagnose certain conditions through their specialty." Another pointed out the value of working not just with students but with doctors from other professions. An environment such as a mission trip, which is less structured than that of a traditional clinic, offers increased opportunities for students to interface with doctors.

Many students enjoyed the overall group sessions during lunch and dinner. As one shared, "At the end of the day it was a great learning experience to hear about the other disciplines' tough cases from the day."

There was also personal satisfaction with the realization that the mission required a team effort. As one student remarked, "We all needed each other to fully help patients. Getting equipment together, sharing buses, having some drinks, referring to one another and just being immersed with the other disciplines forced us to get to know one another and it was nice."

A final educational component of the mission was the post-trip summary. Students were asked to write an article about their experience, which would be published in the college's news magazine. This gave them the opportunity to articulate and consolidate their learning. Reporting back on their trip and spreading the word to their classmates also provided them with a vehicle to reinforce what they learned and encourage others to take part in future trips.

In summary, interprofessional optometric education is an important development that is here to stay. A medical mission trip can add to the traditional educational strategies that take place within classroom and outpatient settings. It offers unique opportunities for enhancing interprofessional understanding and collaboration. It works to better serve patients by imparting skills that can be transferred back to everyday practice settings. It provides an exceptional contribution toward the success of interprofessional health care.

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ASCO ASSOCIATION of SCHOOLS and COLLEGES of OPTOMETRY

Optometric Education The Journal of the Association of Schools and Colleges of Optometry

Warner Named President, North America

Jerry Warner has been named President, North America for CooperVision Inc. In this role he is charged with determining the strategic direction of the company's largest region, driving sustainable business growth and deeper customer relationships in the United States and Canada. Warner previously served as the company's Senior Vice President of Global Marketing. He joined the company in 2012 as Vice President, Life Cycle Management. Prior to moving to CooperVision, Warner was with Bausch + Lomb for 17 years.

Visit the CooperVision website for more information.

New HFA Designed to Streamline Patient Flow

Now available from Zeiss is the latest generation of the Humphrey Field Analyzer, the HFA3. The HFA3 incorporates several features designed to save time and reduce errors, while test results are equal to and interchangeable with test results from previous Humphrey perimeters. The HFA3 is the first perimeter to introduce patented Liquid Lens technology, which saves time, simplifies setup and reduces the possibility of human error in trial lens correction. Liquid Trial Lens automatically delivers the appropriate refractive correction (-8D to +8D sphere with model 860) using measurement information entered into the instrument. Other HFA3 features include: • RelEYE, which allows doctors to instantly review the patient's eye position, at any stimulus point • SmartTouch interface, which reduces the number of steps required for starting a perimetry exam • Faster gaze tracking, which aids in assessing the reliability of test results and initializes faster and works on a wider spectrum of patients compared with earlier HFA models.

For more information, visit the Zeiss website.

New Multifocal Contact Lenses Take Pupil Size into Account

Johnson & Johnson Vision Care Inc. launched 1-Day Acuvue Moist Brand Multifocal Contact Lenses. The new lenses, which feature a unique aspheric center-near design for the presbyopic eye, are created with uniquely optimized optics for addressing the natural variations in pupil size to produce a better visual experience. The 61 available distance powers (in quarter diopter steps from +6D to -9D) and three add powers equal 183 unique designs for enhancing precision, minimizing chair time and maximizing successful wearing. For more information, visit Acuvue Professional.

Also: Organizers of the 1st World Congress of Optometry announced that Johnson & Johnson Vision Care Companies is the event's headline sponsor. The Congress, organized by the World Council of Optometry and the Colombian Federation of Optometrists, is set to take place Aug. 14-15, 2015 in Medellin, Colombia.

TV Host to Tout Fashion and Function

Transitions Optical Inc. has teamed up with fashion icon and Project Runway host Tim Gunn to inspire people to "see life – and fashion – through a new lens." Throughout the collaboration, Gunn will provide fashion tips and motivation to men and women to help them see fashion differently, feel confident in developing their own style and make style choices that are more fashionable and functional. Gunn recently purchased a pair of Transitions Signature lenses and reported that "Frankly, Transitions lenses have surpassed my expectations by far."

Visit the web for more information about Transitions Optical and its family of lenses.

Authors Receive the Dr. Lester Janoff Award for Writing Excellence

| Optometric Education: Volume 40 Number 3 (Summer 2015)

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Denise Goodwin, OD, FAAO, John R. Hayes, PhD (Pacific University College of Optometry) and Len Koh, PhD, OD, MBA (Midwestern University Arizona College of Optometry) are the winners of the 2015 Dr. Lester Janoff Award for Writing Excellence from the Association of Schools and Colleges of Optometry (ASCO). The biannual award recognizes an outstanding research article, based on topic, quality and potential impact, published in ASCO's journal *Optometric Education*. A committee of the journal's Editorial Review Board selects the winner after rating all of the research articles published in the journal in the previous two years.

The authors receive a cash award for their paper "Blended Learning in Optometric Clinical Procedures Instruction," which appeared in the Winter/Spring 2014 edition of the journal.

The award is in honor of the late Lester E. Janoff, OD, MSEd, FAAO, who was editor of *Optometric Education* from 2002 to 2005 and a longtime member of its Editorial Review Board. Along with being known as an exceptional optometric educator, administrator and contact lens clinician and researcher, Dr. Janoff was a beloved mentor of young writers.

Call for Papers for Two Upcoming Theme Editions

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Optometric Education announces that two future editions of the journal will each focus on a specific theme.

► International Optometric Education: Global Expansion and Transformation

(Deadline to submit papers: Jan. 1, 2016)

Over the past 20 years, the profession of optometry has undergone dramatic global changes: expanding scope of practice, increasing quality assurance expectations, significant diversification of students, and the accelerating impact of information technology. Underpinning these changes has been the critical role of international optometric education in supporting and catalyzing this transformation. The same global forces that are driving the transformation of the profession are also creating challenges and opportunities for optometric educational institutions. Student, faculty, patient and institutional expectations are converging and greater accountability is expected. This includes such areas clinical competency, professional ethics, interprofessional collaboration and curricular innovation.

Authors are invited to submit scholarly articles that address this theme and underscore the growing innovation and impact that educational institutions are having on their students, the profession and the communities they serve. We encourage scholarly articles that are translational and promote global dissemination.

We are pleased to have Anthony F. Di Stefano, OD, MEd, MPH, Salus University, serve as the Guest Editor of this issue. For more information, please contact journal Editor Aurora Denial, OD, FAAO.

► Cultural and Linguistic Competence

(Deadline to submit papers: Dec. 31, 2016)

This edition will focus on all aspects of cultural and linguistic competence, including professional, organizational and individual responsibility.

For additional information about this theme edition, contact Gary Chu, OD, New England College of Optometry, or journal Editor Aurora Denial, OD, FAAO.

Going Nuclear: An Ethical Dilemma in Optometric Care

Molly Spatcher, OD | Optometric Education: Volume 40 Number 3 (Summer 2015)

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Patient Case

A 62-year-old Caucasian male presented for a low-vision evaluation on referral from his ophthalmologists. He had recently been diagnosed with a sudden onset optic neuropathy and complained that his vision in both eyes had been getting progressively worse over the last month. He also described visual phenomena suggestive of Charles Bonnet syndrome. His diagnosis was complicated by longstanding pseudoexfoliative glaucoma for which he was using brimonidine. His medical history was significant for type 2 diabetes, hypertension and leukemia, which had been in remission for four years.

Upon examination, his best-corrected vision measured 20/2400 in his right eye and counting fingers at 6 inches in his left eye. Visual field testing was inconclusive because of the patient's inability to fixate. Despite qualifying as legally blind based on his visual acuity, the patient had not yet been registered with the Massachusetts Commission for the Blind (MCB), but he stated that he had given up driving voluntarily because he no longer felt safe doing so. As a father of four and the sole wage earner in his household, he expressed concern that his visual impairment was limiting his ability to work. In spite of the difficulty he was experiencing at work, he disclosed that he could not afford to lose his job and that he feared dismissal if the extent of his visual impairment was made public. The patient reported that he was an engineer at a nuclear power plant.

Ethical Quandary

With a single statement, this patient's case went from being relatively straightforward to ethically complex. While often a source of ethical dilemmas, the loss of driver's license was not this patient's primary concern as he had already voluntarily given up driving. More problematic in this case was the patient's fear of losing his job because of his impairment. As someone in a very specialized profession whose family depended on his ability to provide for them, he found himself facing a potentially life-altering decision, which he brought to the optometrist's attention. From the optometrist's perspective, what are the legal and ethical obligations in a case like this?

As with most ethical dilemmas, this case falls in a gray area. Unlike the well-defined visual requirements needed to legally obtain a driver's license,[3] most employers do not have specific visual criteria that must be met. In fact, with very few exceptions, employers are not legally allowed to inquire about or base employment decisions on knowledge of a disability such as visual impairment. In the United States, this protection is afforded to disabled individuals under the federal Americans with Disabilities Act (ADA).[6] This law exists for obvious reasons to protect the rights and privacy of disabled individuals whose performance on the job is often a better indication of their abilities than an eye examination might be. It is not until such time that job performance is affected or there is an indication that the employee is unable to safely perform the essential functions of his/her job that an employer can even ask about a disability. Without a much more specific job description, it is impossible to tell in this case whether this patient's job performance has been affected or if he is a safety risk.

In addition to the uncertainty surrounding this patient's ability to safely perform his job and the employer's right to be informed about an employee's visual impairment, the optometrist's role in protecting privacy is ambiguous. In general, the federal Health Insurance Portability and Accountability Act (HIPAA) prohibits disclosure of protected health information without patient consent except when required by state law.[5] Disclosure of protected health information is also allowed, but not required, under other limited circumstances, which include measures to protect public health.[5] Unlike the mandated reporting of legal blindness to the MCB and consequently to the Registry of Motor Vehicles (RMV),[3,4] there is no specific legal guidance to help an optometrist decide if visual impairment should be reported to a patient's employer in a high-risk case such as this.

While release of protected health information may be legally allowed in this case, the optometrist has an ethical obligation to act in the best interest of his or patient. As defined by the Code of Ethics published by the American Optometric Association (AOA), "It shall be the ideal, resolve, and duty of all optometrists to keep their patients' eye, vision, and general health paramount at all times; to respect the rights and dignity of patients regarding their health care decisions [and] to ensure confidentiality and privacy of patients' protected health and other personal information."[1] This code of ethics and the AOA's Standards of Professional Conduct indicate that the optometrist should protect his or her patient's confidentiality and autonomy at all costs.[1,2]

From a societal point of view, however, and in light of highly publicized accidents at nuclear power plants in places like Chernobyl, Three Mile Island and Fukushima,[7] it is reasonable and necessary to consider the potential public health impact of a visually impaired individual in a high-risk job with no margin for error. While the World Nuclear Association considers nuclear reactor accidents to be "the epitome of low-probability but high-consequence risks,"[7] it is important to mitigate the risks, including the potential for operator error due to visual impairment. After all, the optometrist has an ethical obligation to protect the interests of both his or her patient and the general public. As stated in the Code of Ethics referenced above, "It shall be the ideal, resolve, and duty of all optometrists … to recognize their obligation to protect the health and welfare of society."[1]

When the interests of various stakeholders are so clearly in opposition, there is inherently an ethical dilemma. On one hand there is the patient's right to autonomy and on the other is the optometrist's obligation to society and to do good (beneficence).[2]

Management and Resolution

After consideration of the ethical and legal obligations in this case, an appropriate management strategy, which included a variety of low-vision aids and significant patient education, was devised. Due to the severity of vision loss, the computer application ZoomText and both a desktop and a handheld CCTV were recommended for this patient's use. The patient also expressed interested in white cane training and was referred to an orientation and mobility specialist for this.

In addition, the patient was reported as legally blind to the MCB as required in Massachusetts and allowed by a clause in HIPAA.[3,5] One consequence of this registration is an automatic loss of driver's license, which the patient was resigned to and willing to accept.[4] With the optometrist's legal obligation fulfilled and the ethical dilemma carefully considered, it was decided that it would be unethical to report the patient's visual impairment to his employer. Instead of breaking confidentiality, the patient was provided with the information he needed to make a fully informed decision about continuing to work. He was educated regarding his rights as a legally blind individual and his employer's responsibility to make reasonable accommodations under the law.[6] In the interest of public safety, the patient was encouraged to communicate openly with his employer about his impairment. It was believed that as a highly educated man, the patient knew best what the visual demands of his job were and what the implications of his decision to keep working might be. By educating this patient regarding his visual impairment, his rights under the law, and asking difficult questions of him, the optometrist was able to promote beneficence while also allowing the patient to retain his autonomy.

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Allergan Academic Partnership

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Allergan Academic Partnership

Allergan is dedicated to supporting optometrists throughout all phases of their careers, and the Allergan Academic Partnership is the foundation of that support. We strongly believe that a commitment to optometric teaching institutions is a commitment to the future of optometry. The Allergan Academic Partnership program offers a full spectrum of resources, including:

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For more information, contact: Mark Risher, Senior Manager, Optometric Academic Development (Risher_Mark@allergan.com)

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