Teaching Clinical Decision Making: The Keystone Experience

Gregory W. Good, OD, PhD
Michael J. Earley, OD, PhD
Kelly K. Nichols, OD, MPH, PhD

Abstract

Preceptors facilitate clinical education by teaching knowledge organization skills to allow meaningful information retrieval during patient examination. The intensive patient-based Keystone Course series designed at The Ohio State University College of Optometry uses case scenarios to help students develop these skills. Students analyze individual patient data and develop a patient illness script composed of three elements: epidemiology, temporal pattern and key features. Students next compose a ranked differential diagnosis list by comparing the patient's illness script to classic disease presentations. The goal is to teach meaningful diagnostic integration and the importance of basic science principles to eye and systemic interactions.

Key Words: *clinical teaching, diagnostic reasoning, differential diagnoses, illness script*

Dr. Good is a Professor of Clinical Optometry at The Ohio State University and serves as Assistant Dean for Clinical Services. His clinical interests are in Environmental Vision and Low Vision.

Dr. Earley is a Professor of Clinical Optometry at The Ohio State University. He is Chairman of the College's Admission Committee and serves as Chief of the Binocular Vision/Pediatrics Clinic.

Dr. Nichols is an Associate Professor of Optometry and Vision Science at The Ohio State University. Her primary interests include dry eye and anterior segment disease.

Introduction

Clinical educators face a daunting task of having to simultaneously provide exemplary patient care, fine-tune students' technical skills, highlight appropriate basic science principles during clinical care, and teach clinical diagnostic reasoning, all while assessing the overall patient care skills of numerous student clinicians. Students certainly face a long road to becoming efficient and accurate doctors. In order to best facilitate this journey, clinical educators must recognize the steps most students take as they travel from novice to experienced clinician. Denial[1] discussed the connection between "critical thinking" ability and clinical thinking and that more was required of educators than just teaching students the "knowledge and technical skills associated with the profession." She expressed support for the teaching of critical thinking concepts. She also demonstrated a general positive association between critical decision-making (as assessed with the California Critical Thinking Skills Test) and overall clinical performance by fourth-year optometry students.[2]

Educators can aid the development of clinical diagnostic reasoning in students by helping them mentally organize learned material to allow them to meaningfully retrieve information during a patient examination. This is a step in the teaching of "scientific thinking" recommended by Willingham[3] and reviewed by Hoppe.[4]

The intent of this paper is to describe the process used by The Ohio State University College of Optometry to teach clinical reasoning to its optometry students. A two-course series was recently developed to introduce students to the skills used by experienced clinicians for patient evaluation. Background information on clinical decision-making is presented before providing a detailed and informal assessment of the course series.

Background

Experimental studies have shown experienced individuals with "expert" knowledge in a discipline recall knowledge differently than beginners.[5] As an example, deGroot studied the chess-

board memory skills of experienced vs. novice chess players. After only a five-second view of a chessboard, expert players could correctly replace more pieces than beginners, but only if the pieces were originally arranged in a recognized manner that conformed to actual game strategies. If chess pieces were originally placed in random fashion, the experts performed no better than beginners. The conclusion was that experts compartmentalize information into more easily recalled packets, which have experiential meaning.[6]

Bordage expanded on this finding to explain clinical decision-making growth for medical practitioners and put the explanation into medical terminology.[7,8] Bordage explained that experienced clinicians organize information about conditions using "semantic networks" aligned along oppositional binary axes. A grouping of these binary axes is used for different disease conditions to give better understanding and retention, and to foster improved diagnostic ability. As clinicians gain experience, the number of semantic axes associated with specific disease conditions increases. This adds specificity to a list of differential diagnoses and allows clinicians to direct case management in a more efficient manner.

An example of this structure is illustrated with a patient complaining of a red eye. **(Table 1)** Examples of oppositional binary pairs used to sort through the case may be: onset, acute vs. chronic; injection, circumlimbal vs. diffuse; discharge, watery vs. mucopurulent; photophobia, mild vs. intense; pupil, normal reaction vs. fixed/sluggish; presence of pseudomembrane, yes or no; preauricular node involvement, yes or no; inflammation type, papillary vs. follicular; intraocular pressure, normal vs. elevated; presence of upper respiratory infection, yes vs. no; and anterior chamber angle, open vs. closed. Using information about these pairs derived from case history and/or exam room testing, the experienced clinician can quickly move from initial presentation to definitive diagnosis. Additionally, the experienced clinician has learned that individual cases may not present classically and that individual features of real patients with disease may be difficult to sort out; however, the overall features will generally match basic representations.

A first step in educating beginning students is to help them "compartmentalize" their learning into condition-specific segments to bring together elements from different parts of the curriculum. To facilitate this process, students should learn to develop "illness scripts," which describe the classic presentations of disease conditions.[9] The illness scripts should include the predisposing conditions (epidemiology) that puts patients at risk for specific conditions, the classic temporal pattern describing the disease onset and course, and the key clinical features most often seen with actual cases. For example, when students are studying acute closed angle glaucoma, they should recognize, and be able to articulate, a classic clinical appearance for the condition. The classic epidemiology is an elderly person with predisposing narrow anterior chamber angles. The temporal pattern is acute to hyperacute presentation. The key clinical features may include deep pain, pronounced circumlimbal injection, fixed mid-dilated pupil, blurred and/or hazy vision, and significantly elevated intraocular pressure. Students can then learn to develop patient illness scripts for clinical patients they examine, and determine which disease condition has an illness script that, in its entirety, best matches that for the specific patient they are examining. Students then learn to build meaningful case descriptions for individual patients through insightful history-taking and clinical testing. Students learn to evaluate the patient as a whole and not to test history elements or clinical findings as independent pieces of information.[8,9]

Clinical memory with diagnostic acumen is also enhanced as students learn to quickly translate the patient history into medical terminology and to process related findings into more descriptive, and efficient, terms.[9] For example, by transforming a patient's history of "red eye for two days in the right eye" into "acute, unilateral conjunctival injection," the clinician has medical terminology that can be matched to descriptions read in textbooks or delivered by classroom/didactic instructors.

To help students develop clinical diagnostic reasoning, a case-based, two-course series (Keystone Course series) was introduced into the curriculum at The Ohio State University College of Optometry. Students completed the initial course at the end of the first training year just as they completed their final examinations for the spring term. Students participated formally from 8 a.m. to 5 p.m. on each of six consecutive weekdays. The final examination was given on day seven. The overall design of this first course was to allow students to work in teams of eight to work through clinic cases. Two eight-student

Table 1
Red Eye
Example of Oppositional Pairs in Differential Diagnoses

	Conjunctivitis		
	Bacterial	**Viral**	**Allergic**
Discharge	mucopurulent	serous	mixed
Laterality	unilateral	unilateral progressing to bilateral	bilateral
Itching	no	variable	yes
Onset	acute	acute	chronic
Preauricular Node Involvement	no	yes	no
Inflammation Type	papillary	follicular	papillary
Exposure to Person with Red Eye	no/yes	yes	no
Respiratory Infection	no	yes	no
Systemic Allergy	no	no	yes

teams would work adjacently on a separate case. The two cases had the same overall theme, but were independent of each other. Each case was comprised of a complete case history along with full testing results for a typical clinic patient. Students would analyze each case as a team with the ultimate goal of developing a logical list of differential diagnoses.

Course Description

The Keystone Course schedule is shown in **Figure 1**. After an intense training/orientation session on day one, students began day two working up their first case within their eight-person team. Eight cases were required. Each eight-person working group would work up four cases. There were two working groups per training area. (The overall class size was 64; therefore, four independent training areas were required.) Two cases were developed for each of four chief complaint areas: 1) reduced visual acuity, 2) red eye, 3) diplopia, and 4) restricted visual field. These four general areas allowed students to review principles learned in a wide variety of basic science courses taken over their first training year. Cases were prepared from actual patient charts. Small modifications were made to the actual findings documented in charts when appropriate. As these were novice clinicians, the intent was to provide "classic" cases with few real-life inconsistencies. Cases were chosen in the appropriate categories named above that appeared to be: relevant, realistic, engaging, challenging and instructional.[10]

The requirements for completion of each case included: 1) a tiered listing of differential diagnoses that compared the degree of agreement of the patient's illness script to the different disease illness scripts, 2) a five-minute presentation describing the clinical aspects of the case, and 3) a five-minute presentation describing the important basic science principles of the case. Each working group member was required to give one presentation (either a clinical or a basic science presentation) for one of the four cases their working group completed. The presentations were given to their working group, the faculty facilitators, and the other eight students within their training area. Following the formal presentations each morning, faculty facilitators led a question and answer session for each of the two covered cases. All students were encouraged to participate by providing "expertise" in areas in which each had researched.

Figure 1
Course Schedule

	Thursday	Friday	XX	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 AM	Introduction and exemplar case	Case 1 facilitated		Present Case 1	Present Case 2	Present Case 3	Present Case 4	Work on final case
9:00 AM								
10:00 AM				Case 2 facilitated	Case 3 facilitated	Case 4 facilitated	Distribute final case	Review cases for final
11:00 AM							Discuss final	Written final
noon	Lunch provided	Lunch on own		Lunch on own	Seminar Lunch provided	Lunch on own	Work on final case	Wrap up
1:00 PM	Continuation of exemplar case	Group work (not facilitated)		Group work (not facilitated)	Group work (not facilitated)	Group work (not facilitated)		BBQ
2:00 PM								
3:00 PM							Review cases for final	
4:00 PM								

Case work began with each working group receiving case history and clinical testing information for its patient/case. A sample case is shown in **Table 2**. Students were instructed to "work up" each case using a general sequence as follows:

1. compose a problem list from case history and clinical test information (students may need to investigate normalcy of clinical findings: for example, is 180 microns a normal macular thickness finding for the Stratus OCT?)
2. combine the related problems or those that can be defined by a single, overarching term or phrase (organize and eliminate redundancy)
3. process a problem list elements into more descriptive medical terminology **(Table 3)**
4. prepare patient illness script (epi-

demiology, temporal pattern, key elements) from case history and clinical findings **(Table 4)**

5. peruse available resource materials (hard copy and online resources) to begin composition of a tiered list of differential diagnoses.

First-year students working in the initial Keystone Course (Keystone 1) stopped case development after composing the list of differential diagnoses. Second-year students (Keystone 2) continued with case development to prepare a formal patient assessment and plan.

The list of differential diagnoses was constructed using a three-section, tiered format. The Tier I diagnosis was the nomenclature used to signify that diagnosis which the working group felt was the actual diagnosis for the case. The illness script for this diagnosis should have almost total agreement with that for the patient. An example of the format is given in **Table 5**. The Tier 1B diagnosis, if present, was a condition, that, although students felt it was not the actual diagnosis, was very important to be ruled out on an emergency basis because of the risk of potential loss of life or sight. The illness scripts for Tier II diagnoses generally fit the patient's illness script, but were different in at least one important element. The Tier III illness script agreed with the patient's illness script only in a peripheral manner and differed in several important elements.

Faculty served as facilitators for the working groups to keep students on-task and to help students from pursuing nonconstructive research paths. Facilitators were not to provide students with specific information relative to each case, but more to guide general avenues of research. Three faculty members would serve as facilitators for each of the two student group working areas. Typically, the three facilitators would be a basic science instructor for a course from the first-year curriculum, a faculty member with both didactic and clinical teaching responsibilities, and an auxiliary faculty member who teaches full-time in the clinic. The facilitators were provided with case scripts with key learning principles to ensure consistent experiences among the various groups.

Table 2
Sample Keystone Case

History	Vision Examination
CC: Patient (58 yo white male) reports that he seems to have lost his lower peripheral field.	Visual Examination: Present Rx/Visual Acuity: OD +1.25DS +1.75 add 20/20 D and 20/30 N OS +2.25 DS +1.75 add 20/40 D and 20/30 N Pinhole Visual Acuity (over present glasses): OD 20/20 OS 20/30 Binocularlity/Eye Mvmts: CT (w/ Rx) 6 m ortho 40 cm 10 XP Motility: smooth and full, no overactions or restrictions Manifest Refraction: OD +1.25 -0.25 x 070 +2.25 20/20 D and N OS +1.50 –0.25 x 060 +2.25 20/30 D and N Pupils: ERRL (-) APD External/SLE: L/L/A: wnl OU Conj: wnl OU Cornea: wnl OU AC: deep and quiet OU, No cells / flare Iris: Flat and intact, No NVI OU Lens: NS OU Grade 1 OD, grade 2 OS Vit: wnl IOP: OD 20 mmHg and OS 20 mmHg @ 2:23 PM Internal/DFE: ON: C/D = 0.30/0.30 OD and OS, disk margins distinct, normal color, no NVD Macula: normal OU Vessels: AV ratio 1/3 AV nicking and moderate tortuosity OU Periphery: OU Intact 360°, no rips, holes, tears OCT RNFL: OD 96.97 and OS 92.67 (both WNL) Macular scan: 181 OD and 177 OS Visual Fields: Confrontations constriction inferior OD and OS HFA attached. Bilateral inferior altitudinal defect Vital signs: BP: 128/78, HR:73 HW: 74" and 292 lbs. General: Alert, clear speech, able to cooperate with ocular examination. Lab Tests: HbA1c 12.5; ESR 13 mm/hr; CRP <0.2; PT and PTT normal
Vision History: First noticed difficulty with lower field vision getting out of bed 2 weeks ago. Is having difficulty walking down stairs. Also noticing that vision in left eye has been getting gradually blurry at both distance and near since his last exam. He has no history of eye trauma or surgery and has not noticed any double vision.	
PMHx: Suffered a stroke in 2004 (6 years ago) – difficulty walking ("like I was drunk" – unsteady and staggering), lost balance a lot – returned to normal after only 2 to 3 weeks. States that his carotid arteries are "partially blocked." He has diabetes, high blood pressure and had a couple of heart attacks.	
Medications: Gemfibrozil 600mg twice a day. Glipizide 10mg twice a day. Aspirin 325mg daily. Dipyridamole 200 mg daily. Insulin NPH 22 units daily, Insulin Reg (based on blood sugar). Lisinopril 10mg daily. Metformin 1000mg daily. metoprolol succinate 50 mg daily. Pentoxifylline 400 mg three times a day. Simvastatin 80mg daily.	
Allergies: Penicillin and ampicillin	
FOHx: No significant history FMHx: No significant history	
SHx: Married. 3 older kids. Retired/on disability. Quit smoking in 2007. Doesn't drink.	
ROS (review of systems): **ENT: normal** **CV: + HTN since 2004; +CAD (2 MIs in 2004); + CVA 2004; 50% to 79% carotid stenosis** ***noted 3/28/2007** **Pulmonary: normal** **Dermatological: normal** **GI: high cholesterol** **UG: normal** **Endo: + DM since 2004 blood sugar runs btw 200 and 400** **Musculoskeletal: normal** **Neurophyc: normal , denies TIAs**	Vessels: AV ratio 1/3 AV nicking and moderate tortuosity OU Periphery: OU Intact 360°, no rips, holes, tears OCT RNFL: OD 96.97 and OS 92.67 (both WNL) Macular scan: 181 OD and 177 OS Visual Fields: Confrontations constriction inferior OD and OS HFA attached. Bilateral inferior altitudinal defect Vital signs: BP: 128/78, HR:73 HW: 74" and 292 lbs. General: Alert, clear speech, able to cooperate with ocular examination. Lab Tests: HbA1c 12.5; ESR 13 mm/hr; CRP <0.2; PT and PTT normal

Working group activities for the afternoon sessions were accomplished without faculty facilitators. Students worked without supervision to finalize their list of differential diagnoses and to compose and rehearse their presentations to be given the following morning.

Each new day would begin with the selected students giving their five-minute presentations (clinical or basic science) from the previous day's cases. Considering the richness of each case, students were often challenged to limit their comments to only five minutes. In addition to saving time for the new day's activities, limiting presentations to five minutes forced students to concentrate on the important, relevant issues of each case. These novice clinicians were forced to act like more experienced, clinically savvy optometrists that can succinctly describe case findings using semantic qualifiers that illustrate strong clinical reasoning.[5] Peer review and facilitator review were part of the grading process.

Each case concluded with approximately 45 minutes of discussion of the case's clinical and basic science aspects. Faculty facilitators led the discussion with both small groups participating (i.e., the group that worked on the specific case and the group that worked on the other case with the same chief complaint). By involving both groups, the important points that differentiated the two cases, and led to different differential diagnoses, where reinforced. Because of the overlap gained from the previous research of the common theme (e.g., red eye), both groups were able to actively participate in discussion of both cases. Non-presenter group members were encouraged to participate, especially in subject areas each had individually researched. Additionally, by assembling faculty facilitator teams that included a basic scientist, a full-time clinician, and an optometrist from the lecturing faculty, each case was discussed from a wide range of perspectives.

Keystone week concluded with students required to work up the final case individually (i.e., submit a processed problem list, illness script and tiered list of differential diagnoses) and to complete a final examination. The final examination was a comprehensive examination that included information from the first-year curriculum and that had been included within at least one of the nine course cases.

Table 3
Processing of Problem List

Unprocessed Grouped Problem List	Processed Problem List
"Lost lower peripheral field" Difficulty walking down stairs Constricted fields inferiorly OD and OS on confrontations and automated fields	Homonymous congruous inferior altitudinal field defect
Left eye gradually blurry distance and near BCVA 20/30 distance and near for OS Grade 2 nuclear sclerosis cataract left eye Old Rx +2.25 for OS New Rx +1.50 for OS	Grade 2 NS cataract with slight myopic shift and reduced BCVA OS
Stroke in 2004, symptoms lasted 2 to 3 weeks Staggering like drunk Lost balance a lot	Past transient neurological deficit with cerebellar/vestibular involvement
Carotids partially blocked bilaterally 50% to 70% blockage on carotid doppler	Carotid stenosis
Couple heart attacks	Coronary artery disease with previous MI x2 Rx: anticoagulants and OTC aspirin
High blood pressure since 2004 BP 128/78 AV nicking and moderate tortuosity AV ratio 1:3	Moderately controlled hypertension with grade 2 hypertensive retinopathy Rx: ACE inhibitor and beta blocker
Diabetes HbA1c: 12.5	Uncontrolled Type 2 diabetes Rx: Insulin, biguanide and sulfonylurea
High cholesterol	Hypercholesteremia Rx: fibrate and statin
Previous smoker	Previous smoker (nonsmoker for 3 years)
6'2" and 292 lbs	Obesity

Table 4
Patient Illness Script

Epidemiology: 58 yo obese white male with uncontrolled diabetes and history of previous stroke and MI
Temporal pattern: Acute onset lower field loss OU with chronic loss of vision OS
Syndrome statement: Homonymous congruous inferior altitudinal field loss
Other problems: hypertension, hypercholesteremia, history of CVA, nuclear sclerotic cataract, carotid stenosis

Discussion

The Keystone Course series has been an intensive, and worthwhile, curricular undertaking for our College. It has proven to be extremely faculty intensive both in preparation and application (e.g., three faculty dedicated to each working group of students), yet has provided extra benefits in ways that were unforeseen during initial course implementation.

The primary intent for implementing the course was to explicitly model clinical decision-making to our students prior to their beginning clinical rotations. During preparation for course development, it became apparent, however, that even our most experienced clinicians

had difficulty articulating the mental processes they each used to make clinical decisions. Experience appeared to be the great teacher as clinicians processed case findings into meaningful, related concepts. During patient examination, clinicians were building their own versions of patient illness scripts without knowing the proper nomenclature and were unable to fully describe the process to students.

The Keystone Course did provide students with a structure with which to organize clinic information. An important process in the growth of a clinician is to recognize the associations among the various signs and symptoms of conditions. The importance of these associations was demonstrated to these first-year optometry students (i.e., novice clinicians) through the Keystone process. Students processed the initial problem list by combining related terms, removing redundancies of information, and translating "patient speak" into medical terminology. They learned that expert clinicians not only know more, but they access what they know differently than novice clinicians.

Students next composed a patient illness script that included concepts related to epidemiology, temporal pattern and key features of each case.[9] Epidemiological doctrine was reinforced, i.e., disease does not strike at random, but rather, the patient's conditions, situations and activities all modify risk. The temporal pattern and key features also provided students a patient-oriented context to aid memory concerning their cases for future clinical management.[5]

Construction of the tiered list of differential diagnoses reinforced the concept of the illness scripts and the degree to which real patient presentations agree with the classic presentations learned in the classroom setting. Students learned that there is not always a single right diagnosis (which after years of multiple choice tests they expect to find) and the ranking of diagnoses depends on the degree of matching between the patient's illness script and the myriad of disease illness scripts they learn in school and in practice.

Faculty facilitators for the course were chosen from across the entire faculty. Basic science faculty, lecturing faculty optometrists and clinical auxiliary faculty all participated. The benefits of this faculty mix were many.

Faculty facilitators were instructed not to "spoon feed" information to students during the facilitated working group discussions. Instead, facilitators could gently "push" students in the proper direction as they researched diseases and conditions, and, importantly, help keep students from using large amounts of valuable time on minor points unrelated to case disposition. In this role, all facilitators benefited from hearing the students' discourse and their sometimes improper interpretation of important case concepts. Often, facilitators would have long episodes of anxiety as

Table 5
Tiered Differential Diagnoses

Tier	Diagnosis	Analysis
I	Bilateral occipital lobe cuneus damage (likely vascular infarct to posterior cerebral arteries)	Epidemiology: fits well, older vasculopath, very high risk for second CVA, previous basilar/vertebral artery involvement Time course: fits well with acute onset Syndrome: explains field loss well (bilateral, congruous)
IB	Suprachiasmic brain tumor	Epidemiology: fits well; older Time course: doesn't fit; usually more indolent, chronic Syndrome: explains bilateral inferior hemianopic field loss, but not supported by lack of nerve pallor, or signs of increased intracranial pressure
II	Bilateral AION (nonarteritic) (Arteritic not supported by patient's lower ESR)	Epidemiology: fits well (older, vasculopathy) Time course: fits with acute onset with morning onset Syndrome: fits field loss in each eye but not supported by field congruity and normal ESR, or optic nerve appearance
III	Bilateral retinal detachment	Epidemiology: doesn't fit (no high myopia, trauma) Time course: fits for acute onset Syndrome: not consistent with retinal findings or congruous field loss

Table 6
Student Evaluation of Instruction
Five-Point Scale

1 Strongly Disagree	2	3 Neutral	4	5 Strongly Agree

The Keystone Course Teaching Objectives:	Mean Score*
provides for a cognitive transition from basic science to clinical science	4.57
helps foster integration of basic science knowledge through knowledge reorganization	4.39
explicitly models and help develops clinical reasoning skills	4.40
promotes lifelong learning skills	4.35
allows students to identify and correct knowledge deficits	4.12
helps develop interpersonal and communication skills	4.39
Overall, the Keystone Course was a valuable learning experience	4.54

**(Mean scores for total of 127 students, classes of 2012 and 2013)*

students incorrectly remembered concepts "learned" in a facilitator's earlier course, before a working group member would "save the day" by consulting course notes or hitting upon the proper memory cue. This often provided excellent feedback to faculty concerning what students "learned" concerning the material that instructors "taught."

The expertise of faculty was most often revealed to students during the discussions that followed case presentations. In this forum, faculty facilitators were free to express their thoughts concerning the cases. This process was especially useful for basic science faculty. This allowed basic science faculty to reinforce to students the importance of many basic science concepts on actual clinic cases. These discussions were also beneficial to clinical faculty that may have forgotten the underlying basic science principles that set the stage for all clinical conditions. The interactions among faculty in this forum were also useful to help modify didactic course materials to make taught information as clinically relevant as possible.

The structure and content of the course theoretically provided our students with a strategy to increase the accuracy and efficiency of their examinations. Understanding the illness script concept and structure should help novice clinicians develop meaningful follow-up questions during patient interviews and proper test selection during patient examinations. It has been our observation from working with student clinicians that by learning to present cases using the patient illness script format, these novice clinicians can quickly learn to present cases to their clinical preceptors using a succinct and structured format. Student clinicians should ultimately be less likely to ramble concerning case findings, but rather present patient history and test findings in a more efficient and clinically relevant manner to more quickly and accurately arrive at the proper patient management. Selected clinical faculty have commented on the change in student behavior since the course implementation. The chief of our ocular disease service has noted: "After experiencing Keystone, students have increased their abilities to present cases in Grand Rounds. Students are concise in presenting illness scripts for their patients and provide the case analysis in a straightforward and logical sequence."

The Student Evaluation of Instruction results have also been very positive. **Table 6** shows the mean results for the first two years of course administration using a five-point grading scale. All course objectives received mean scores above the agree level (score of 4), although "allows students to identify and correct knowledge deficits" was noticeably lower than the rest. Overall, however, students graded the course highly (4.54).

The Keystone Course also provided a detailed structure and nomenclature for our faculty to use to teach eye examination and clinical decision-making skills. This structure is now being implemented into the clinical education of interns and residents at several affiliated VA Optometry programs. The course also provided a forum for students to give case presentations before beginning their clinic rotations, introduced the concept of self-education to foster lifelong learning skills, and illustrated the need for healthcare personnel to work as a team to foster cooperation in today's healthcare environment.

While the Keystone Course has been widely accepted by faculty and students, we have yet to see a cohort of students matriculate through the entire series and be evaluated through the extern program. Additionally, objective, independent evaluation of the Keystone Course series through comparison of present student performance to that of previous students (who had no Keystone experience) has been complicated by other simultaneous enhancements made to the overall curriculum and to changes made to the instruments used for evaluation of student clinical performance. However, assessment of the value of the program will be monitored over the upcoming years using evaluations of student clinical performance by extern preceptors, with feedback by students comparing results from pre- and post-course evaluations, and with more general feedback from clinical faculty.

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