

OPHTHALMOLOGY GOALS AND OBJECTIVES

OPHTHALMOLOGY GOALS AND OBJECTIVES

Table of Contents

PROGRAM	1
POSTGRADUATE YEAR	
1. First Year (PGY-2) Resident	2
2. Second Year (PGY-3) Resident	5
3. Third Year (PGY-4) Resident	7
ROTATION	
1. Chief Resident	9
2. Consults/Call	14
3. Cornea and External Disease	20
4. General Ophthalmology/Continuity Clinic	27
5. General Ophthalmology/Glaucoma	32
6. Glaucoma	36
7. International Ophthalmology	42
8. Neuro-Ophthalmology	45
9. Oculoplastics	50
10. Pediatric Ophthalmology and Strabismus	54
11. Refractive Surgery	60
12. Vitreoretina	63

PROGRAM GOALS AND OBJECTIVES

Goals

The goals of the Ophthalmology Residency Program are to:

1. Graduate ethical and compassionate comprehensive ophthalmologists with the knowledge, skills and confidence required to enter into practice.
2. Educate residents in a supportive environment where patient care is provided by a faculty who model behaviors to be emulated.
3. Provide residents with didactic instruction and clinical experience that will enable them to obtain American Board of Ophthalmology certification upon graduation.
4. Provide residents with the fundamental scientific background in ophthalmology to prepare them to become life-long learners.
5. Provide residents with skills to practice evidence-based medicine.

Objectives

The objectives of Ophthalmology Residency Program are to:

1. Provide residents with a strong scientific understanding of the fundamentals of ophthalmology through a combination of mentoring and didactic education.
2. Provide residents with clinical skills in all subspecialties of ophthalmology.
3. Provide residents with broad surgical experience in all subspecialties of ophthalmology.
4. Encourage residents to perform literature reviews and use critical thinking skills to make informed patient care decisions.
5. Provide residents with an understanding of ethical, legal, and moral issues involved in eye care and medical care.
6. Provide residents with the fundamental business and managerial skills for a systems-based practice.

POSTGRADUATE YEAR GOALS AND OBJECTIVES

1. First Year (PGY-2) Resident

a. *Goals*

During the first year of residency, the PGY-2 resident is expected to become a member of the eye care team at the University of Arizona and to establish a reputation for reliable and trustworthy behavior in all aspects of their professional life.

In the clinic, during the first year, the resident will learn recognize the normal eye examination and to be able to reliably describe deviations from normal. It is not expected that a first year resident will accurately diagnose all manner of eye conditions, but they should recognize deviations from normality and be reliable in bringing them to the attention of others.

In the operating room, the resident will become a skilled assistant, will read about the surgeries that they are assisting in, and will assist in the preoperative evaluation and postoperative care of the patients whose surgeries they are assisting in.

In the hospital and while on call, the first year resident will develop confidence in their ability to serve as a member of a team that will provide all levels of eye care for all presenting eye emergencies and urgencies.

During the first year of residency, the resident will develop a base of basic knowledge through the study of the American Academy of Ophthalmology Basic and Clinical Science curricula, and will develop in-depth knowledge in focal areas through preparation of grand rounds.

b. *Objectives*

Competency-based objectives during the first year of residency relate specifically to the rotation in which the residents participate.

Patient Care

Global aspects of patient care that are not rotation-specific include:

- Development of emergency department specific eye care skills and knowledge, where a patient presenting with either global trauma or eye specific complaints are properly evaluated and managed.
- Development of telephone communication skills with patients and attendings, as often the first year eye resident is the first line of communication when a patient calls after hours.
- Initial development of communication skills required to allow the efficient establishment of a consulting relationship to meet a patient's eye care needs.

Medical Knowledge

- Global medical knowledge objectives during the first year of residency can be summarized by the expectation that Basic and Clinical Sciences Course material of the American Academy of Ophthalmology is the reading expectation for the first year.
- It is not expected that first year resident will have time for broad reading of textbooks; that is expected during the second year of residency.

- The resident is expected by the end of the first week of residency to have read the *Wills Eye Manual* from cover to cover, and to be able to quickly and efficiently use this text in its current edition as the primary guide for protocol-driven care in the emergency room and after hours consultations.

Professionalism

- Demonstrate compassion, integrity, and respect for others, including patients, their families, and all fellow employees regardless of their job classification.
- Respect patient privacy and autonomy.
- Be sensitive and responsive to a diverse patient. In particular, if a resident is not fluent in Spanish, it is expected that appropriate translators will be used so that effective doctor/patient communication can occur.
- Conduct themselves in a courteous, neat and professional manner at all times. Residents are expected to acquaint themselves with the dress code requirements of the hospitals that they are rotating through and respect the requests of the parent institution.
- Be available at all times on after-hours call duty, whether primary or back-up call. This includes getting a cell phone that is a local number that does not require a long distance call to access the resident.
- Complete all dictations and paperwork in a timely manner. Discharge dictations must be completed by the time of discharge and operative dictations immediately following the surgical procedure.
- Attend all educational activities including conferences, lectures, and journal clubs. Attendance is taken, this is a small program and your participation is essential for the experience to be good for all parties.
- Demonstrate timeliness in arrival to clinics, ORs and lectures. If you are not early, you are late!
- When disagreements arise as they will, seek a respectful solution. For issues between residents, it is best to involve the Chief Resident first to mediate a solution.

Practice-Based Learning and Improvement

- Make a point of each day, writing down the medical record number of a patient that you have seen, and then reading something about that diagnosis.
- Each exam room has internet connectivity. Learn the library on-line resources and access those resources while the patient is in the room.
- Review key findings with your attending after each patient encounter, and when you do not see a key finding, try to get the patient back into a room.
- As a general rule, we have plenty of exam rooms and more patients than you can hope to see during the course of a day. It is preferable that you learn as much as possible from each patient that you see, than learn little from many patients. There will be time in your later years of residency to develop rapidity; during the first year concentrate on developing diagnostic skills.
- Use your time with patients to develop your portfolio.

Interpersonal and Communication Skills

- Develop methods to communicate effectively with patients and their families across the spectrum of our community.
- Become proficient at rapidly and effectively presenting the eye history and exam to your fellow residents and attendings.
- Work effectively as a member of a health care team or other professional group.
- Act in a consultative role to other physicians and health professionals.

- Maintain comprehensive, timely, and legible and intelligible medical records. Your responsibilities in documenting patient visits have medicolegal implications. Learn your charting responsibilities.
- Each hospital has different charting requirements and methods for order entry. Avoid verbal orders; you must sign them anyway within 24 hours, so take the time to enter any orders extemporaneously and you will save time overall.

Systems-Based Practice

- Work effectively in various health care delivery settings and systems relevant to their clinical specialty.
- Ophthalmology is a consultative service and your future success will be determined in large measure by how well you communicate with your referring physicians. Learn now how to communicate effectively.
- Advocate for quality patient care and optimal patient care systems.
- Maintain medical records in a timely manner.

2. **Second Year (PGY-3) Resident (in addition to PGY-2 requirements)**

a. ***Goals***

During the second year (PGY-3), expectations are placed on the resident to develop competency at readily identifying the most common eye diseases, identifying the pathology accurately, and being able to develop a plan for care.

The second year resident is to assist in surgery, developing surgical skills and competences in preparation for extensive surgical experience in the third year.

During the second year of residency, the didactic education goals center upon developing in-depth knowledge on a daily basis by focal reading on the subspecialty rotation that the resident is participating in, while reviewing the BCSC core material on an ongoing basis. By doing so, the resident is expected to develop a broad knowledge of the breadth of the ophthalmic literature.

b. ***Objectives***

Patient Care

- During the second year emphasis shifts from learning general ophthalmology to developing a nuanced education in the various specialties.
- During the second year, you will have increased patient care expectations from the faculty.
- In the second year, residents are expected to be sufficiently skilled that they can serve as effective teachers to medical students and other health care providers.
- In the second year it is expected that residents will learn to recognize more than one presenting problem and develop a coherent management plan that addresses all the problems of a given patient.

Medical Knowledge

- While the primary educational source material remains the AAO BCSC, on each rotation there will be a secondary reading list that utilizes both journal articles and reference texts. It is your responsibility to obtain these materials and study them in a timely manner.
- The expectation is that reading the BCSC should now be a review process, and references that are presented in the BCSC can now be explored.
- The sophistication of Rounds presentations is expected to increase as a result of the greater level of intellectual sophistication.
- In the operating room, evidence of wet lab practice should be evident.

Professionalism

- Demonstrate an ability to confidently communicate the risks and benefits of surgery to a patient in preparation for the VA experience.
- Manage angry patients and their families in a respectful and calm fashion.
- Manage the patient with non-organic disease in an appropriate fashion.
- Demonstrate sensitivity with patient confidentiality issues being judicious in their choice of words and choice of timing in discussion of patient issues.

Practice-Based Learning and Improvement

- Develop a portfolio of patient encounters that link reading with specific diagnoses on a recurring basis.

- Begin to differentiate care that is practiced on the basis of evidence from care that is delivered empirically. When evidence based care recommendations can be made, make care recommendations accordingly.

Interpersonal and Communication Skills

- Communicate complications compassionately and clearly to patients and their families.
- Work effectively as a leader of a health care team or other professional group.

Systems-Based Practice

- Incorporate considerations of cost awareness and risk-benefit analysis in patient care.
- Demonstrate flexibility in clinical care balancing patient financial needs with the clinical situation at hand to ensure the best possible outcome.
- Understand how conclusions within the medical literature if implemented will impact the larger medical climate.

3. **PGY-4 Resident (in addition to PGY-2 and PGY-3 requirements)**

a. ***Goals***

The senior year (PGY-4) of resident education is intended to be a time of skill and knowledge consolidation, and a time where surgical confidence develops. Basic skills are trained on a repetitive basis. The ability to develop a differential diagnosis and develop a management plan matures. Leadership skills are emphasized and confidence to establish an independent practice is instilled.

A major goal for third year residents is employment or continued training upon completion of the third year. Thus, time is dedicated to career counseling and time off is provided for job and fellowship interviews.

During the third year of residency, the resident is expected to develop and polish their surgical skills and interpersonal skills for patient management by managing a practice at SAVAHCS. Additionally, during the final year of residency, the resident is expected to demonstrate leadership and administrative skills during their rotation as Chief Resident.

During Chief Residency, the resident will serve as administrator for the residency program in many respects and will be the assistant to the Program Director for the day-to-day operations of the residency program. The Chief Resident is directly involved in dealing with the problems encountered during the routine operation of a clinical service.

b. ***Objectives***

Patient Care

- Recognize the difference between the routine and the challenging patient, and learn to use VA teaching staff for the challenging patient while effectively communicating the care of the routine patient.
- Spend time reviewing cataract surgery recordings in order to develop an appreciation for the earliest time a problem might have been recognized. Use the recordings to improve the next case.
- Continue to utilize the wet lab for surgical practice.
- Facilitate patient care in the operating room as well as in the pre and post-operative areas.

Medical Knowledge

- Develop a vocabulary that will allow an accurate portrayal of the eye findings of an individual basis that is sufficiently nuanced to describe the incremental improvement or worsening of a patient.
- Manage or supervise the more junior trainees (e.g., medical students or medical residents) in the management ocular emergencies (e.g., central retinal artery occlusion, giant cell arteritis, chemical burn, angle closure glaucoma, endophthalmitis).
- Perform more advanced external and adnexal surgical procedures (e.g., lacrimal gland procedures, complex lid laceration repair, e.g., canalicular and lacrimal apparatus involvement).

Professionalism

- Model respect, compassion, and integrity in interactions with surgical patients.
- Model a commitment to excellence and on-going professional development.

- Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities.

Practice-Based Learning and Improvement

- Track your own surgical results to identify trends in your practice.
- Develop vigilance for complications, and as they arise, review the recordings to see when they might have been avoided.
- Participate in the department Morbidity and Mortality process to allow others to learn from your experience.
- Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness.

Interpersonal and Communication Skills

- Demonstrate ability to disclose medical errors and complications to patients and families in a compassionate manner.
- Maintain a calm and rational demeanor in dealing with angry patients, staff, fellow residents and faculty.

Systems-Based Practice

- Participate in identifying systems errors and in implementing potential systems solutions.
- Understand third party payers and practice management issues, including billing and coding, cost containment, and quality assurance and improvement.
- Know how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance.

ROTATION GOALS AND OBJECTIVES

1. Chief Resident

a. *Goals*

The goals of the Chief Resident rotation are to develop leadership skills and to develop experience in administration and practice management in preparation for the transition from a resident to an independent practitioner. During the Chief rotation, the senior (PGY-4) resident is expected to develop insight into practice management from both the human resources and financial stance.

While the academic setting does not mirror the private practice environment, there are management skills to be developed in terms of making expectations clear, assignment of responsibility, and management of financial systems. Additional skills required beyond medical knowledge include schedule management and patient flow, as well as those administrative tasks required for credentialing and insurance. Many financial operations of billing and collections involve a specialized vocabulary, and a goal is to develop this vocabulary for later use in practice.

Each third year (PGY-4) resident will spend three months as Chief Resident. It is expected that during this time, they will demonstrate hands-on management of the residency under the direct supervision of the Program Director. The Chief Resident will assist the Program Director on the day-to-day operation of the residency program in serving as an administrator for the residency program in many respects. The Chief Resident will be directly involved in dealing with the issues encountered during the routine operation of a clinical service. The Chief will assist the program coordinator in determining that resident logs are appropriately maintained. The Chief will work with the junior residents in the development of their portfolios.

The Chief Resident will monitor the clinical assignments of the first (PGY-2) and second (PGY-3) year residents, and will mediate problems regarding call and vacation as they arise. They will be responsible for tracking attendance of the residents at educational events. The Chief will also schedule assignments for medical students.

The Chief Resident will be assigned patients with urgent problems and to follow up trauma-related surgeries performed at BUMC. The Chief Resident will have each patient staffed by an attending and may choose the attending based on availability and the subspecialty needs of the problem. As these clinics will not always be full, the Chief will also be assigned to an attending clinic where they will assist that clinician. Every effort will be made for the Chief Resident to see their own post-operative cases and to follow-up the ruptured globes and other BUMC surgical traumas.

The Chief Resident will have input into which clinic they are assigned based on their subspecialty interests.

The Chief Resident will also oversee the consults rotation.

The Chief Resident will be expected to function as a typical resident in the clinic of each attending, except as otherwise required. In addition, the Chief Resident will continue to develop their surgical skills. They will spend time with the anterior segment and clinical cataract surgeons to refine

technique and patient management skills (see goals and objectives for comprehensive ophthalmology rotation.)

b. Objectives

PGY-4 residents are expected to meet the objectives for level 4.

	Level 2	Level 3	Level 4
PATIENT CARE			
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none"> • Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings • Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan) 	<ul style="list-style-type: none"> • Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders • Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography) 	<ul style="list-style-type: none"> • Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
PC-3: Office-Based Procedures	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with direct supervision • Recognizes and manages intra- and post-operative complications, with direct supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with indirect supervision • Manages intra- and post-operative complications, with indirect supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with oversight • Manages intra- and post-operative complications, with oversight
PC-4: Cataract Surgery – Technical Skill	<ul style="list-style-type: none"> • Assesses patients for routine cataract surgery • Performs elements of cataract surgery in the hands-on surgical skills laboratory and in the operating room (OR) • Manages common post-operative complications (e.g., post-op pain, high intraocular pressure) 	<ul style="list-style-type: none"> • Assesses patients for complex cataract surgery • Performs routine cataract surgery in the OR • Manages common intra- and post-operative complications (e.g., posterior capsule rupture, wound leak) 	<ul style="list-style-type: none"> • Assesses patients who are candidates for refractive intraocular lenses to correct astigmatism and/or provide near correction • Performs cataract surgery requiring complex technical maneuvers (e.g., pupil expander, capsular tension ring) • Manages complex intra- and post-operative complications (e.g., endophthalmitis)
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> • Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions

	Level 2	Level 3	Level 4
MK-2: Differential Diagnosis	<ul style="list-style-type: none"> Generates comprehensive differential diagnosis based on patient symptoms and history; documents and presents differential in oral presentation clearly and concisely Describes diagnostic tests to aid in the differential diagnosis 	<ul style="list-style-type: none"> Generates refined differential based on patient symptoms, history and examination findings, distinguishing between common and uncommon conditions Selects additional diagnostic testing to distinguish between conditions on the differential 	<ul style="list-style-type: none"> Generates probabilistic differential diagnosis in patients with multiple ocular and medical comorbidities; modifies likely differential with new information from additional testing Articulates the rationale for ordering diagnostic testing in hierarchical fashion based upon probabilistic differential
MK-3: Therapeutic Interventions	<ul style="list-style-type: none"> Explains relevant pathophysiology and lists indications and contraindications for planned medical therapy Explains indications, contraindications, and relevant steps required for procedural intervention (e.g., anesthesia, technique, instruments) 	<ul style="list-style-type: none"> Identifies and describes side effects of medical therapies and ways to minimize potential complications Identifies and describes causes of complications and alternatives for routine procedural interventions 	<ul style="list-style-type: none"> Describes and articulates the rationale for using emerging alternative medical therapies Describes and articulates the rationale for using novel alternative procedural interventions
SYSTEMS-BASED PRACTICE			
SBP-1: Patient Safety and Quality Improvement	<ul style="list-style-type: none"> Identifies system factors that lead to patient safety events Reports patient safety events through institutional reporting systems (simulated or actual) Describes local quality improvement initiatives (e.g., eye protection for high risk activities, diabetic eye screening) 	<ul style="list-style-type: none"> Participates in analysis of patient safety events (simulated or actual) Participates in disclosure of patient safety events to patients and families (simulated or actual) Participates in local quality improvement initiatives 	<ul style="list-style-type: none"> Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) Discloses patient safety events to patients and families (simulated or actual) Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project
SBP-2: System Navigation for Patient-Centered Care	<ul style="list-style-type: none"> Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams Performs safe and effective transitions of care/hand-offs in routine clinical situations Demonstrates knowledge of local population and community health needs and disparities 	<ul style="list-style-type: none"> Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams Performs safe and effective transitions of care/hand-offs in complex clinical situations Identifies specific local health needs and disparities related to ophthalmic care 	<ul style="list-style-type: none"> Teaches effective coordination of patient-centered care among different disciplines and specialties to junior members of the team Advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems Uses local resources effectively to meet the needs of a patient population and community
PRACTICE-BASED LEARNING AND IMPROVEMENT			
PBLI-1: Evidence-Based and Informed Practice	<ul style="list-style-type: none"> Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care 	<ul style="list-style-type: none"> Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients 	<ul style="list-style-type: none"> Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient

	Level 2	Level 3	Level 4
PBLI-2: Reflective Practice and Commitment to Personal Growth	<ul style="list-style-type: none"> • Demonstrates openness to performance data (feedback and other input) in order to inform goals; designs and implements a learning plan, with guidance • Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> • Seeks performance data and accepts it with responsibility and equipoise; demonstrates implementation of a learning plan • Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> • Uses performance data to measure the effectiveness of the learning plan and when necessary, improves it • Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance
PROFESSIONALISM			
PROF-1. Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> • Demonstrates insight into professional behavior in routine situations • Takes responsibility for own professionalism lapses • Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> • Demonstrates professional behavior in complex or stressful situations • Recognizes need to seek help in managing and resolving complex ethical situations • Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> • Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others • Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk management/legal consultation)
PROF-2: Accountability/Conscientiousness	<ul style="list-style-type: none"> • Performs tasks and responsibilities in a timely manner with attention to detail in routine situations • Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner 	<ul style="list-style-type: none"> • Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations • Recognizes detrimental consequences when tasks and responsibilities are not completed in a timely manner (e.g., team members, compliance) 	<ul style="list-style-type: none"> • Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner • Proactively implements strategies to ensure that the needs of patients, teams, and systems are met
PROF-3: Self-Awareness and Help-Seeking	<ul style="list-style-type: none"> • Independently recognizes status of personal and professional well-being • Independently recognizes limits in the knowledge/skills of self and/or team; demonstrates appropriate help-seeking behaviors for self or others 	<ul style="list-style-type: none"> • With assistance, proposes a plan to optimize personal and professional well-being • With assistance, proposes a plan to improve knowledge/skills of self and/or team 	<ul style="list-style-type: none"> • Independently develops a plan to optimize personal and professional well-being • Independently develops a plan to improve the knowledge/skills of self and/or team
INTERPERSONAL AND COMMUNICATION SKILLS			
ICS-1: Patient and Family-Centered Communication	<ul style="list-style-type: none"> • Establishes a therapeutic relationship in straightforward encounters using active listening and clear language • Addresses barriers to effective communication 	<ul style="list-style-type: none"> • Establishes a therapeutic relationship in challenging patient encounters (e.g., breaking bad news) • When prompted, reflects on personal biases while attempting to minimize communication barriers 	<ul style="list-style-type: none"> • Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity • Role models self-awareness to minimize communication barriers

	Level 2	Level 3	Level 4
ICS-2: Interprofessional and Team Communication	<ul style="list-style-type: none"> Communicates information effectively and uses active listening with all health care team members Solicits feedback on performance as a member of the health care team 	<ul style="list-style-type: none"> Communicates concerns to the team and learners Provides feedback and constructive criticism to peers and learners 	<ul style="list-style-type: none"> Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed Provides feedback and constructive criticism to superiors
ICS-3: Communication within Health Care Systems	<ul style="list-style-type: none"> Demonstrates organized diagnostic and therapeutic reasoning through notes in the medical record Appropriately selects forms of communication (e.g., telephone versus text) to promote patient safety and privacy Identifies appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Communicates clearly and concisely, including anticipatory guidance, in the medical record Avoids creating or propagating errors in the medical record through accurate use of documentation tools Uses appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Provides feedback to improve others' written communication Provides feedback and constructive criticism regarding compliance with patient privacy and safety Offers clear and constructive suggestions to address system deficiencies

a. **Required Reading**

Steinert RG, ed. *Cataract Surgery*, 3rd ed. Saunders, 2010. (Available online through Arizona Health Sciences Library, www.ahsl.arizona.edu.)

- Chang DF. *Phaco Chop and Advanced Phaco Techniques: Strategies for Complicated Cataracts*, 2nd ed. Slack Inc., 2013.

Operating senior residents should have read the following by deadline dates below (*Phaco Chop* can be checked out by the program coordinator.)

Reading Deadline: July 30

Chapter 16	Capsulorrhexis: Sizing Objectives and Pearls
Chapter 17	Conquering Capsulorrhexis Complications
Chapter 18	Pearls for Hydrodissection and Hydrodelineation
Chapter 27	Strategies for Managing Posterior Capsular Rupture
Chapter 30	Posterior Capsule Rupture and Vitreous Loss: Advanced Approaches

Reading Deadline: December 31

Chapter 1	Why Learning Chopping
Chapter 2	Horizontal Chopping: Principles and Pearls
Chapter 3	Vertical Chopping: Principles and Pearls
Chapter 4	Comparing and Integrating Horizontal and Vertical Chopping
Chapter 5	Transitioning to Phaco Chop: Pearls and Pitfalls
Chapter 8	Understanding the Phacodynamics of Chopping
Chapter 9	Optimizing Machine Settings for Chopping Techniques
Chapter 10	Optimizing the Alcon Infiniti for Chopping
Chapter 25-30	Complicated Cataract Surgeries (<i>Cataract Surgery</i> ; online)

2. Consults/Call

a. *Goals*

The overall goal of the consult rotation is to develop experience with managing the types of ophthalmological problems patients demonstrate in a tertiary care setting, either through admission to the eye service, consultation from another service for evaluation of an ophthalmological problem, or for the patients who present to the emergency department during non-call hours. The consult resident will work with, and be instructed by, the faculty member who is assigned to consults.

The consult resident is responsible for the care of patients at the three sites where inpatient care is conducted: BUMCT, BUMCS, and SAVAHCS. The continued care of eye service inpatients at the three hospitals, and ongoing care that is required for consultations, as well as emergency room care during the hours of 7:00 a.m. to 5:00 p.m. Monday through Friday, are the responsibility of the consult resident. The consult resident is expected to be on-site of the three participating institutions during these hours. This is not a call activity and is not call from home.

The consult resident must ensure adequate transition of care from the call team after hours, on weekends, and on holidays.

The first goal of the consult rotation is to learn the care and management of patients in an inpatient setting, frequently who are admitted to the hospital following complex trauma, or who have been admitted to other services but who have ophthalmic manifestations of systemic disease.

The second goal of the experience is to develop experience in the systems management of inpatients, and to develop collegial relationships with other services.

A third goal is to obtain surgical experience in the management of trauma patients by participating in surgery that is performed at the participating inpatient hospital when performed by another service.

A final goal is to provide the junior resident with opportunities to learn independent time management skills in a graduated manner and to learn the systems wide aspects of health care that follow from inpatient admission, including the development of a cost-effective care plan for a patient, and planning for outpatient services following discharge.

This rotation also provides an opportunity for development of research projects and rounds presentations, as well as study for basic sciences. A study log is recommended.

b. *Objectives*

The consult service is conducted in an inpatient setting, frequently at the bedside of patients who are unable to travel to an eye examination room. As such, the objectives differ from those presented in the outpatient clinic environment.

PGY-2 residents are expected to meet the objectives for level 2.

PGY-3 residents are expected to meet the objectives for level 3.

	Level 2	Level 3	Level 4
PATIENT CARE			
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none"> • Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings • Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan) 	<ul style="list-style-type: none"> • Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders • Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography) 	<ul style="list-style-type: none"> • Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
PC-2: Hospital-Based Consultation	<ul style="list-style-type: none"> • Triage consult requests • Performs a complete examination • Recognizes ophthalmic emergencies and initiates non-surgical treatment plan, with indirect supervision 	<ul style="list-style-type: none"> • Manages consultations (including coordination of care) requiring surgical intervention, including procedural options and timing; requests ophthalmic subspecialty advice, with indirect supervision • Manages ophthalmic emergencies with non-surgical and surgical treatment, with indirect supervision 	<ul style="list-style-type: none"> • Manages consultations (including coordination of care) requiring surgical intervention, including procedural options and timing; requests ophthalmic subspecialty input, with oversight • Manages ophthalmic emergencies with non-surgical and surgical treatment, with oversight
PC-3: Office-Based Procedures	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with direct supervision • Recognizes and manages intra- and post-operative complications, with direct supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with indirect supervision • Manages intra- and post-operative complications, with indirect supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with oversight • Manages intra- and post-operative complications, with oversight
PC-4: Cataract Surgery – Technical Skill	<ul style="list-style-type: none"> • Assesses patients for routine cataract surgery • Performs elements of cataract surgery in the hands-on surgical skills laboratory and in the operating room (OR) • Manages common post-operative complications (e.g., post-op pain, high intraocular pressure) 	<ul style="list-style-type: none"> • Assesses patients for complex cataract surgery • Performs routine cataract surgery in the OR • Manages common intra- and post-operative complications (e.g., posterior capsule rupture, wound leak) 	<ul style="list-style-type: none"> • Assesses patients who are candidates for refractive intraocular lenses to correct astigmatism and/or provide near correction • Performs cataract surgery requiring complex technical maneuvers (e.g., pupil expander, capsular tension ring) • Manages complex intra- and post-operative complications (e.g., endophthalmitis)
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> • Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions

	Level 2	Level 3	Level 4
MK-2: Differential Diagnosis	<ul style="list-style-type: none"> Generates comprehensive differential diagnosis based on patient symptoms and history; documents and presents differential in oral presentation clearly and concisely Describes diagnostic tests to aid in the differential diagnosis 	<ul style="list-style-type: none"> Generates refined differential based on patient symptoms, history and examination findings, distinguishing between common and uncommon conditions Selects additional diagnostic testing to distinguish between conditions on the differential 	<ul style="list-style-type: none"> Generates probabilistic differential diagnosis in patients with multiple ocular and medical comorbidities; modifies likely differential with new information from additional testing Articulates the rationale for ordering diagnostic testing in hierarchical fashion based upon probabilistic differential
MK-3: Therapeutic Interventions	<ul style="list-style-type: none"> Explains relevant pathophysiology and lists indications and contraindications for planned medical therapy Explains indications, contraindications, and relevant steps required for procedural intervention (e.g., anesthesia, technique, instruments) 	<ul style="list-style-type: none"> Identifies and describes side effects of medical therapies and ways to minimize potential complications Identifies and describes causes of complications and alternatives for routine procedural interventions 	<ul style="list-style-type: none"> Describes and articulates the rationale for using emerging alternative medical therapies Describes and articulates the rationale for using novel alternative procedural interventions
SYSTEMS-BASED PRACTICE			
SBP-1: Patient Safety and Quality Improvement	<ul style="list-style-type: none"> Identifies system factors that lead to patient safety events Reports patient safety events through institutional reporting systems (simulated or actual) Describes local quality improvement initiatives (e.g., eye protection for high risk activities, diabetic eye screening) 	<ul style="list-style-type: none"> Participates in analysis of patient safety events (simulated or actual) Participates in disclosure of patient safety events to patients and families (simulated or actual) Participates in local quality improvement initiatives 	<ul style="list-style-type: none"> Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) Discloses patient safety events to patients and families (simulated or actual) Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project
SBP-2: System Navigation for Patient-Centered Care	<ul style="list-style-type: none"> Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams Performs safe and effective transitions of care/hand-offs in routine clinical situations Demonstrates knowledge of local population and community health needs and disparities 	<ul style="list-style-type: none"> Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams Performs safe and effective transitions of care/hand-offs in complex clinical situations Identifies specific local health needs and disparities related to ophthalmic care 	<ul style="list-style-type: none"> Teaches effective coordination of patient-centered care among different disciplines and specialties to junior members of the team Advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems Uses local resources effectively to meet the needs of a patient population and community

	Level 2	Level 3	Level 4
SBP-3: Physician Role in Health Care Systems	<ul style="list-style-type: none"> Describes how different system types require the physician to deliver care effectively with available resources Identifies the documentation required for billing and coding compliance 	<ul style="list-style-type: none"> Optimizes patient care given available resources Describes knowledge domains for effective transition to practice (e.g., information technology, legal, billing and coding) 	<ul style="list-style-type: none"> Advocates for patient care needs beyond patients' available resources (e.g., community resources, patient assistance resources, telehealth) Demonstrates administrative knowledge needed for transition to practice (e.g., contract negotiations, malpractice insurance, government regulation, compliance)
PRACTICE-BASED LEARNING AND IMPROVEMENT			
PBLI-1: Evidence-Based and Informed Practice	<ul style="list-style-type: none"> Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care 	<ul style="list-style-type: none"> Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients 	<ul style="list-style-type: none"> Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient
PBLI-2: Reflective Practice and Commitment to Personal Growth	<ul style="list-style-type: none"> Demonstrates openness to performance data (feedback and other input) in order to inform goals; designs and implements a learning plan, with guidance Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> Seeks performance data and accepts it with responsibility and equipoise; demonstrates implementation of a learning plan Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> Uses performance data to measure the effectiveness of the learning plan and when necessary, improves it Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance
PROFESSIONALISM			
PROF-1. Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> Demonstrates insight into professional behavior in routine situations Takes responsibility for own professionalism lapses Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> Demonstrates professional behavior in complex or stressful situations Recognizes need to seek help in managing and resolving complex ethical situations Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk management/legal consultation)
PROF-2: Accountability/Conscientiousness	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in routine situations Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner 	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations Recognizes detrimental consequences when tasks and responsibilities are not completed in a timely manner (e.g., team members, compliance) 	<ul style="list-style-type: none"> Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner Proactively implements strategies to ensure that the needs of patients, teams, and systems are met

	Level 2	Level 3	Level 4
PROF-3: Self-Awareness and Help-Seeking	<ul style="list-style-type: none"> Independently recognizes status of personal and professional well-being Independently recognizes limits in the knowledge/skills of self and/or team; demonstrates appropriate help-seeking behaviors for self or others 	<ul style="list-style-type: none"> With assistance, proposes a plan to optimize personal and professional well-being With assistance, proposes a plan to improve knowledge/skills of self and/or team 	<ul style="list-style-type: none"> Independently develops a plan to optimize personal and professional well-being Independently develops a plan to improve the knowledge/skills of self and/or team
INTERPERSONAL AND COMMUNICATION SKILLS			
ICS-1: Patient and Family-Centered Communication	<ul style="list-style-type: none"> Establishes a therapeutic relationship in straightforward encounters using active listening and clear language Addresses barriers to effective communication 	<ul style="list-style-type: none"> Establishes a therapeutic relationship in challenging patient encounters (e.g., breaking bad news) When prompted, reflects on personal biases while attempting to minimize communication barriers 	<ul style="list-style-type: none"> Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity Role models self-awareness to minimize communication barriers
ICS-2: Interprofessional and Team Communication	<ul style="list-style-type: none"> Communicates information effectively and uses active listening with all health care team members Solicits feedback on performance as a member of the health care team 	<ul style="list-style-type: none"> Communicates concerns to the team and learners Provides feedback and constructive criticism to peers and learners 	<ul style="list-style-type: none"> Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed Provides feedback and constructive criticism to superiors
ICS-3: Communication within Health Care Systems	<ul style="list-style-type: none"> Demonstrates organized diagnostic and therapeutic reasoning through notes in the medical record Appropriately selects forms of communication (e.g., telephone versus text) to promote patient safety and privacy Identifies appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Communicates clearly and concisely, including anticipatory guidance, in the medical record Avoids creating or propagating errors in the medical record through accurate use of documentation tools Uses appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Provides feedback to improve others' written communication Provides feedback and constructive criticism regarding compliance with patient privacy and safety Offers clear and constructive suggestions to address system deficiencies

b. **Reading** (*required)

The following are available online through the University of Arizona Health Sciences Library, www.ahsl.arizona.edu.

- *Kaiser P, Friedman NJ, Pineda R. *The Massachusetts Eye and Ear Infirmary Illustrated Manual of Ophthalmology*, 4th ed. Philadelphia: Saunders, 2014.
- *Liu GT, Volpe NI, Galetta SL. *Neuro-ophthalmology: Diagnosis and Management*. Philadelphia: Saunders Elsevier, c2010.
- *Singh A, Hayden BC. *Ophthalmic Ultrasonography*. Elsevier, c2012.
- *Kanski JJ. *Signs in Ophthalmology: Causes and Differential Diagnosis*. St. Louis: Mosby/Elsevier, 2010.
- Gault JA, Vander JF. *Ophthalmic Secrets in Color*, 4ed. Elsevier, c2016.
- Schuman JS. *Rapid Diagnosis in Ophthalmology: Glaucoma and Lens*. Philadelphia: Mosby Elsevier, c2008.

- Trobe JD. *Rapid Diagnosis in Ophthalmology: Neuro-ophthalmology*. Philadelphia: Mosby/Elsevier, c2008.
- Carter KD, Alford M. *Rapid Diagnosis in Ophthalmology: Oculoplastic and Reconstructive Surgery*. St. Louis, MO: Mosby Elsevier, 2008.
- Strominger MB. *Rapid Diagnosis in Ophthalmology: Pediatric Ophthalmology and Strabismus*. Elsevier, c2008.
- Roy FH, Fraunfelder FW, Fraunfelder FT. *Current Ocular Therapy*, 6th ed. Philadelphia, PA; Edinburgh: Elsevier Saunders, 2008.
- Dutton JJ. *Radiology of the Orbit and Visual Pathway*. Philadelphia: Saunders Elsevier, c2010.
- Fraunfelder FT, Fraunfelder FW, Chambers WA. *Clinical Ocular Toxicology: Drugs, Chemical and Herbs*. Philadelphia, PA: Elsevier Saunders, 2008.

3. Cornea and External Disease

a. Goals

The primary educational goals of the residents on the cornea and external disease rotation is to develop facility in the examination of cornea and external disease patients, understanding in the basic physiology of the cornea, and ability to identify common pathological conditions and understand the judicious use of antibiotics, corticosteroids, non steroidal inflammatory drugs in the pharmacological regimen as well as understand the indications for surgical procedures.

b. Objectives

PGY-2 residents are expected to meet the objectives for level 2.

PGY-3 residents are expected to meet the objectives for level 3.

PGY-4 residents are expected to meet the objectives for level 4.

	Level 2	Level 3	Level 4
PATIENT CARE			
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none"> • Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings • Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan) 	<ul style="list-style-type: none"> • Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders • Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography) 	<ul style="list-style-type: none"> • Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
PC-3: Office-Based Procedures	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with direct supervision • Recognizes and manages intra- and post-operative complications, with direct supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with indirect supervision • Manages intra- and post-operative complications, with indirect supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with oversight • Manages intra- and post-operative complications, with oversight
PC-4: Cataract Surgery – Technical Skill	<ul style="list-style-type: none"> • Assesses patients for routine cataract surgery • Performs elements of cataract surgery in the hands-on surgical skills laboratory and in the operating room (OR) • Manages common post-operative complications (e.g., post-op pain, high intraocular pressure) 	<ul style="list-style-type: none"> • Assesses patients for complex cataract surgery • Performs routine cataract surgery in the OR • Manages common intra- and post-operative complications (e.g., posterior capsule rupture, wound leak) 	<ul style="list-style-type: none"> • Assesses patients who are candidates for refractive intraocular lenses to correct astigmatism and/or provide near correction • Performs cataract surgery requiring complex technical maneuvers (e.g., pupil expander, capsular tension ring) • Manages complex intra- and post-operative complications (e.g., endophthalmitis)

	Level 2	Level 3	Level 4
PC-6: Intraocular Surgery (Cornea, Retina, Glaucoma)	<ul style="list-style-type: none"> Assesses patients for routine intraocular surgery Performs routine intraocular surgery in the hands-on surgical skills laboratory Manages common post-operative complications (e.g., post-op pain, high intraocular pressure) 	<ul style="list-style-type: none"> Assesses patients for complex intraocular surgery Assists in subspecialty intraocular surgery Manages common intra-operative complications (e.g., flat chamber, wound leak, hyphema) 	<ul style="list-style-type: none"> Assesses patients for multispecialty intraocular surgeries Performs routine intraocular surgery Manages complex intra- and post-operative complications (e.g., re-bubble graft, blebitis)
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions
MK-2: Differential Diagnosis	<ul style="list-style-type: none"> Generates comprehensive differential diagnosis based on patient symptoms and history; documents and presents differential in oral presentation clearly and concisely Describes diagnostic tests to aid in the differential diagnosis 	<ul style="list-style-type: none"> Generates refined differential based on patient symptoms, history and examination findings, distinguishing between common and uncommon conditions Selects additional diagnostic testing to distinguish between conditions on the differential 	<ul style="list-style-type: none"> Generates probabilistic differential diagnosis in patients with multiple ocular and medical comorbidities; modifies likely differential with new information from additional testing Articulates the rationale for ordering diagnostic testing in hierarchical fashion based upon probabilistic differential
MK-3: Therapeutic Interventions	<ul style="list-style-type: none"> Explains relevant pathophysiology and lists indications and contraindications for planned medical therapy Explains indications, contraindications, and relevant steps required for procedural intervention (e.g., anesthesia, technique, instruments) 	<ul style="list-style-type: none"> Identifies and describes side effects of medical therapies and ways to minimize potential complications Identifies and describes causes of complications and alternatives for routine procedural interventions 	<ul style="list-style-type: none"> Describes and articulates the rationale for using emerging alternative medical therapies Describes and articulates the rationale for using novel alternative procedural interventions
SYSTEMS-BASED PRACTICE			
SBP-1: Patient Safety and Quality Improvement	<ul style="list-style-type: none"> Identifies system factors that lead to patient safety events Reports patient safety events through institutional reporting systems (simulated or actual) Describes local quality improvement initiatives (e.g., eye protection for high risk activities, diabetic eye screening) 	<ul style="list-style-type: none"> Participates in analysis of patient safety events (simulated or actual) Participates in disclosure of patient safety events to patients and families (simulated or actual) Participates in local quality improvement initiatives 	<ul style="list-style-type: none"> Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) Discloses patient safety events to patients and families (simulated or actual) Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project

	Level 2	Level 3	Level 4
SBP-2: System Navigation for Patient-Centered Care	<ul style="list-style-type: none"> Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams Performs safe and effective transitions of care/hand-offs in routine clinical situations Demonstrates knowledge of local population and community health needs and disparities 	<ul style="list-style-type: none"> Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams Performs safe and effective transitions of care/hand-offs in complex clinical situations Identifies specific local health needs and disparities related to ophthalmic care 	<ul style="list-style-type: none"> Teaches effective coordination of patient-centered care among different disciplines and specialties to junior members of the team Advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems Uses local resources effectively to meet the needs of a patient population and community
PRACTICE-BASED LEARNING AND IMPROVEMENT			
PBLI-1: Evidence-Based and Informed Practice	<ul style="list-style-type: none"> Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care 	<ul style="list-style-type: none"> Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients 	<ul style="list-style-type: none"> Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient
PBLI-2: Reflective Practice and Commitment to Personal Growth	<ul style="list-style-type: none"> Demonstrates openness to performance data (feedback and other input) in order to inform goals; designs and implements a learning plan, with guidance Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> Seeks performance data and accepts it with responsibility and equipoise; demonstrates implementation of a learning plan Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> Uses performance data to measure the effectiveness of the learning plan and when necessary, improves it Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance
PROFESSIONALISM			
PROF-1. Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> Demonstrates insight into professional behavior in routine situations Takes responsibility for own professionalism lapses Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> Demonstrates professional behavior in complex or stressful situations Recognizes need to seek help in managing and resolving complex ethical situations Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk management/legal consultation)
PROF-2: Accountability/Conscientiousness	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in routine situations Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner 	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations Recognizes detrimental consequences when tasks and responsibilities are not completed in a timely manner (e.g., team members, compliance) 	<ul style="list-style-type: none"> Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner Proactively implements strategies to ensure that the needs of patients, teams, and systems are met

	Level 2	Level 3	Level 4
PROF-3: Self-Awareness and Help-Seeking	<ul style="list-style-type: none"> Independently recognizes status of personal and professional well-being Independently recognizes limits in the knowledge/skills of self and/or team; demonstrates appropriate help-seeking behaviors for self or others 	<ul style="list-style-type: none"> With assistance, proposes a plan to optimize personal and professional well-being With assistance, proposes a plan to improve knowledge/skills of self and/or team 	<ul style="list-style-type: none"> Independently develops a plan to optimize personal and professional well-being Independently develops a plan to improve the knowledge/skills of self and/or team
INTERPERSONAL AND COMMUNICATION SKILLS			
ICS-1: Patient and Family-Centered Communication	<ul style="list-style-type: none"> Establishes a therapeutic relationship in straightforward encounters using active listening and clear language Addresses barriers to effective communication 	<ul style="list-style-type: none"> Establishes a therapeutic relationship in challenging patient encounters (e.g., breaking bad news) When prompted, reflects on personal biases while attempting to minimize communication barriers 	<ul style="list-style-type: none"> Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity Role models self-awareness to minimize communication barriers
ICS-2: Interprofessional and Team Communication	<ul style="list-style-type: none"> Communicates information effectively and uses active listening with all health care team members Solicits feedback on performance as a member of the health care team 	<ul style="list-style-type: none"> Communicates concerns to the team and learners Provides feedback and constructive criticism to peers and learners 	<ul style="list-style-type: none"> Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed Provides feedback and constructive criticism to superiors
ICS-3: Communication within Health Care Systems	<ul style="list-style-type: none"> Demonstrates organized diagnostic and therapeutic reasoning through notes in the medical record Appropriately selects forms of communication (e.g., telephone versus text) to promote patient safety and privacy Identifies appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Communicates clearly and concisely, including anticipatory guidance, in the medical record Avoids creating or propagating errors in the medical record through accurate use of documentation tools Uses appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Provides feedback to improve others' written communication Provides feedback and constructive criticism regarding compliance with patient privacy and safety Offers clear and constructive suggestions to address system deficiencies

c. Additional Delineation of Resident Responsibilities

At the Alvernon Eye Clinic, the residents will evaluate patients with complete faculty supervision. They are to do complete examinations on new patients including formulation of diagnoses and treatment. On existing patients, the examination should be directed toward the appropriate problem with reaffirmation of diagnosis, estimation of progress of therapy, checking results (labs, cultures, biopsies, etc.), and recommendation for future therapy. The resident is responsible for seeing all emergency cornea patients and those referred by outside ophthalmologists or optometrists. The resident will contact faculty to discuss findings and management.

d. Routine for New Patients

Following check in at the front desk, patients are seen by the resident. Patient interviews will include identification of chief complaint, history of the current medical condition, a complete review of systems, a complete review of past medical and surgical history, a listing of known medical allergies,

a listing of current medications, past ocular history, past surgical history, family medical history, family ocular history and psycho/social analysis as is detailed in the new patient evaluation. Residents should neutralize the lenses, check the visual acuity and refract the patients that are less than 20/25. Recheck intraocular pressure, if abnormal. The residents should record all of the pertinent data and this is to be co-signed by the faculty. Patients that are coming in with a question of herpes simplex keratitis or keratitis of unknown ideology should have corneal sensation prior to administration of fluorescein or proparacaine for intraocular pressure assessment. Once the anterior segment is examined, the patient can be dilated and presented to the attending physician for completion of the examination or the patient may be completed by the resident and then the diagnoses entered as well as the treatment plan and then presented to faculty. For those patients who have the posterior pole exam done by the resident, the estimation of cup/disc ratio, macular and peripheral pathology should be identified both with a 78- or 90-diopter lens and a 20-diopter lens for the peripheral retina. A differential diagnosis should be formulated and discussed with faculty.

For follow-up patients, the resident may check the patient in themselves or rely on the technician to check the patient in. Where the residents are checking the patients in, they should obtain chief complaint, interval ocular history, any changes in the interval medical history or review of systems, record the medications taken, record the allergies and then perform the appropriate ophthalmological examination including visual acuity, refraction where visual acuity is less than 20/25, intraocular pressure, pupil reaction, visual field by confrontation and extraocular motions and slit lamp examination. The diagnosis should be recorded as well as treatment planned. The patient should be dilated if it is deemed appropriate, i.e., visual acuity that cannot be corrected, no recent dilation (2 years for routine patients 65 or older or 5 years for patients less than 65 years of age) in the chart or post-operative patients that have not previously been dilated since intraocular surgery.

Any laboratory testing that is required should be noted by the resident on a daily appointment card or calendar and then followed up as appropriate within the time interval that the laboratory results will be obtained. These should then be recorded and communicated both to the faculty and to the patient. The lab results should be followed, as appropriate.

e. ***Chart Review***

In general, the patients that a resident has any question on should be discussed with faculty before the patient is discharged. The resident should record the name of the patient and either hold the chart aside or request the chart at the end of the clinic so that this can be discussed. It is very important that residents bring up questions regarding patient management and care that they do not understand at the time of the examination.

f. ***Reading List***

Rather than have assigned reading for each week, residents will be asked to keep a log of the assigned reading chapters. As they see patients that fit into the appropriate categories, they are expected to read the chapters from the basic science text that are appropriate, as well as the review articles that are provided. By the end of each year, they should have gone through the entire cornea and external disease book. In April of each year, they submit their logs so that any areas that are deficient can be completed by the end of the year.

g. ***Surgery***

The residents who are assigned to the operating room with a corneal/external disease faculty member will act as first assistant. The resident is expected to review the chart prior to the day of surgery or

prior to the actual surgical procedure so that they understand what procedure is to take place. The resident should introduce themselves to the patient prior to surgery together with the attending. In the case of cataract surgery, the resident should review what the IOL choice was based on and identify any unusual circumstances with the particular case. If there are any unusual procedures or events that have occurred during surgery, they are expected to discuss these with the attending before and after surgery. They are responsible for dictating the operating report. The faculty will always verify and co-sign the report if the resident dictated. They are also responsible for reviewing the tapes with the attending surgeon of any cases where a complication occurred and to be sure there are tapes available at the BUMCT Outpatient Surgery Center. The attending surgeons and the library have reference video tapes on phacoemulsification surgery, cornea transplant surgery, refractive surgery and reading materials on other anterior segment surgical procedures. The resident is expected to be up to date on the latest techniques of these surgical procedures and when patients are scheduled they are expected to be versed in discussing what the surgical techniques are and what the relative risks and benefits of each approach are. They are expected to review new procedures (book and video) prior to surgery.

Preoperative surgical patients require a complete medical history and physical form which should be completed on every patient by either the nurse practitioner or the resident. If the residents are performing these activities, they need to make sure that the reason for the visual disability is recorded, that the cataract's eye is identified and marked correctly, the expectations for improved visual acuity are recorded and realistic, the patient is made aware, and all their questions answered. Residents need to meet the patient before surgery, especially if they are involved in the case and obtain their consent to participate during the surgical procedure (together with and without the attending). The faculty will be responsible for the contact.

h. *Consent*

In general, the resident is asked to assure that the consent form has been signed by the patient and faculty. This should be performed by faculty.

i. *Emergency Coverage*

Occasionally corneal ulcers and anterior segment trauma will be referred in. These patients are followed by faculty and resident on the service during their complete hospital stay or during the acute phase of their illness.

j. *Research*

Residents are encouraged to participate in either basic or clinical research projects while on the service and during the year. Those who are interested should discuss this with faculty. There is no specific research expectation, however, and residents may satisfactorily complete this rotation without performing research.

k. *Required Reading*

- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 8: External Disease and Cornea*. (This should be read in its entirety each academic year.)
- Spalton DJ. *Atlas of Clinical Ophthalmology*. Mosby, 2004.
- *McMannis MJ. *Cornea*. Elsevier, 2017.
- *Krachmer JH. *Cornea Atlas*. New York: Saunders/Elsevier, c2014.
- *Brightbill FS, ed. *Corneal Surgery: Theory, Technique and Tissue*. London: Mosby, c2009.

*Available online through the University of Arizona Health Sciences Library,
www.ahsl.arizona.edu.

4. General Ophthalmology/Continuity Clinic

a. *Goals*

The goal of the comprehensive ophthalmology experience is to develop the experience and knowledge required to competently and confidently enter into the general practice of ophthalmology upon graduation, and to learn the appropriate use of consultative services in ophthalmic care. Comprehensive ophthalmology encompasses the core of all subspecialties, and as such within each practitioner, a different level of expertise within each of the subspecialties is expected to develop. Recognizing your own strengths in patient care, and the appropriate time to refer, is a core objective in the practice of general ophthalmology.

b. *Objectives*

Comprehensive ophthalmology skills encompass the common skills of our faculty and the types of patient care experiences encountered in a general ophthalmology practice. Specific objectives for clinic experience follows.

PGY-2 residents are expected to meet the objectives for level 2.

PGY-3 residents are expected to meet the objectives for level 3.

PGY-4 residents are expected to meet the objectives for level 4.

	Level 2	Level 3	Level 4
PATIENT CARE			
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none">• Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings• Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan)	<ul style="list-style-type: none">• Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders• Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography)	<ul style="list-style-type: none">• Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
PC-3: Office-Based Procedures	<ul style="list-style-type: none">• Administers anesthesia and performs procedure, with direct supervision• Recognizes and manages intra- and post-operative complications, with direct supervision	<ul style="list-style-type: none">• Administers anesthesia and performs procedure, with indirect supervision• Manages intra- and post-operative complications, with indirect supervision	<ul style="list-style-type: none">• Administers anesthesia and performs procedure, with oversight• Manages intra- and post-operative complications, with oversight

	Level 2	Level 3	Level 4
PC-4: Cataract Surgery – Technical Skill	<ul style="list-style-type: none"> Assesses patients for routine cataract surgery Performs elements of cataract surgery in the hands-on surgical skills laboratory and in the operating room (OR) Manages common post-operative complications (e.g., post-op pain, high intraocular pressure) 	<ul style="list-style-type: none"> Assesses patients for complex cataract surgery Performs routine cataract surgery in the OR Manages common intra- and post-operative complications (e.g., posterior capsule rupture, wound leak) 	<ul style="list-style-type: none"> Assesses patients who are candidates for refractive intraocular lenses to correct astigmatism and/or provide near correction Performs cataract surgery requiring complex technical maneuvers (e.g., pupil expander, capsular tension ring) Manages complex intra- and post-operative complications (e.g., endophthalmitis)
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions
MK-2: Differential Diagnosis	<ul style="list-style-type: none"> Generates comprehensive differential diagnosis based on patient symptoms and history; documents and presents differential in oral presentation clearly and concisely Describes diagnostic tests to aid in the differential diagnosis 	<ul style="list-style-type: none"> Generates refined differential based on patient symptoms, history and examination findings, distinguishing between common and uncommon conditions Selects additional diagnostic testing to distinguish between conditions on the differential 	<ul style="list-style-type: none"> Generates probabilistic differential diagnosis in patients with multiple ocular and medical comorbidities; modifies likely differential with new information from additional testing Articulates the rationale for ordering diagnostic testing in hierarchical fashion based upon probabilistic differential
MK-3: Therapeutic Interventions	<ul style="list-style-type: none"> Explains relevant pathophysiology and lists indications and contraindications for planned medical therapy Explains indications, contraindications, and relevant steps required for procedural intervention (e.g., anesthesia, technique, instruments) 	<ul style="list-style-type: none"> Identifies and describes side effects of medical therapies and ways to minimize potential complications Identifies and describes causes of complications and alternatives for routine procedural interventions 	<ul style="list-style-type: none"> Describes and articulates the rationale for using emerging alternative medical therapies Describes and articulates the rationale for using novel alternative procedural interventions
SYSTEMS-BASED PRACTICE			
SBP-1: Patient Safety and Quality Improvement	<ul style="list-style-type: none"> Identifies system factors that lead to patient safety events Reports patient safety events through institutional reporting systems (simulated or actual) Describes local quality improvement initiatives (e.g., eye protection for high risk activities, diabetic eye screening) 	<ul style="list-style-type: none"> Participates in analysis of patient safety events (simulated or actual) Participates in disclosure of patient safety events to patients and families (simulated or actual) Participates in local quality improvement initiatives 	<ul style="list-style-type: none"> Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) Discloses patient safety events to patients and families (simulated or actual) Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project

	Level 2	Level 3	Level 4
SBP-2: System Navigation for Patient-Centered Care	<ul style="list-style-type: none"> • Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams • Performs safe and effective transitions of care/hand-offs in routine clinical situations • Demonstrates knowledge of local population and community health needs and disparities 	<ul style="list-style-type: none"> • Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams • Performs safe and effective transitions of care/hand-offs in complex clinical situations • Identifies specific local health needs and disparities related to ophthalmic care 	<ul style="list-style-type: none"> • Teaches effective coordination of patient-centered care among different disciplines and specialties to junior members of the team • Advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems • Uses local resources effectively to meet the needs of a patient population and community
PRACTICE-BASED LEARNING AND IMPROVEMENT			
PBLI-1: Evidence-Based and Informed Practice	<ul style="list-style-type: none"> • Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care 	<ul style="list-style-type: none"> • Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients 	<ul style="list-style-type: none"> • Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient
PBLI-2: Reflective Practice and Commitment to Personal Growth	<ul style="list-style-type: none"> • Demonstrates openness to performance data (feedback and other input) in order to inform goals; designs and implements a learning plan, with guidance • Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> • Seeks performance data and accepts it with responsibility and equipoise; demonstrates implementation of a learning plan • Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> • Uses performance data to measure the effectiveness of the learning plan and when necessary, improves it • Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance
PROFESSIONALISM			
PROF-1. Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> • Demonstrates insight into professional behavior in routine situations • Takes responsibility for own professionalism lapses • Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> • Demonstrates professional behavior in complex or stressful situations • Recognizes need to seek help in managing and resolving complex ethical situations • Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> • Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others • Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk management/legal consultation)
PROF-2: Accountability/Conscientiousness	<ul style="list-style-type: none"> • Performs tasks and responsibilities in a timely manner with attention to detail in routine situations • Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner 	<ul style="list-style-type: none"> • Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations • Recognizes detrimental consequences when tasks and responsibilities are not completed in a timely manner (e.g., team members, compliance) 	<ul style="list-style-type: none"> • Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner • Proactively implements strategies to ensure that the needs of patients, teams, and systems are met

	Level 2	Level 3	Level 4
PROF-3: Self-Awareness and Help-Seeking	<ul style="list-style-type: none"> Independently recognizes status of personal and professional well-being Independently recognizes limits in the knowledge/skills of self and/or team; demonstrates appropriate help-seeking behaviors for self or others 	<ul style="list-style-type: none"> With assistance, proposes a plan to optimize personal and professional well-being With assistance, proposes a plan to improve knowledge/skills of self and/or team 	<ul style="list-style-type: none"> Independently develops a plan to optimize personal and professional well-being Independently develops a plan to improve the knowledge/skills of self and/or team
INTERPERSONAL AND COMMUNICATION SKILLS			
ICS-1: Patient and Family-Centered Communication	<ul style="list-style-type: none"> Establishes a therapeutic relationship in straightforward encounters using active listening and clear language Addresses barriers to effective communication 	<ul style="list-style-type: none"> Establishes a therapeutic relationship in challenging patient encounters (e.g., breaking bad news) When prompted, reflects on personal biases while attempting to minimize communication barriers 	<ul style="list-style-type: none"> Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity Role models self-awareness to minimize communication barriers
ICS-2: Interprofessional and Team Communication	<ul style="list-style-type: none"> Communicates information effectively and uses active listening with all health care team members Solicits feedback on performance as a member of the health care team 	<ul style="list-style-type: none"> Communicates concerns to the team and learners Provides feedback and constructive criticism to peers and learners 	<ul style="list-style-type: none"> Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed Provides feedback and constructive criticism to superiors
ICS-3: Communication within Health Care Systems	<ul style="list-style-type: none"> Demonstrates organized diagnostic and therapeutic reasoning through notes in the medical record Appropriately selects forms of communication (e.g., telephone versus text) to promote patient safety and privacy Identifies appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Communicates clearly and concisely, including anticipatory guidance, in the medical record Avoids creating or propagating errors in the medical record through accurate use of documentation tools Uses appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Provides feedback to improve others' written communication Provides feedback and constructive criticism regarding compliance with patient privacy and safety Offers clear and constructive suggestions to address system deficiencies

c. Required Reading

First Year (PGY-2) Resident

- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 2: Fundamentals and Principles of Ophthalmology*.
- *Kanski JJ. *Signs in Ophthalmology: Causes and Differential Diagnosis*. Mosby/Elsevier, 2010.
- *Bowling B. *Kanski's Clinical Ophthalmology: A Systematic Approach*. Saunders, 2016.
- *Elliott DB. *Clinical Procedures in Primary Eye Care*. Edinburgh; New York: Elsevier/Butterworth Heinemann, 2007.

Second Year (PGY-3) Resident

- *Sadda SR. *Ryan's Retinal Imaging and Diagnosis*. Saunders Elsevier, c2013.
- *Levin LA, Albert DM, eds. *Ocular Disease: Mechanisms and Management*. Saunders/Elsevier, 2010.
- *Spaeth GL. *Ophthalmic Surgery: Principles and Practice*. Edinburgh: Elsevier, 2012.
- *Kanski JJ. *Synopsis of Clinical Ophthalmology*. Saunders, 2013.

*Available online through the University of Arizona Health Sciences Library,

5. General Ophthalmology/Glaucoma

a. *Goals*

The goal of the comprehensive ophthalmology experience is to develop the experience and knowledge required to competently and confidently enter into the general practice of ophthalmology upon graduation, and to learn the appropriate use of consultative services in ophthalmic care. Comprehensive ophthalmology encompasses the core of all subspecialties, and as such within each practitioner, a different level of expertise within each of the subspecialties is expected to develop. Recognizing your own strengths in patient care, and the appropriate time to refer, is a core objective in the practice of general ophthalmology.

Glaucoma is a disease characterized by slow progression over many years. Decision making for the glaucoma patient requires review of quantitative and qualitative data to detect changes in the patient's status that would necessitate a change in management. The goal of the glaucoma rotation is to develop expertise in the diagnosis and management (both medical and surgical) of glaucoma, including both primary open angle glaucoma and the more unusual glaucomas. Skill and expertise is expected to develop with experience.

b. *Objectives*

Comprehensive ophthalmology skills encompass the common skills of our faculty and the types of patient care experiences encountered in a general ophthalmology practice. Specific objectives for clinic experience follows.

PGY-2 residents are expected to meet the objectives for level 2.

PGY-3 residents are expected to meet the objectives for level 3.

PGY-4 residents are expected to meet the objectives for level 4.

	Level 2	Level 3	Level 4
PATIENT CARE			
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none">• Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings• Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan)	<ul style="list-style-type: none">• Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders• Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography)	<ul style="list-style-type: none">• Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
PC-3: Office-Based Procedures	<ul style="list-style-type: none">• Administers anesthesia and performs procedure, with direct supervision• Recognizes and manages intra- and post-operative complications, with direct supervision	<ul style="list-style-type: none">• Administers anesthesia and performs procedure, with indirect supervision• Manages intra- and post-operative complications, with indirect supervision	<ul style="list-style-type: none">• Administers anesthesia and performs procedure, with oversight• Manages intra- and post-operative complications, with oversight

	Level 2	Level 3	Level 4
PC-4: Cataract Surgery – Technical Skill	<ul style="list-style-type: none"> Assesses patients for routine cataract surgery Performs elements of cataract surgery in the hands-on surgical skills laboratory and in the operating room (OR) Manages common post-operative complications (e.g., post-op pain, high intraocular pressure) 	<ul style="list-style-type: none"> Assesses patients for complex cataract surgery Performs routine cataract surgery in the OR Manages common intra- and post-operative complications (e.g., posterior capsule rupture, wound leak) 	<ul style="list-style-type: none"> Assesses patients who are candidates for refractive intraocular lenses to correct astigmatism and/or provide near correction Performs cataract surgery requiring complex technical maneuvers (e.g., pupil expander, capsular tension ring) Manages complex intra- and post-operative complications (e.g., endophthalmitis)
PC-6: Intraocular Surgery (Cornea, Retina, Glaucoma)	<ul style="list-style-type: none"> Assesses patients for routine intraocular surgery Performs routine intraocular surgery in the hands-on surgical skills laboratory Manages common post-operative complications (e.g., post-op pain, high intraocular pressure) 	<ul style="list-style-type: none"> Assesses patients for complex intraocular surgery Assists in subspecialty intraocular surgery Manages common intra-operative complications (e.g., flat chamber, wound leak, hyphema) 	<ul style="list-style-type: none"> Assesses patients for multispecialty intraocular surgeries Performs routine intraocular surgery Manages complex intra- and post-operative complications (e.g., re-bubble graft, blebitis)
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions
MK-2: Differential Diagnosis	<ul style="list-style-type: none"> Generates comprehensive differential diagnosis based on patient symptoms and history; documents and presents differential in oral presentation clearly and concisely Describes diagnostic tests to aid in the differential diagnosis 	<ul style="list-style-type: none"> Generates refined differential based on patient symptoms, history and examination findings, distinguishing between common and uncommon conditions Selects additional diagnostic testing to distinguish between conditions on the differential 	<ul style="list-style-type: none"> Generates probabilistic differential diagnosis in patients with multiple ocular and medical comorbidities; modifies likely differential with new information from additional testing Articulates the rationale for ordering diagnostic testing in hierarchical fashion based upon probabilistic differential
MK-3: Therapeutic Interventions	<ul style="list-style-type: none"> Explains relevant pathophysiology and lists indications and contraindications for planned medical therapy Explains indications, contraindications, and relevant steps required for procedural intervention (e.g., anesthesia, technique, instruments) 	<ul style="list-style-type: none"> Identifies and describes side effects of medical therapies and ways to minimize potential complications Identifies and describes causes of complications and alternatives for routine procedural interventions 	<ul style="list-style-type: none"> Describes and articulates the rationale for using emerging alternative medical therapies Describes and articulates the rationale for using novel alternative procedural interventions

	Level 2	Level 3	Level 4
SYSTEMS-BASED PRACTICE			
SBP-1: Patient Safety and Quality Improvement	<ul style="list-style-type: none"> Identifies system factors that lead to patient safety events Reports patient safety events through institutional reporting systems (simulated or actual) Describes local quality improvement initiatives (e.g., eye protection for high risk activities, diabetic eye screening) 	<ul style="list-style-type: none"> Participates in analysis of patient safety events (simulated or actual) Participates in disclosure of patient safety events to patients and families (simulated or actual) Participates in local quality improvement initiatives 	<ul style="list-style-type: none"> Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) Discloses patient safety events to patients and families (simulated or actual) Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project
SBP-2: System Navigation for Patient-Centered Care	<ul style="list-style-type: none"> Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams Performs safe and effective transitions of care/hand-offs in routine clinical situations Demonstrates knowledge of local population and community health needs and disparities 	<ul style="list-style-type: none"> Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams Performs safe and effective transitions of care/hand-offs in complex clinical situations Identifies specific local health needs and disparities related to ophthalmic care 	<ul style="list-style-type: none"> Teaches effective coordination of patient-centered care among different disciplines and specialties to junior members of the team Advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems Uses local resources effectively to meet the needs of a patient population and community
PRACTICE-BASED LEARNING AND IMPROVEMENT			
PBLI-1: Evidence-Based and Informed Practice	<ul style="list-style-type: none"> Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care 	<ul style="list-style-type: none"> Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients 	<ul style="list-style-type: none"> Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient
PBLI-2: Reflective Practice and Commitment to Personal Growth	<ul style="list-style-type: none"> Demonstrates openness to performance data (feedback and other input) in order to inform goals; designs and implements a learning plan, with guidance Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> Seeks performance data and accepts it with responsibility and equipoise; demonstrates implementation of a learning plan Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> Uses performance data to measure the effectiveness of the learning plan and when necessary, improves it Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance
PROFESSIONALISM			
PROF-1. Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> Demonstrates insight into professional behavior in routine situations Takes responsibility for own professionalism lapses Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> Demonstrates professional behavior in complex or stressful situations Recognizes need to seek help in managing and resolving complex ethical situations Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk management/legal)

	Level 2	Level 3	Level 4
PROF-2: Accountability/Conscientiousness	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in routine situations Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner 	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations Recognizes detrimental consequences when tasks and responsibilities are not completed in a timely manner (e.g., team members, compliance) 	consultation) <ul style="list-style-type: none"> Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner Proactively implements strategies to ensure that the needs of patients, teams, and systems are met
PROF-3: Self-Awareness and Help-Seeking	<ul style="list-style-type: none"> Independently recognizes status of personal and professional well-being Independently recognizes limits in the knowledge/skills of self and/or team; demonstrates appropriate help-seeking behaviors for self or others 	<ul style="list-style-type: none"> With assistance, proposes a plan to optimize personal and professional well-being With assistance, proposes a plan to improve knowledge/skills of self and/or team 	<ul style="list-style-type: none"> Independently develops a plan to optimize personal and professional well-being Independently develops a plan to improve the knowledge/skills of self and/or team
INTERPERSONAL AND COMMUNICATION SKILLS			
ICS-1: Patient and Family-Centered Communication	<ul style="list-style-type: none"> Establishes a therapeutic relationship in straightforward encounters using active listening and clear language Addresses barriers to effective communication 	<ul style="list-style-type: none"> Establishes a therapeutic relationship in challenging patient encounters (e.g., breaking bad news) When prompted, reflects on personal biases while attempting to minimize communication barriers 	<ul style="list-style-type: none"> Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity Role models self-awareness to minimize communication barriers
ICS-2: Interprofessional and Team Communication	<ul style="list-style-type: none"> Communicates information effectively and uses active listening with all health care team members Solicits feedback on performance as a member of the health care team 	<ul style="list-style-type: none"> Communicates concerns to the team and learners Provides feedback and constructive criticism to peers and learners 	<ul style="list-style-type: none"> Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed Provides feedback and constructive criticism to superiors
ICS-3: Communication within Health Care Systems	<ul style="list-style-type: none"> Demonstrates organized diagnostic and therapeutic reasoning through notes in the medical record Appropriately selects forms of communication (e.g., telephone versus text) to promote patient safety and privacy Identifies appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Communicates clearly and concisely, including anticipatory guidance, in the medical record Avoids creating or propagating errors in the medical record through accurate use of documentation tools Uses appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Provides feedback to improve others' written communication Provides feedback and constructive criticism regarding compliance with patient privacy and safety Offers clear and constructive suggestions to address system deficiencies

6. Glaucoma

a. Goals

Glaucoma is a disease characterized by slow progression over many years. Decision making for the glaucoma patient requires review of quantitative and qualitative data to detect changes in the patient's status that would necessitate a change in management. The goal of the glaucoma rotation is to develop expertise in the diagnosis and management (both medical and surgical) of glaucoma, including both primary open angle glaucoma and the more unusual glaucomas. Skill and expertise is expected to develop with experience.

b. Objectives

PGY-2 residents are expected to meet the objectives for level 2.

PGY-3 residents are expected to meet the objectives for level 3.

PGY-4 residents are expected to meet the objectives for level 4.

	Level 2	Level 3	Level 4
PATIENT CARE			
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none"> • Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings • Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan) 	<ul style="list-style-type: none"> • Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders • Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography) 	<ul style="list-style-type: none"> • Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
PC-3: Office-Based Procedures	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with direct supervision • Recognizes and manages intra- and post-operative complications, with direct supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with indirect supervision • Manages intra- and post-operative complications, with indirect supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with oversight • Manages intra- and post-operative complications, with oversight
PC-6: Intraocular Surgery (Cornea, Retina, Glaucoma)	<ul style="list-style-type: none"> • Assesses patients for routine intraocular surgery • Performs routine intraocular surgery in the hands-on surgical skills laboratory • Manages common post-operative complications (e.g., post-op pain, high intraocular pressure) 	<ul style="list-style-type: none"> • Assesses patients for complex intraocular surgery • Assists in subspecialty intraocular surgery • Manages common intra-operative complications (e.g., flat chamber, wound leak, hyphema) 	<ul style="list-style-type: none"> • Assesses patients for multispecialty intraocular surgeries • Performs routine intraocular surgery • Manages complex intra- and post-operative complications (e.g., re-bubble graft, blebitis)

	Level 2	Level 3	Level 4
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> • Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions
MK-2: Differential Diagnosis	<ul style="list-style-type: none"> • Generates comprehensive differential diagnosis based on patient symptoms and history; documents and presents differential in oral presentation clearly and concisely • Describes diagnostic tests to aid in the differential diagnosis 	<ul style="list-style-type: none"> • Generates refined differential based on patient symptoms, history and examination findings, distinguishing between common and uncommon conditions • Selects additional diagnostic testing to distinguish between conditions on the differential 	<ul style="list-style-type: none"> • Generates probabilistic differential diagnosis in patients with multiple ocular and medical comorbidities; modifies likely differential with new information from additional testing • Articulates the rationale for ordering diagnostic testing in hierarchical fashion based upon probabilistic differential
MK-3: Therapeutic Interventions	<ul style="list-style-type: none"> • Explains relevant pathophysiology and lists indications and contraindications for planned medical therapy • Explains indications, contraindications, and relevant steps required for procedural intervention (e.g., anesthesia, technique, instruments) 	<ul style="list-style-type: none"> • Identifies and describes side effects of medical therapies and ways to minimize potential complications • Identifies and describes causes of complications and alternatives for routine procedural interventions 	<ul style="list-style-type: none"> • Describes and articulates the rationale for using emerging alternative medical therapies • Describes and articulates the rationale for using novel alternative procedural interventions
SYSTEMS-BASED PRACTICE			
SBP-1: Patient Safety and Quality Improvement	<ul style="list-style-type: none"> • Identifies system factors that lead to patient safety events • Reports patient safety events through institutional reporting systems (simulated or actual) • Describes local quality improvement initiatives (e.g., eye protection for high risk activities, diabetic eye screening) 	<ul style="list-style-type: none"> • Participates in analysis of patient safety events (simulated or actual) • Participates in disclosure of patient safety events to patients and families (simulated or actual) • Participates in local quality improvement initiatives 	<ul style="list-style-type: none"> • Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) • Discloses patient safety events to patients and families (simulated or actual) • Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project

	Level 2	Level 3	Level 4
SBP-2: System Navigation for Patient-Centered Care	<ul style="list-style-type: none"> Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams Performs safe and effective transitions of care/hand-offs in routine clinical situations Demonstrates knowledge of local population and community health needs and disparities 	<ul style="list-style-type: none"> Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams Performs safe and effective transitions of care/hand-offs in complex clinical situations Identifies specific local health needs and disparities related to ophthalmic care 	<ul style="list-style-type: none"> Teaches effective coordination of patient-centered care among different disciplines and specialties to junior members of the team Advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems Uses local resources effectively to meet the needs of a patient population and community
PRACTICE-BASED LEARNING AND IMPROVEMENT			
PBLI-1: Evidence-Based and Informed Practice	<ul style="list-style-type: none"> Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care 	<ul style="list-style-type: none"> Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients 	<ul style="list-style-type: none"> Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient
PBLI-2: Reflective Practice and Commitment to Personal Growth	<ul style="list-style-type: none"> Demonstrates openness to performance data (feedback and other input) in order to inform goals; designs and implements a learning plan, with guidance Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> Seeks performance data and accepts it with responsibility and equipoise; demonstrates implementation of a learning plan Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> Uses performance data to measure the effectiveness of the learning plan and when necessary, improves it Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance
PROFESSIONALISM			
PROF-1: Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> Demonstrates insight into professional behavior in routine situations Takes responsibility for own professionalism lapses Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> Demonstrates professional behavior in complex or stressful situations Recognizes need to seek help in managing and resolving complex ethical situations Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk management/legal consultation)
PROF-2: Accountability/Conscientiousness	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in routine situations Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner 	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations Recognizes detrimental consequences when tasks and responsibilities are not completed in a timely manner (e.g., team members, compliance) 	<ul style="list-style-type: none"> Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner Proactively implements strategies to ensure that the needs of patients, teams, and systems are met

	Level 2	Level 3	Level 4
PROF-3: Self-Awareness and Help-Seeking	<ul style="list-style-type: none"> Independently recognizes status of personal and professional well-being Independently recognizes limits in the knowledge/skills of self and/or team; demonstrates appropriate help-seeking behaviors for self or others 	<ul style="list-style-type: none"> With assistance, proposes a plan to optimize personal and professional well-being With assistance, proposes a plan to improve knowledge/skills of self and/or team 	<ul style="list-style-type: none"> Independently develops a plan to optimize personal and professional well-being Independently develops a plan to improve the knowledge/skills of self and/or team
INTERPERSONAL AND COMMUNICATION SKILLS			
ICS-1: Patient and Family-Centered Communication	<ul style="list-style-type: none"> Establishes a therapeutic relationship in straightforward encounters using active listening and clear language Addresses barriers to effective communication 	<ul style="list-style-type: none"> Establishes a therapeutic relationship in challenging patient encounters (e.g., breaking bad news) When prompted, reflects on personal biases while attempting to minimize communication barriers 	<ul style="list-style-type: none"> Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity Role models self-awareness to minimize communication barriers
ICS-2: Interprofessional and Team Communication	<ul style="list-style-type: none"> Communicates information effectively and uses active listening with all health care team members Solicits feedback on performance as a member of the health care team 	<ul style="list-style-type: none"> Communicates concerns to the team and learners Provides feedback and constructive criticism to peers and learners 	<ul style="list-style-type: none"> Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed Provides feedback and constructive criticism to superiors
ICS-3: Communication within Health Care Systems	<ul style="list-style-type: none"> Demonstrates organized diagnostic and therapeutic reasoning through notes in the medical record Appropriately selects forms of communication (e.g., telephone versus text) to promote patient safety and privacy Identifies appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Communicates clearly and concisely, including anticipatory guidance, in the medical record Avoids creating or propagating errors in the medical record through accurate use of documentation tools Uses appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Provides feedback to improve others' written communication Provides feedback and constructive criticism regarding compliance with patient privacy and safety Offers clear and constructive suggestions to address system deficiencies

c. ***Additional Delineation of Glaucoma Service Resident Responsibilities***

Format for Patient Examination

First Year (PGY-2) Residents: First year residents shall shadow the glaucoma faculty, observing and learning examination and test interpretation. The resident will be questioned about the patient management and encouraged to ask questions when appropriate. Respect for the patient and their wishes must always be considered, as well as the efficiency with which the patient is examined. Ideally, questions that may be inappropriate during examination or thought of at a later time may be reviewed at a later time. The resident is responsible in this case for recording the patient's name, studies, etc., that would be helpful for later review. As the resident progresses in understanding and skill, they will progress toward the second year resident format.

The glaucoma faculty may assign various topics through the rotation for discussion during lulls. The resident should familiarize themselves with the topic beforehand.

The glaucoma faculty will supervise resident performed surgery on animal eyes in the wet lab. A trabeculectomy, express shunt, and tube shunt surgery should be attempted during each year. The resident should become familiar with the steps of surgery, the reason for each step, variation on the regimen and the instruments used to perform each surgery. The resident will be responsible for securing the animal eyes.

Second Year Residents: Patient charts are placed in the box outside of the examination room and a white flag is put out, indicating that the patient is ready to be seen by the resident.

On new patients, the resident reviews the chart and summarizes the patient's history to date, performs a complete anterior segment slit lamp exam, indirect ophthalmoscopy, and stereo disc biomicroscopy with a 78-diopter lens. The discs and fundus are drawn, findings are noted, and the resident formulates and writes an impression and plan. The chart is then placed in the patient box outside of the room and the green flag is put out to indicate that the resident has completed the examination.

For follow-up patients, the resident reviews the chart and summarizes the patient's history to date, performs a complete anterior segment slit lamp exam and examines the fundus and disc through undilated pupils, unless a note has been made previously to dilate the patient, or the patient has a complaint requiring dilation. The resident then writes the impression and plan. The chart is placed in the box and the green flag is put out.

d. *Chart Review*

In general, no discussion of patients occurs in the examination room. At the end of the session, whenever possible, faculty, resident and students will discuss patients seen during the course of the day. Patients may be used as a starting point from which to delve into mechanisms of disease and treatment.

e. *Surgery*

Residents should review the records of the patient before surgery and be familiar with the planned procedure and therapeutic options. Surgical techniques and instrumentation should be reviewed even if the resident will not perform the surgery.

All pre-op surgical patients require the following:

- A complete glaucoma evaluation including IOP, slit lamp, indirect examination and gonioscopy, impression and plan.
- Recording of the examination in the EHR.
- A medical history and physical form must be completed for every patient. If the patient has medical problems, then a medical consultation needs to be arranged.

Consent: The resident should be well versed in the indications, risks, and potential complications for all commonly performed glaucoma procedures.

f. *Emergency Coverage*

Occasionally, angle closure and other glaucoma emergency cases are referred after hours. It is the responsibility of the resident on-call (not the resident on glaucoma) to work-up such patients.

g. ***Required Reading***

First Year (PGY-2) Resident

- American Academy of Ophthalmology. *Basic Clinical and Science Course, Section 10: Glaucoma*.

Second Year (PGY-3) Resident

- *Shaarawy TM, Sherwood MB, Hitchings RA, Crowston JG, eds.. *Glaucoma*. 1st or 2nd ed. Baltimore: Saunders Ltd, 2015.
- *Schuman JS. *Rapid Diagnosis in Ophthalmology: Lens and Glaucoma*. Philadelphia: Mosby Elsevier, c2008.
- *Stamper RL. *Becker-Shaffer's Diagnosis and Therapy of the Glaucomas*. Mosby/Elsevier, c2009.
- www.gonioscopy.org

*Available online through the University of Arizona Health Sciences Library,
www.ahsl.arizona.edu.

Reference Text for Topical Reading on Individual Patients

- Humphrey-Zeiss. *Owner's Manual for HFAII Perimeters*.

To be read and assimilated by completion of third year (PGY-4):

- Quality of Care Committee, Glaucoma Panel. *Primary Open-Angle Glaucoma and Primary Angle Closure*. Preferred Practice Pattern. San Francisco: American Academy of Ophthalmology.
- Quality of Care Committee, Glaucoma Panel. *The Glaucoma Suspect*. Preferred Practice Pattern. San Francisco: American Academy of Ophthalmology.

Latest Reports on the Following Studies

- Glaucoma Laser Trial Research Group. The Glaucoma Laser Trial (GLT). 2. Results of argon laser trabeculoplasty versus topical medicines. *Ophthalmology*. 1990;97:1403-1413.
- Advanced Glaucoma Intervention Study (AGIS)
- Early Manifest Glaucoma Treatment (EMGT)
- Collaborative Initial Glaucoma Treatment Study (CIGTS)
- Ocular Hypertension Treatment Study (OHTS)
- Trabeculectomy vs. Tube Shunt Study (TVT)

Additional glaucoma resources are available for check-out at the red box dispensary in Dr. Altenbernd's office.

- Surgical DVDs on express shunt placement and Ahmed valve placement
- Eyetube and Youtube have a rich source of surgical videos

7. International Ophthalmology

a. Goals

- To develop an understanding of healthcare delivery from a global perspective, and to learn of appropriate interventions for healthcare delivery in countries outside of the United States.
- To develop cultural competency with respect to the immigrant population from Central America and Mexico.
- To develop some facility with ophthalmic Spanish language skills through an immersion experience with a native Spanish-speaking ophthalmologist.

b. Objectives

	Level 2	Level 3	Level 4
PATIENT CARE			
Greets Patient	Always greets patient in Spanish.	Always greets patient in Spanish.	Always greets patient in Spanish.
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none"> • Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings • Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan) 	<ul style="list-style-type: none"> • Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders • Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography) 	<ul style="list-style-type: none"> • Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> • Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions
MK-2: Differential Diagnosis	<ul style="list-style-type: none"> • Generates comprehensive differential diagnosis based on patient symptoms and history; documents and presents differential in oral presentation clearly and concisely • Describes diagnostic tests to aid in the differential diagnosis 	<ul style="list-style-type: none"> • Generates refined differential based on patient symptoms, history and examination findings, distinguishing between common and uncommon conditions • Selects additional diagnostic testing to distinguish between conditions on the differential 	<ul style="list-style-type: none"> • Generates probabilistic differential diagnosis in patients with multiple ocular and medical comorbidities; modifies likely differential with new information from additional testing • Articulates the rationale for ordering diagnostic testing in hierarchical fashion based upon probabilistic differential

	Level 2	Level 3	Level 4
MK-3: Therapeutic Interventions	<ul style="list-style-type: none"> Explains relevant pathophysiology and lists indications and contraindications for planned medical therapy Explains indications, contraindications, and relevant steps required for procedural intervention (e.g., anesthesia, technique, instruments) 	<ul style="list-style-type: none"> Identifies and describes side effects of medical therapies and ways to minimize potential complications Identifies and describes causes of complications and alternatives for routine procedural interventions 	<ul style="list-style-type: none"> Describes and articulates the rationale for using emerging alternative medical therapies Describes and articulates the rationale for using novel alternative procedural interventions
MK-2: Reviews LALES		Reviews findings of Los Angeles Latino Eye Study (LALES)	
SYSTEMS-BASED PRACTICE			
SBP-1: Patient Safety and Quality Improvement	<ul style="list-style-type: none"> Identifies system factors that lead to patient safety events Reports patient safety events through institutional reporting systems (simulated or actual) Describes local quality improvement initiatives (e.g., eye protection for high risk activities, diabetic eye screening) 	<ul style="list-style-type: none"> Participates in analysis of patient safety events (simulated or actual) Participates in disclosure of patient safety events to patients and families (simulated or actual) Participates in local quality improvement initiatives 	<ul style="list-style-type: none"> Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) Discloses patient safety events to patients and families (simulated or actual) Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project
PRACTICE-BASED LEARNING AND IMPROVEMENT			
PBLI-1: Evidence-Based and Informed Practice	<ul style="list-style-type: none"> Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care 	<ul style="list-style-type: none"> Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients 	<ul style="list-style-type: none"> Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient
PROFESSIONALISM			
PROF-1: Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> Demonstrates insight into professional behavior in routine situations Takes responsibility for own professionalism lapses Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> Demonstrates professional behavior in complex or stressful situations Recognizes need to seek help in managing and resolving complex ethical situations Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk management/legal consultation)
PROF-2: Accountability/Conscientiousness	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in routine situations Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner 	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations Recognizes detrimental consequences when tasks and responsibilities are not completed in a timely manner (e.g., team members, compliance) 	<ul style="list-style-type: none"> Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner Proactively implements strategies to ensure that the needs of patients, teams, and systems are met

	Level 2	Level 3	Level 4
INTERPERSONAL AND COMMUNICATION SKILLS			
Learn Spanish Phrases		Learns 20 Spanish phrases regarding the eyes and symptoms of eye diseases	
ICS-1: Patient and Family-Centered Communication	<ul style="list-style-type: none"> • Establishes a therapeutic relationship in straightforward encounters using active listening and clear language • Addresses barriers to effective communication 	<ul style="list-style-type: none"> • Establishes a therapeutic relationship in challenging patient encounters (e.g., breaking bad news) • When prompted, reflects on personal biases while attempting to minimize communication barriers 	<ul style="list-style-type: none"> • Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity • Role models self-awareness to minimize communication barriers
ICS-2: Interprofessional and Team Communication	<ul style="list-style-type: none"> • Communicates information effectively and uses active listening with all health care team members • Solicits feedback on performance as a member of the health care team 	<ul style="list-style-type: none"> • Communicates concerns to the team and learners • Provides feedback and constructive criticism to peers and learners 	<ul style="list-style-type: none"> • Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed • Provides feedback and constructive criticism to superiors

8. Neuro-Ophthalmology

a. *Goals*

The resident educational goal in neuro-ophthalmology is to develop knowledge and diagnostic skills in neuro-ophthalmology in order to diagnose and treat the types of conditions expected to be encountered during the general practice of ophthalmology. This educational goal is met through exposure to patients in the general eye service, in the pediatric eye service, and during a subspecialty rotation with a preceptor.

While neuro-ophthalmology is frequently encountered during the general ophthalmology rotation, subspecialty education in neuro-ophthalmology is provided by Tomas Tredici, MD. Because of the considerable overlap between the neuro-ophthalmology examination and the pediatric ophthalmology examination, many of the neuro-ophthalmology objectives in terms of patient skills are developed during the pediatric rotation. Consultations for neuro-ophthalmologic patients are obtained through consults in the hospital or in clinic, and may be presented to Dr. Tredici for assistance in patient care.

b. *Objectives*

PGY-2 residents are expected to meet the objectives for level 2.

PGY-3 residents are expected to meet the objectives for level 3.

	Level 2	Level 3	Level 4
PATIENT CARE			
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none">• Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings• Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan)	<ul style="list-style-type: none">• Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders• Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography)	<ul style="list-style-type: none">• Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
PC-3: Office-Based Procedures	<ul style="list-style-type: none">• Administers anesthesia and performs procedure, with direct supervision• Recognizes and manages intra- and post-operative complications, with direct supervision	<ul style="list-style-type: none">• Administers anesthesia and performs procedure, with indirect supervision• Manages intra- and post-operative complications, with indirect supervision	<ul style="list-style-type: none">• Administers anesthesia and performs procedure, with oversight• Manages intra- and post-operative complications, with oversight

	Level 2	Level 3	Level 4
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> • Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions
MK-2: Differential Diagnosis	<ul style="list-style-type: none"> • Generates comprehensive differential diagnosis based on patient symptoms and history; documents and presents differential in oral presentation clearly and concisely • Describes diagnostic tests to aid in the differential diagnosis 	<ul style="list-style-type: none"> • Generates refined differential based on patient symptoms, history and examination findings, distinguishing between common and uncommon conditions • Selects additional diagnostic testing to distinguish between conditions on the differential 	<ul style="list-style-type: none"> • Generates probabilistic differential diagnosis in patients with multiple ocular and medical comorbidities; modifies likely differential with new information from additional testing • Articulates the rationale for ordering diagnostic testing in hierarchical fashion based upon probabilistic differential
MK-3: Therapeutic Interventions	<ul style="list-style-type: none"> • Explains relevant pathophysiology and lists indications and contraindications for planned medical therapy • Explains indications, contraindications, and relevant steps required for procedural intervention (e.g., anesthesia, technique, instruments) 	<ul style="list-style-type: none"> • Identifies and describes side effects of medical therapies and ways to minimize potential complications • Identifies and describes causes of complications and alternatives for routine procedural interventions 	<ul style="list-style-type: none"> • Describes and articulates the rationale for using emerging alternative medical therapies • Describes and articulates the rationale for using novel alternative procedural interventions
SYSTEMS-BASED PRACTICE			
SBP-1: Patient Safety and Quality Improvement	<ul style="list-style-type: none"> • Identifies system factors that lead to patient safety events • Reports patient safety events through institutional reporting systems (simulated or actual) • Describes local quality improvement initiatives (e.g., eye protection for high risk activities, diabetic eye screening) 	<ul style="list-style-type: none"> • Participates in analysis of patient safety events (simulated or actual) • Participates in disclosure of patient safety events to patients and families (simulated or actual) • Participates in local quality improvement initiatives 	<ul style="list-style-type: none"> • Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) • Discloses patient safety events to patients and families (simulated or actual) • Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project

	Level 2	Level 3	Level 4
SBP-2: System Navigation for Patient-Centered Care	<ul style="list-style-type: none"> Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams Performs safe and effective transitions of care/hand-offs in routine clinical situations Demonstrates knowledge of local population and community health needs and disparities 	<ul style="list-style-type: none"> Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams Performs safe and effective transitions of care/hand-offs in complex clinical situations Identifies specific local health needs and disparities related to ophthalmic care 	<ul style="list-style-type: none"> Teaches effective coordination of patient-centered care among different disciplines and specialties to junior members of the team Advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems Uses local resources effectively to meet the needs of a patient population and community
SBP-3: Physician Role in Health Care Systems	<ul style="list-style-type: none"> Describes how different system types require the physician to deliver care effectively with available resources Identifies the documentation required for billing and coding compliance 	<ul style="list-style-type: none"> Optimizes patient care given available resources Describes knowledge domains for effective transition to practice (e.g., information technology, legal, billing and coding) 	<ul style="list-style-type: none"> Advocates for patient care needs beyond patients' available resources (e.g., community resources, patient assistance resources, telehealth) Demonstrates administrative knowledge needed for transition to practice (e.g., contract negotiations, malpractice insurance, government regulation, compliance)
PRACTICE-BASED LEARNING AND IMPROVEMENT			
PBLI-1: Evidence-Based and Informed Practice	<ul style="list-style-type: none"> Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care 	<ul style="list-style-type: none"> Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients 	<ul style="list-style-type: none"> Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient
PBLI-2: Reflective Practice and Commitment to Personal Growth	<ul style="list-style-type: none"> Demonstrates openness to performance data (feedback and other input) in order to inform goals; designs and implements a learning plan, with guidance Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> Seeks performance data and accepts it with responsibility and equipoise; demonstrates implementation of a learning plan Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> Uses performance data to measure the effectiveness of the learning plan and when necessary, improves it Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance
PROFESSIONALISM			
PROF-1. Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> Demonstrates insight into professional behavior in routine situations Takes responsibility for own professionalism lapses Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> Demonstrates professional behavior in complex or stressful situations Recognizes need to seek help in managing and resolving complex ethical situations Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk

	Level 2	Level 3	Level 4
			management/legal consultation)
PROF-2: Accountability/Conscientiousness	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in routine situations Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner 	<ul style="list-style-type: none"> Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations Recognizes detrimental consequences when tasks and responsibilities are not completed in a timely manner (e.g., team members, compliance) 	<ul style="list-style-type: none"> Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner Proactively implements strategies to ensure that the needs of patients, teams, and systems are met
PROF-3: Self-Awareness and Help-Seeking	<ul style="list-style-type: none"> Independently recognizes status of personal and professional well-being Independently recognizes limits in the knowledge/skills of self and/or team; demonstrates appropriate help-seeking behaviors for self or others 	<ul style="list-style-type: none"> With assistance, proposes a plan to optimize personal and professional well-being With assistance, proposes a plan to improve knowledge/skills of self and/or team 	<ul style="list-style-type: none"> Independently develops a plan to optimize personal and professional well-being Independently develops a plan to improve the knowledge/skills of self and/or team
INTERPERSONAL AND COMMUNICATION SKILLS			
ICS-1: Patient and Family-Centered Communication	<ul style="list-style-type: none"> Establishes a therapeutic relationship in straightforward encounters using active listening and clear language Addresses barriers to effective communication 	<ul style="list-style-type: none"> Establishes a therapeutic relationship in challenging patient encounters (e.g., breaking bad news) When prompted, reflects on personal biases while attempting to minimize communication barriers 	<ul style="list-style-type: none"> Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity Role models self-awareness to minimize communication barriers
ICS-2: Interprofessional and Team Communication	<ul style="list-style-type: none"> Communicates information effectively and uses active listening with all health care team members Solicits feedback on performance as a member of the health care team 	<ul style="list-style-type: none"> Communicates concerns to the team and learners Provides feedback and constructive criticism to peers and learners 	<ul style="list-style-type: none"> Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed Provides feedback and constructive criticism to superiors
ICS-3: Communication within Health Care Systems	<ul style="list-style-type: none"> Demonstrates organized diagnostic and therapeutic reasoning through notes in the medical record Appropriately selects forms of communication (e.g., telephone versus text) to promote patient safety and privacy Identifies appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Communicates clearly and concisely, including anticipatory guidance, in the medical record Avoids creating or propagating errors in the medical record through accurate use of documentation tools Uses appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Provides feedback to improve others' written communication Provides feedback and constructive criticism regarding compliance with patient privacy and safety Offers clear and constructive suggestions to address system deficiencies

c. Resident Responsibilities for the Neuro-Ophthalmological Service

The residents are encouraged to do complete examinations, assessments, suggestions for testing, and listing of therapeutic options. In general, any discussions of these options should be made with the attending physician, out of range of patients, prior to discussion with the patient and the family.

Format for Patient Examination: Following check-in, patients are screened by a technician, who will take a pertinent history, list medications, record intraocular pressure, list current glasses prescription, and take auto-refraction measurement. Generally, visual field examinations will be performed prior to the examination with the attending physician, and will be available for review with the chart.

With the attending physician, the resident reviews the chart and participates in the information gathering process. The resident will observe the complete neuro-ophthalmological exam as performed by the attending, with direct participation as directed by the attending. The examination will include assessment of pupillary reflex, ocular motility, color vision, stereoscopic vision, slit lamp examination, and dilated funduscopy. At the completion of the exam, the attending and the resident will then discuss the assessment and plan with the patient, including prognosis and appropriate follow-up.

d. ***Chart Review***

In general, no discussion of patients occurs in the examination room. At the end of the session, whenever possible, faculty, resident and students will discuss patients seen during the course of the day. Patients may be used as a starting point from which to delve into mechanisms of disease and treatment.

e. ***Emergency Coverage***

Occasionally, neuro-ophthalmic problems present on both an inpatient and outpatient basis. It is the responsibility of the resident on-call to work-up such patients.

f. ***Required Reading***

- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 5: Neuro-ophthalmology*.
- *Liu GT, Volpe NJ, Galetta SL. *Neuro-ophthalmology: Diagnosis and Management*. Saunders Elsevier, c2010.
- *Trobe JD. *Rapid Diagnosis in Ophthalmology: Neuro-ophthalmology*. Philadelphia: Mosby/Elsevier, c2008.
- *Dutton JJ. *Radiology of the Orbit and Visual Pathways*. Saunders Elsevier, c2010.

*Available online through the University of Arizona Health Sciences Library,
www.ahsl.arizona.edu.

9. Oculoplastics

a. Goals

The goal of the oculoplastics rotation is to develop the knowledge of eye and orbit anatomy along with the required surgical skills, to address the most commonly encountered congenital and acquired structural lesions of the eye, and the proper management of eye adnexal trauma. The basic goals for the first year (PGY-2) residents are to become familiar with the basic anatomy of the eyelid, lacrimal apparatus and orbit, and to be able to recognize the deviations from normal and their anatomic origins. The second year (PGY-3) residents are expected to increase their knowledge base by awareness of congenital malformations, such as congenital ptosis, and to deal with progressive pathologies, such as thyroid ophthalmopathy. The third year (PGY-4) residents require much more complex knowledge of facial trauma and recognition of advanced reconstructive techniques that would be required subsequent to trauma.

b. Objectives

PGY-2 residents are expected to meet the objectives for level 2.

PGY-3 residents are expected to meet the objectives for level 3.

	Level 2	Level 3	Level 4
PATIENT CARE			
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none"> • Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings • Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan) 	<ul style="list-style-type: none"> • Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders • Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography) 	<ul style="list-style-type: none"> • Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
PC-3: Office-Based Procedures	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with direct supervision • Recognizes and manages intra- and post-operative complications, with direct supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with indirect supervision • Manages intra- and post-operative complications, with indirect supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with oversight • Manages intra- and post-operative complications, with oversight
PC-5: Extraocular Surgery (Plastics, Strabismus)	<ul style="list-style-type: none"> • Identifies patients for routine extraocular surgery • Performs simple extraocular surgery (e.g., simple lid laceration repair, nasolacrimal duct probing) • Manages common post-operative complications 	<ul style="list-style-type: none"> • Develops a pre-operative plan for routine extraocular surgery • Performs routine extraocular surgery (e.g., complex lid laceration repair, horizontal strabismus, ptosis) • Manages intra- and post-operative complications (e.g., bleeding, perforation) 	<ul style="list-style-type: none"> • Develops a pre-operative plan for complex extraocular surgery • Performs complex extraocular surgery (e.g., vertical strabismus), with assistance • Manages complex intra- and post-operative complications (e.g., infection, retrobulbar hemorrhage)

	Level 2	Level 3	Level 4
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> • Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions
MK-2: Differential Diagnosis	<ul style="list-style-type: none"> • Generates comprehensive differential diagnosis based on patient symptoms and history; documents and presents differential in oral presentation clearly and concisely • Describes diagnostic tests to aid in the differential diagnosis 	<ul style="list-style-type: none"> • Generates refined differential based on patient symptoms, history and examination findings, distinguishing between common and uncommon conditions • Selects additional diagnostic testing to distinguish between conditions on the differential 	<ul style="list-style-type: none"> • Generates probabilistic differential diagnosis in patients with multiple ocular and medical comorbidities; modifies likely differential with new information from additional testing • Articulates the rationale for ordering diagnostic testing in hierarchical fashion based upon probabilistic differential
MK-3: Therapeutic Interventions	<ul style="list-style-type: none"> • Explains relevant pathophysiology and lists indications and contraindications for planned medical therapy • Explains indications, contraindications, and relevant steps required for procedural intervention (e.g., anesthesia, technique, instruments) 	<ul style="list-style-type: none"> • Identifies and describes side effects of medical therapies and ways to minimize potential complications • Identifies and describes causes of complications and alternatives for routine procedural interventions 	<ul style="list-style-type: none"> • Describes and articulates the rationale for using emerging alternative medical therapies • Describes and articulates the rationale for using novel alternative procedural interventions
PROFESSIONALISM			
PROF-1: Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> • Demonstrates insight into professional behavior in routine situations • Takes responsibility for own professionalism lapses • Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> • Demonstrates professional behavior in complex or stressful situations • Recognizes need to seek help in managing and resolving complex ethical situations • Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> • Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others • Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk management/legal consultation)
PROF-2: Accountability/Conscientiousness	<ul style="list-style-type: none"> • Performs tasks and responsibilities in a timely manner with attention to detail in routine situations • Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner 	<ul style="list-style-type: none"> • Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations • Recognizes detrimental consequences when tasks and responsibilities are not completed in a timely manner (e.g., team members, compliance) 	<ul style="list-style-type: none"> • Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner • Proactively implements strategies to ensure that the needs of patients, teams, and systems are met

	Level 2	Level 3	Level 4
PROF-3: Self-Awareness and Help-Seeking	<ul style="list-style-type: none"> Independently recognizes status of personal and professional well-being Independently recognizes limits in the knowledge/skills of self and/or team; demonstrates appropriate help-seeking behaviors for self or others 	<ul style="list-style-type: none"> With assistance, proposes a plan to optimize personal and professional well-being With assistance, proposes a plan to improve knowledge/skills of self and/or team 	<ul style="list-style-type: none"> Independently develops a plan to optimize personal and professional well-being Independently develops a plan to improve the knowledge/skills of self and/or team
INTERPERSONAL AND COMMUNICATION SKILLS			
ICS-1: Patient and Family-Centered Communication	<ul style="list-style-type: none"> Establishes a therapeutic relationship in straightforward encounters using active listening and clear language Addresses barriers to effective communication 	<ul style="list-style-type: none"> Establishes a therapeutic relationship in challenging patient encounters (e.g., breaking bad news) When prompted, reflects on personal biases while attempting to minimize communication barriers 	<ul style="list-style-type: none"> Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity Role models self-awareness to minimize communication barriers
ICS-2: Interprofessional and Team Communication	<ul style="list-style-type: none"> Communicates information effectively and uses active listening with all health care team members Solicits feedback on performance as a member of the health care team 	<ul style="list-style-type: none"> Communicates concerns to the team and learners Provides feedback and constructive criticism to peers and learners 	<ul style="list-style-type: none"> Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed Provides feedback and constructive criticism to superiors
ICS-3: Communication within Health Care Systems	<ul style="list-style-type: none"> Demonstrates organized diagnostic and therapeutic reasoning through notes in the medical record Appropriately selects forms of communication (e.g., telephone versus text) to promote patient safety and privacy Identifies appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Communicates clearly and concisely, including anticipatory guidance, in the medical record Avoids creating or propagating errors in the medical record through accurate use of documentation tools Uses appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Provides feedback to improve others' written communication Provides feedback and constructive criticism regarding compliance with patient privacy and safety Offers clear and constructive suggestions to address system deficiencies

c. *Additional Delineation of Resident Responsibilities*

At the SAVAHCS, the residents are responsible to see patients in a manner similar to those at the the Alvernon Eye Clinic. However, the residents are expected to take more of a leadership role in the examination and treatment of patients. The residents act as the primary liaison between the patient and the attending physician. The residents are also responsible for the flow and scheduling of oculoplastics at the SAVAHCS, as well as scheduling of surgery and follow-up of these patients.

Format for Patient Examination: Following check-in, patients are screened by a technician, who will take a pertinent history, list medications, and note visual acuity. Some patients may require a visual field examination, which will be done at this time, prior to the resident examination.

The resident reviews the chart and summarizes the patient's history to-date and performs a complete refraction and assessment of visual acuity. This is followed by complete documentation of ocular motility. An anterior slit lamp examination is performed, followed by dilated fundus microscopy.

Prior to dilation, the attending physician will repeat motility examination, as well as assessment of visual acuity. During this time, the resident should continue with the next patient.

d. ***Chart Review***

In general, no discussion of patients occurs in the examination room. At the end of the session, whenever possible, the attending, resident and students will discuss patients seen during the course of the day. Patients may be used as a starting point from which to delve into mechanisms of disease and treatment.

e. ***Emergency Coverage***

Occasionally, oculoplastics problems present on both an inpatient and outpatient basis. It is the responsibility of the resident on-call to work-up such patients.

f. ***Required Reading***

- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 7: Orbit, Eyelids, and Lacrimal System*.
- *Cantisano-Zilkha, Haddad A. *Aesthetic Oculofacial Rejuvenation*. Saunders Elsevier, c2010.
- *Kim P. *Asian Blepharoplasty and the Eyelid Crease*. Chen WPD. Edinburgh: Elsevier, 2016.
- *Dutton JJ. *Atlas of Clinical and Surgical Orbital Anatomy*. Elsevier/Saunders, 2011.
- *Chen WPD, Khan JA. *Color Atlas of Cosmetic Oculofacial Surgery*. Saunders Elsevier, c2010.
- *Tyers AG, Collin RJO. *Colour Atlas of Ophthalmic Plastic Surgery*. Butterworth-Heinemann/Elsevier, c2008.
- *Putterman AM. *Cosmetic Oculoplastic Surgery*. Philadelphia: Saunders, c1993.
- *Dutton JJ. *Radiology of the Orbit and Visual Pathways*. Saunders Elsevier, c2010.
- *Nerad JA, Carter KD. *Alford M. Rapid Diagnosis in Ophthalmology: Ophthalmic Plastic Surgery*. St. Louis, MO: Mosby Elsevier, 2008.
- *Long JA. *Surgical Techniques in Ophthalmology: Oculoplastic Surgery*. Elsevier, Inc., c2009.
- *Korn B, Kikkawa D, eds. *Video Atlas of Oculofacial Plastic Reconstructive Surgery*. Elsevier, 2017.

*Available online through the University of Arizona Health Sciences Library,
www.ahsl.arizona.edu.

10. Pediatric Ophthalmology and Strabismus

a. *Goals*

The goal of the pediatric ophthalmology rotation is to develop facility at the diagnosis and management of the most commonly encountered pediatric eye problems. Manual diagnostic skills that will be developed include strabismus classification and deviation measurement, measurement of visual acuity, and measurement of refractive error.

b. *Objectives*

PGY-2 residents are expected to meet the objectives for level 2.

PGY-3 residents are expected to meet the objectives for level 3.

	Level 2	Level 3	Level 4
PATIENT CARE			
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none"> • Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings • Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan) 	<ul style="list-style-type: none"> • Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders • Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography) 	<ul style="list-style-type: none"> • Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
PC-3: Office-Based Procedures	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with direct supervision • Recognizes and manages intra- and post-operative complications, with direct supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with indirect supervision • Manages intra- and post-operative complications, with indirect supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with oversight • Manages intra- and post-operative complications, with oversight
PC-5: Extraocular Surgery (Plastics, Strabismus)	<ul style="list-style-type: none"> • Identifies patients for routine extraocular surgery • Performs simple extraocular surgery (e.g., simple lid laceration repair, nasolacrimal duct probing) • Manages common post-operative complications 	<ul style="list-style-type: none"> • Develops a pre-operative plan for routine extraocular surgery • Performs routine extraocular surgery (e.g., complex lid laceration repair, horizontal strabismus, ptosis) • Manages intra- and post-operative complications (e.g., bleeding, perforation) 	<ul style="list-style-type: none"> • Develops a pre-operative plan for complex extraocular surgery • Performs complex extraocular surgery (e.g., vertical strabismus), with assistance • Manages complex intra- and post-operative complications (e.g., infection, retrobulbar hemorrhage)

	Level 2	Level 3	Level 4
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> • Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions
MK-2: Differential Diagnosis	<ul style="list-style-type: none"> • Generates comprehensive differential diagnosis based on patient symptoms and history; documents and presents differential in oral presentation clearly and concisely • Describes diagnostic tests to aid in the differential diagnosis 	<ul style="list-style-type: none"> • Generates refined differential based on patient symptoms, history and examination findings, distinguishing between common and uncommon conditions • Selects additional diagnostic testing to distinguish between conditions on the differential 	<ul style="list-style-type: none"> • Generates probabilistic differential diagnosis in patients with multiple ocular and medical comorbidities; modifies likely differential with new information from additional testing • Articulates the rationale for ordering diagnostic testing in hierarchical fashion based upon probabilistic differential
MK-3: Therapeutic Interventions	<ul style="list-style-type: none"> • Explains relevant pathophysiology and lists indications and contraindications for planned medical therapy • Explains indications, contraindications, and relevant steps required for procedural intervention (e.g., anesthesia, technique, instruments) 	<ul style="list-style-type: none"> • Identifies and describes side effects of medical therapies and ways to minimize potential complications • Identifies and describes causes of complications and alternatives for routine procedural interventions 	<ul style="list-style-type: none"> • Describes and articulates the rationale for using emerging alternative medical therapies • Describes and articulates the rationale for using novel alternative procedural interventions
SYSTEMS-BASED PRACTICE			
SBP-1: Patient Safety and Quality Improvement	<ul style="list-style-type: none"> • Identifies system factors that lead to patient safety events • Reports patient safety events through institutional reporting systems (simulated or actual) • Describes local quality improvement initiatives (e.g., eye protection for high risk activities, diabetic eye screening) 	<ul style="list-style-type: none"> • Participates in analysis of patient safety events (simulated or actual) • Participates in disclosure of patient safety events to patients and families (simulated or actual) • Participates in local quality improvement initiatives 	<ul style="list-style-type: none"> • Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) • Discloses patient safety events to patients and families (simulated or actual) • Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project
PRACTICE-BASED LEARNING AND IMPROVEMENT			
PBLI-1: Evidence-Based and Informed Practice	<ul style="list-style-type: none"> • Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care 	<ul style="list-style-type: none"> • Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients 	<ul style="list-style-type: none"> • Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient

	Level 2	Level 3	Level 4
PBLI-2: Reflective Practice and Commitment to Personal Growth	<ul style="list-style-type: none"> • Demonstrates openness to performance data (feedback and other input) in order to inform goals; designs and implements a learning plan, with guidance • Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> • Seeks performance data and accepts it with responsibility and equipoise; demonstrates implementation of a learning plan • Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> • Uses performance data to measure the effectiveness of the learning plan and when necessary, improves it • Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance
PROFESSIONALISM			
PROF-1: Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> • Demonstrates insight into professional behavior in routine situations • Takes responsibility for own professionalism lapses • Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> • Demonstrates professional behavior in complex or stressful situations • Recognizes need to seek help in managing and resolving complex ethical situations • Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> • Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others • Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk management/legal consultation)
PROF-2: Accountability/Conscientiousness	<ul style="list-style-type: none"> • Performs tasks and responsibilities in a timely manner with attention to detail in routine situations • Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner 	<ul style="list-style-type: none"> • Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations • Recognizes detrimental consequences when tasks and responsibilities are not completed in a timely manner (e.g., team members, compliance) 	<ul style="list-style-type: none"> • Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner • Proactively implements strategies to ensure that the needs of patients, teams, and systems are met
PROF-3: Self-Awareness and Help-Seeking	<ul style="list-style-type: none"> • Independently recognizes status of personal and professional well-being • Independently recognizes limits in the knowledge/skills of self and/or team; demonstrates appropriate help-seeking behaviors for self or others 	<ul style="list-style-type: none"> • With assistance, proposes a plan to optimize personal and professional well-being • With assistance, proposes a plan to improve knowledge/skills of self and/or team 	<ul style="list-style-type: none"> • Independently develops a plan to optimize personal and professional well-being • Independently develops a plan to improve the knowledge/skills of self and/or team
INTERPERSONAL AND COMMUNICATION SKILLS			
ICS-1: Patient and Family-Centered Communication	<ul style="list-style-type: none"> • Establishes a therapeutic relationship in straightforward encounters using active listening and clear language • Addresses barriers to effective communication 	<ul style="list-style-type: none"> • Establishes a therapeutic relationship in challenging patient encounters (e.g., breaking bad news) • When prompted, reflects on personal biases while attempting to minimize communication barriers 	<ul style="list-style-type: none"> • Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity • Role models self-awareness to minimize communication barriers

	Level 2	Level 3	Level 4
ICS-2: Interprofessional and Team Communication	<ul style="list-style-type: none"> Communicates information effectively and uses active listening with all health care team members Solicits feedback on performance as a member of the health care team 	<ul style="list-style-type: none"> Communicates concerns to the team and learners Provides feedback and constructive criticism to peers and learners 	<ul style="list-style-type: none"> Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed Provides feedback and constructive criticism to superiors
ICS-3: Communication within Health Care Systems	<ul style="list-style-type: none"> Demonstrates organized diagnostic and therapeutic reasoning through notes in the medical record Appropriately selects forms of communication (e.g., telephone versus text) to promote patient safety and privacy Identifies appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Communicates clearly and concisely, including anticipatory guidance, in the medical record Avoids creating or propagating errors in the medical record through accurate use of documentation tools Uses appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Provides feedback to improve others' written communication Provides feedback and constructive criticism regarding compliance with patient privacy and safety Offers clear and constructive suggestions to address system deficiencies

c. *Pediatric Ophthalmology Specific Delineation of Resident Responsibilities*

The pediatric ophthalmology rotation differs from other rotations in that the resident seldom sees a young child in the absence of faculty due to the tendency for a child to “wear out” during an examination, thereby decreasing the utility of the examination. For this reason, the resident works at the elbow of faculty.

Dr. Smith expects you to learn how to work up pediatric patients on your own. The first days of the rotation will be starting to learn the pediatric exam, including stereo acuity testing, visual acuity testing, and alignment. You are expected to take charts from the check-in area and initiate work-up of patients without prompting after this period and should grow comfortable with prism and acuity measurements. You should try and follow your patients so that you can do the dilated and retinoscopy exams as well.

The resident may leave clinic and consult reference text while clinic is in session. Often, the best learning is accomplished while a patient is reviewed at the same time as reference material is available.

The primary textbook for learning the basics of pediatric ophthalmology and strabismus is the *BCSC* from the American Academy of Ophthalmology. Reading has been broken into approximately 25-page segments, to be spaced over time that the resident is on the pediatrics service. Along with each reading assignment, there is a reference article for the resident to read. It is the resident's responsibility to keep up-to-date on the reading, and ask Dr. Smith questions that suggest that he/she has done some of this reading.

With regard to the operating room, surgery starts on time, and if Dr. Smith does not see the resident at the start of the case, the surgical scrub tech will get the opportunity to first assist! Although the cases are scheduled for starting at 7:30 a.m., the usual start time is around 7:15 a.m., as the anesthesia team needs to get two rooms started, and they like to start the ophthalmology room first. This means the resident should be in the OR at around 7:00 a.m. and dressed, so that the patient can be seen beforehand in the holding area. The resident is expected to have his/her surgical plan for each patient.

Pre-operative evaluations are conducted on Friday mornings, and the resident is expected to see the patients and repeat all motility measurements to confirm the surgical plan and what is hoped to be accomplished in the operating room. There are instances when Dr. Smith will be out of town on Friday, and so if parents have questions that the resident is not able to answer, Dr. Smith will call them. It is important to understand that any child with a cough or cold will need to be rescheduled because of the increased risk of general anesthesia complications under these conditions.

d. When Dr. Smith is Unavailable

There are occasions when Dr. Miller and/or Dr. Smith will be out of town, and during this time, telephone messages from patients will be directed to the resident's attention by the technicians. The resident should try and answer as many phone calls as possible. The doctors will add you to the inbox during times away, at which point you will be expected to manage simple problems and phone calls. If the resident needs to contact Dr. Smith, try her cell phone or contact Rosanna, who usually has a phone number.

e. Reading Assignments (see public resident files)

- View the videotape, "Anatomy and Embryology of the Eye" by Smollen
- *Lid Disorders, Infectious and Allergic Ocular Diseases, Lacrimal Drainage System*
 - Kushner BJ: Early office-based vs. late hospital-based nasolacrimal duct probing. *Arch Ophthalmol* 1995;113:1103-1104.
 - Kassoff J, Meyer DR: Early office-based vs. late hospital-based nasolacrimal duct probing - a clinical decision analysis. *Ophthalmology* 1995;113:1168-1171.
- *Diseases of the Cornea and Anterior Segment, Iris Abnormalities*
 - Idrees F, Vaideanu D, Fraser SG, Sowden JC, Khaw PT: A review of anterior segment dysgeneses. *Surv Ophthalmol* 2006;51:213-231.
- *Pediatric Glaucoma*
 - DeLuise VP, Anderson DR: Primary infantile glaucoma (congenital glaucoma). *Surv Ophthalmol* 1983;28(1):1-19.
- *Childhood Cataracts*
 - Hutchinson AK, Drews-Botsch C, Lambert SR: Myopic shift after intraocular lens implantation during childhood. *Ophthalmology* 1997;104:1752-1757.
 - Amaya L, Taylor D, Russell-Eggitt I, Nischal KK, Lengyel D: The morphology and natural history of childhood cataracts. *Surv Ophthalmol* 2003;48:125-144.
- *Uveitis, Vitreous and Retinal Diseases and Disorders*
 - Cryotherapy for Retinopathy of Prematurity Cooperative Group: Multicenter trial of cryotherapy for retinopathy of prematurity. *Arch Ophthalmol* 1993;111:339-344.
- *Optic Nerve Disorders, Ocular Tumors in Childhood, Phakomatoses*
 - Knudson AG: Mutation and cancer: statistical study of retinoblastoma. *Proc Natl Acad Sci* 1971;68(4):820-823.
 - Abramson DH, Scheffer AC: Update on retinoblastoma. *Retina* 2004;(6):828-848.
- *Craniofacial Malformations, Ocular Findings in Inborn Errors of Metabolism, Ocular Trauma in Childhood*
 - Marcus DM, Albert DM: Recognizing child abuse. *Arch Ophthalmol* 1992;110:766-767.
 - Harley RD: Ocular manifestations of child abuse. *J Pediatr Ophthalmol Strabismus* 1980;17(1):5-13.
 - Aryan HE, Ghosheh FR, Jandial R, Levy ML: Retinal hemorrhage and pediatric brain injury: etiology and review of the literature. *J Clin Neurosci* 2005;12(6):624-631.

- *Decreased Vision in Infants and Children, Learning Disabilities, Dyslexia, and Vision*
 - Good WV, Jan JE, DeSa L, Barkovich AJ, Groenvelde M, Hoyt CS: Cortical visual impairment in children. *Surv Ophthalmol* 1994;38:351-364.
- *Strabismus, Anatomy of the Extraocular Muscles, Motor Physiology, Sensory Physiology*
 - Hubel DH, Weisel TN: Binocular interaction in the striate cortex of kittens reared with artificial squint. *J Neurophysiol* 1965;28:1041-1057.
- *Amblyopia*
 - The Pediatric Eye Disease Investigator Group: A randomized trial of Atropine vs patching for treatment of moderate amblyopia in children. *Arch Ophthalmol* 2002;120:268-278.
- *Introduction to Strabismus, Diagnostic Techniques for Strabismus*
 - Prism Adaptation Study Research Group: Efficacy of prism adaptation in the surgical management of acquired esotropia. *Arch Ophthalmol* 1990;108:1248-1256.
- *Esodeviations*
 - von Noorden GK: A reassessment of infantile esotropia (SLIV Edward Jackson Memorial Lecture). *Am J Ophthalmol* 1988;105(1):1-10.
- *Exodeviations*
 - Coffey B, Wick B, Cotter S, Scharre J, Horner D: Treatment options in intermittent exotropia: a critical appraisal. *Optom Vis Sci* 1992;69(5):386-404.
- *Vertical Deviations, A and V Patterns, Special Forms of Strabismus, Nystagmus*
 - Molarte AB, Rosenbaum AL: Vertical rectus muscle transposition surgery for Duane's syndrome. *J Pediatr Ophthalmol Strabismus* 1990;27:171-177.
- *Surgery of the Extraocular Muscles*
 - Guyton DL: Strabismus surgery. pp. 85-113.
- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 6: Pediatric Ophthalmology and Strabismus*.
- *Lambert SR, Lyons CJ, eds. *Taylor and Hoyt's Pediatric Ophthalmology and Strabismus*, 5th ed. Edinburgh: Elsevier, 2017.
- *Strominger MB. *Rapid Diagnosis in Ophthalmology: Strabismus*. Elsevier, c2008.

*Available online through the University of Arizona Health Sciences Library,
www.ahsl.arizona.edu.

11. Refractive Surgery

a. *Goals*

The primary educational goals of the residents on the refractive surgery rotation are to understand the physiology of the cornea and anterior segment, the refractive errors, and to develop facility in the examination of patients, understanding the laser technology, the various refractive surgical procedures, and ability to identify common pathological conditions and understand the judicious use of antibiotics, corticosteroids, non-steroidal inflammatory drugs in the pharmacological regimen, as well as understand the indications for surgical procedures, and to learn how to manage possible complications. The goals are met through exposure to patients during a subspecialty rotation with a preceptor during the first year of residency.

b. *Learning Objectives*

- Underlying Concepts of Refractive Surgery
 - Contribution of the corneal layers and shape to the optics of the eye
 - Computerized corneal topography
 - Wavefront analysis
 - Biomechanics of the cornea
 - Corneal wound healing
 - Laser biophysics
- Incisional Corneal Surgery
 - Incisional correction of myopia
 - Incisional correction of astigmatism
- Photoablation
 - Photorefractive keratectomy, laser subepithelial keratomileusism, and epithelial laser in situ keratomileusis
 - Laser in situ keratomileusis
 - Wavefront-guided surface ablation and LASIK
- Intraocular Surgery
 - Phakic intraocular lenses
 - Bioptics
 - Clear lens extraction (refractive lens exchange)
 - Toric intraocular lenses
 - Multifocal intraocular lenses
 - Accommodating intraocular lenses
 - Wavefront-designed intraocular lenses
 - Light-adjustable intraocular lenses
- Accommodative and Nonaccommodative Treatment of Presbyopia
 - Theories of accommodation
 - Nonaccommodative treatment of presbyopia
 - Accommodative treatment of presbyopia
- Considerations after Refractive Surgery
 - IOL calculations after refractive surgery
 - Retinal detachment repair after LASIK
 - Corneal transplantation after refractive surgery

PGY-2 residents are expected to meet the objectives for level 2.

	Level 2	Level 3	Level 4
PATIENT CARE			
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none"> • Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings • Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan) 	<ul style="list-style-type: none"> • Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders • Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography) 	<ul style="list-style-type: none"> • Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> • Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions
PROFESSIONALISM			
PROF-1. Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> • Demonstrates insight into professional behavior in routine situations • Takes responsibility for own professionalism lapses • Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> • Demonstrates professional behavior in complex or stressful situations • Recognizes need to seek help in managing and resolving complex ethical situations • Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> • Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others • Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk management/legal consultation)

c. *Reading List*

Rather than have assigned reading for each week, residents will be asked to keep a log of the assigned reading chapters. At the beginning of the rotation, they are to review the assignment with the attending. As they see patients that fit into the appropriate categories, they are expected to read the chapters from the basic science text that are appropriate, as well as the review articles that are provided. By the end of each year, they should have gone through the entire refractive surgery book. In April of each year, they are to submit their logs so that any areas that are deficient can be completed by the end of the year.

d. ***Required Reading***

- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 14: Refractive Surgery*. (This should be read in its entirety each academic year.)
- Azar DT, Gatinel D, Hoang-xuan T. *Refractive Surgery*, 2nd ed. Mosby, 2006.
- Wang M. *Corneal Topography in the Wavefront Era: A Guide for Clinical Application*. Thorofare, NJ: Slack, Inc., 2006.
- Agarwal S, Agarwal A, Agarwal A. *Step by Step Corneal Topography*. Maryland Heights, MO: Jaypee Brothers Medical Publishers, Inc., 2006.
- Krueger RR, MacRae S, Applegate RA. *Wavefront Customized Visual Correction*. Thorofare, NJ: Slack, Inc., 2004.
- *Hampton RF. *Surgical Techniques in Ophthalmology: Refractive Surgery*. Elsevier, c2008.
- *Brightbill FS, ed. *Cornea Surgery: Theory, Techniques, and Tissue*. London: Mosby, c2009.

*Available online through the University of Arizona Health Sciences Library,
www.ahsl.arizona.edu.

12. Vitreoretina

a. *Goals*

The goal of the retina rotation is to master the diagnosis and either recommend or deliver appropriate therapy for disorders of the retina and vitreous, through mastery of the direct examination skills and through mastery of the ancillary testing that is performed

b. *Objectives*

PGY-2 residents are expected to meet the objectives for level 2.

PGY-3 residents are expected to meet the objectives for level 3.

PGY-4 residents are expected to meet the objectives for level 4.

	Level 2	Level 3	Level 4
PATIENT CARE			
PC-1: Data Acquisition – Basic Ophthalmology Exam and Testing	<ul style="list-style-type: none"> • Performs problem-focused exam with appropriate techniques (e.g., gonioscopy and scleral depression), consistently identifies common abnormalities on examination; may identify subtle findings • Orders, performs, and interprets basic testing (e.g., visual field testing, Optical Coherence Tomography, B-scan) 	<ul style="list-style-type: none"> • Identifies subtle or uncommon examination findings of common disorders and typical or common findings of rarer disorders • Interprets unusual findings on routine testing, identifies artifacts; recognizes indications for advanced diagnostic tests and imaging procedures (e.g., specular microscopy, electroretinography) 	<ul style="list-style-type: none"> • Orders and interprets advanced diagnostic tests and imaging procedures according to evidence-based medicine (i.e., when and when not to order testing)
PC-3: Office-Based Procedures	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with direct supervision • Recognizes and manages intra- and post-operative complications, with direct supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with indirect supervision • Manages intra- and post-operative complications, with indirect supervision 	<ul style="list-style-type: none"> • Administers anesthesia and performs procedure, with oversight • Manages intra- and post-operative complications, with oversight
PC-6: Intraocular Surgery (Cornea, Retina, Glaucoma)	<ul style="list-style-type: none"> • Assesses patients for routine intraocular surgery • Performs routine intraocular surgery in the hands-on surgical skills laboratory • Manages common post-operative complications (e.g., post-op pain, high intraocular pressure) 	<ul style="list-style-type: none"> • Assesses patients for complex intraocular surgery • Assists in subspecialty intraocular surgery • Manages common intra-operative complications (e.g., flat chamber, wound leak, hyphema) 	<ul style="list-style-type: none"> • Assesses patients for multispecialty intraocular surgeries • Performs routine intraocular surgery • Manages complex intra- and post-operative complications (e.g., re-bubble graft, blebitis)

	Level 2	Level 3	Level 4
MEDICAL KNOWLEDGE			
MK-1: Pathophysiology	<ul style="list-style-type: none"> • Demonstrates basic knowledge of pathophysiology and clinical findings for common ophthalmic conditions routinely managed by ophthalmologists 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for commonly encountered ophthalmic conditions; demonstrates basic knowledge of pathophysiology and clinical findings for uncommon conditions 	<ul style="list-style-type: none"> • Demonstrates advanced knowledge of pathophysiology and clinical findings for uncommon ophthalmic conditions
MK-2: Differential Diagnosis	<ul style="list-style-type: none"> • Generates comprehensive differential diagnosis based on patient symptoms and history; documents and presents differential in oral presentation clearly and concisely • Describes diagnostic tests to aid in the differential diagnosis 	<ul style="list-style-type: none"> • Generates refined differential based on patient symptoms, history and examination findings, distinguishing between common and uncommon conditions • Selects additional diagnostic testing to distinguish between conditions on the differential 	<ul style="list-style-type: none"> • Generates probabilistic differential diagnosis in patients with multiple ocular and medical comorbidities; modifies likely differential with new information from additional testing • Articulates the rationale for ordering diagnostic testing in hierarchical fashion based upon probabilistic differential
MK-3: Therapeutic Interventions	<ul style="list-style-type: none"> • Explains relevant pathophysiology and lists indications and contraindications for planned medical therapy • Explains indications, contraindications, and relevant steps required for procedural intervention (e.g., anesthesia, technique, instruments) 	<ul style="list-style-type: none"> • Identifies and describes side effects of medical therapies and ways to minimize potential complications • Identifies and describes causes of complications and alternatives for routine procedural interventions 	<ul style="list-style-type: none"> • Describes and articulates the rationale for using emerging alternative medical therapies • Describes and articulates the rationale for using novel alternative procedural interventions
SYSTEMS-BASED PRACTICE			
SBP-1: Patient Safety and Quality Improvement	<ul style="list-style-type: none"> • Identifies system factors that lead to patient safety events • Reports patient safety events through institutional reporting systems (simulated or actual) • Describes local quality improvement initiatives (e.g., eye protection for high risk activities, diabetic eye screening) 	<ul style="list-style-type: none"> • Participates in analysis of patient safety events (simulated or actual) • Participates in disclosure of patient safety events to patients and families (simulated or actual) • Participates in local quality improvement initiatives 	<ul style="list-style-type: none"> • Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) • Discloses patient safety events to patients and families (simulated or actual) • Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project
PRACTICE-BASED LEARNING AND IMPROVEMENT			
PBLI-1: Evidence-Based and Informed Practice	<ul style="list-style-type: none"> • Articulates clinical questions and elicits patient preferences and values in order to guide evidence-based care 	<ul style="list-style-type: none"> • Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients 	<ul style="list-style-type: none"> • Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient

	Level 2	Level 3	Level 4
PBLI-2: Reflective Practice and Commitment to Personal Growth	<ul style="list-style-type: none"> • Demonstrates openness to performance data (feedback and other input) in order to inform goals; designs and implements a learning plan, with guidance • Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> • Seeks performance data and accepts it with responsibility and equipoise; demonstrates implementation of a learning plan • Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance 	<ul style="list-style-type: none"> • Uses performance data to measure the effectiveness of the learning plan and when necessary, improves it • Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance
PROFESSIONALISM			
PROF-1: Professional Behavior and Ethical Principles	<ul style="list-style-type: none"> • Demonstrates insight into professional behavior in routine situations • Takes responsibility for own professionalism lapses • Analyzes straightforward situations using ethical principles 	<ul style="list-style-type: none"> • Demonstrates professional behavior in complex or stressful situations • Recognizes need to seek help in managing and resolving complex ethical situations • Analyzes complex situations using ethical principles 	<ul style="list-style-type: none"> • Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others • Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed (e.g., ethics consultations, literature review, risk management/legal consultation)
PROF-2: Accountability/Conscientiousness	<ul style="list-style-type: none"> • Performs tasks and responsibilities in a timely manner with attention to detail in routine situations • Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner 	<ul style="list-style-type: none"> • Performs tasks and responsibilities in a timely manner with attention to detail in complex or stressful situations • Recognizes detrimental consequences when tasks and responsibilities are not completed in a timely manner (e.g., team members, compliance) 	<ul style="list-style-type: none"> • Recognizes situations that may impact others' ability to complete tasks and responsibilities in a timely manner • Proactively implements strategies to ensure that the needs of patients, teams, and systems are met
PROF-3: Self-Awareness and Help-Seeking	<ul style="list-style-type: none"> • Independently recognizes status of personal and professional well-being • Independently recognizes limits in the knowledge/skills of self and/or team; demonstrates appropriate help-seeking behaviors for self or others 	<ul style="list-style-type: none"> • With assistance, proposes a plan to optimize personal and professional well-being • With assistance, proposes a plan to improve knowledge/skills of self and/or team 	<ul style="list-style-type: none"> • Independently develops a plan to optimize personal and professional well-being • Independently develops a plan to improve the knowledge/skills of self and/or team
INTERPERSONAL AND COMMUNICATION SKILLS			
ICS-1: Patient and Family-Centered Communication	<ul style="list-style-type: none"> • Establishes a therapeutic relationship in straightforward encounters using active listening and clear language • Addresses barriers to effective communication 	<ul style="list-style-type: none"> • Establishes a therapeutic relationship in challenging patient encounters (e.g., breaking bad news) • When prompted, reflects on personal biases while attempting to minimize communication barriers 	<ul style="list-style-type: none"> • Easily establishes therapeutic relationships, with attention to patient/family concerns and context, regardless of complexity • Role models self-awareness to minimize communication barriers

	Level 2	Level 3	Level 4
ICS-2: Interprofessional and Team Communication	<ul style="list-style-type: none"> Communicates information effectively and uses active listening with all health care team members Solicits feedback on performance as a member of the health care team 	<ul style="list-style-type: none"> Communicates concerns to the team and learners Provides feedback and constructive criticism to peers and learners 	<ul style="list-style-type: none"> Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed Provides feedback and constructive criticism to superiors
ICS-3: Communication within Health Care Systems	<ul style="list-style-type: none"> Demonstrates organized diagnostic and therapeutic reasoning through notes in the medical record Appropriately selects forms of communication (e.g., telephone versus text) to promote patient safety and privacy Identifies appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Communicates clearly and concisely, including anticipatory guidance, in the medical record Avoids creating or propagating errors in the medical record through accurate use of documentation tools Uses appropriate channels to communicate system deficiencies 	<ul style="list-style-type: none"> Provides feedback to improve others' written communication Provides feedback and constructive criticism regarding compliance with patient privacy and safety Offers clear and constructive suggestions to address system deficiencies

c. *Retina Rotation Specific Delineation of Resident Responsibilities*

The residents will be evaluating patients alongside the attending physicians. The residents are encouraged to do complete examinations, assessments, suggestions for testing, and listing of therapeutic options. In general, any discussions of these options for further diagnosis and management should be made with the attending physician, out of range of patients, prior to discussion with the patient and the family.

Format for Patient Examination: Following check-in, patients are screened by a technician, who will take a pertinent history, list medications and note visual acuity and dilate the patient.

On new patients, the resident reviews the chart and summarizes the patient's history to date, performs a complete anterior segment slit lamp exam and gonioscopy when necessary. The resident then places dilating drops. After dilation is complete, the resident performs a complete fundus examination with indentation, ophthalmoscopy when necessary. The patient is sent for photographs and fluorescein angiograms as indicated. Following the angiogram, the angiogram is reviewed with faculty and the impression is recorded in the chart. The fundus examination is completed and documented in the chart, as well. The patient is then left in the room and the attending completes the examination.

For follow-up patients, the resident reviews the chart and summarizes the patient's history to date. The resident performs a complete anterior segment and examines the fundus with 60- and 90-diopter lenses. A complete examination is performed with indirect ophthalmoscopy, as well. After the resident documents the findings in the chart, he will write the impressions and plan. The patient is left in the room to await the arrival of the attending physician.

d. *Chart Review*

In general, no discussion of patients occurs in the examination room. At the end of the session, whenever possible, the attending, resident and students will discuss patients seen during the course of

the day. Patients may be used as a starting point from which to delve into mechanisms of disease and treatment.

e. ***Surgery***

In general, the resident acts as a first assistant at surgery. The resident is expected to do a pre-op evaluation on any patient that the resident is to operate on. In addition, the resident follows all patients post-operatively.

Residents should review the records of the patient before surgery and be familiar with the planned procedure and therapeutic options. Surgical techniques and instrumentation should be reviewed even if the resident will not perform the surgery.

All pre-op surgical patients require the following:

- A complete retinal evaluation including drawings of pertinent pathology.
- Recording of the examination in the office chart.
- A medical history and physical form must be completed for every patient. If the patient has medical problems, then a medical consultation needs to be arranged. The surgical coordinator will assist in doing this.

Consent: In general, the resident is not asked to get informed consent for surgical procedures. This is typically done by the attending. The resident should, however, be well versed in the indications, risks and potential complications for all commonly performed glaucoma procedures.

f. ***Emergency Coverage***

Occasionally, retinal detachment, hemorrhages, and other problems with acute vision loss may occur. It is the responsibility of the resident on-call to work-up the patients with the assistance of the Chief Resident. The faculty on-call should be notified or consulted regarding any relevant findings.

g. ***Research***

The resident on the retina service is encouraged to participate in a clinical or basic science research project. There is no specific research requirement.

h. ***Fluorescein Angiography (FA) Conference***

Residents are expected to attend all FA conferences.

i. ***Required Reading***

General Reference for Topical Reading on Selected Patients

*Schachat AP, Sadda SR, Hinton DR, Wilkinson CP, Wiedemann P. *Ryan's Retina*. Elsevier, Inc., c2018.

First Year (PGY-2) Resident

Complete:

- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 12, Retina and Vitreous*.
- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 9, Intraocular Inflammation and Uveitis*.
- Berkow JW, Flower RW, Orth DH, Kelley JS. *Fluorescein Angiography and Indocyanine Green Angiography: Technique and Interpretation*. Ophthalmology Monograph 5, 2nd ed. Oxford University Press; 1997.
- Folk JC, Pulido JS: *Laser Photocoagulation of the Retina and Choroid*. Ophthalmology Monograph 11. Oxford University Press; 1997.

Others: Reference as necessary

Second Year (PGY-3) Resident

Repeat:

- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 12, Retina and Vitreous*.
- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 9, Intraocular Inflammation and Uveitis*.
- Berkow JW, Flower RW, Orth DH, Kelley JS. *Fluorescein and Indocyanine Green Angiography: Technique and Interpretation*. Ophthalmology Monograph 5, 2nd ed. Oxford University Press; 1997.
- Folk JC, Pulido JS: *Laser Photocoagulation of the Retina and Choroid*. Ophthalmology Monograph 11. Oxford University Press; 1997.

Complete:

- Fishman GA, Birch DG, Holder GE, Brigell MG. *Electrophysiologic Testing in Disorders of the Retina, Optic Nerve, and Visual Pathway*. Ophthalmology Monograph 2, 2nd ed. Oxford University Press, 2001.
- Gass JDM. *Stereoscopic Atlas of Macular Diseases: Diagnosis and Treatment*. 4th ed. St. Louis: Mosby, c1997.
- Hilton GF, McLean JB, Brinton DA. *Retinal Detachment: Principles and Practice*. Ophthalmology Monograph 1, 2nd ed. San Francisco: American Academy of Ophthalmology, 1995.

Others: Reference as necessary

Third Year (PGY-4) Resident

Repeat:

- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 12, Retina and Vitreous*.
- American Academy of Ophthalmology. *Basic and Clinical Science Course, Section 9, Intraocular Inflammation and Uveitis*.
- Berkow JW, Flower RW, Orth DH, Kelley JS. *Fluorescein and Indocyanine Green Angiography: Technique and Interpretation*. Ophthalmology Monograph 5, 2nd ed. Oxford University Press; 1997.
- Folk JC, Pulido JS: *Laser Photocoagulation of the Retina and Choroid*. Ophthalmology Monograph 11. Oxford University Press; 1997.
- *Brinton DA, Wilkinson CP. *Retinal Detachment: Principles and Practice*, 3rd ed. Oxford University Press, 2009.

Complete:

- Ryan SJ, ed. *Retina*. 2nd ed. St Louis; Mosby-Year Book; 1994.
- Wilkinson CP, Rice TA. *Michels Retinal Detachment*. 2nd ed. Mosby; 1997.

Others: Reference as necessary

All Residents

- *Duker JS, Waheed NK, Goldman DR, eds. *Handbook of Retinal OCT: Optical Coherence Tomography*. London; New York: Saunders/Elsevier, 2014.
- *Singh AD, Hayden BC. *Ophthalmic Ultrasonography*. Edinburgh; New York: Elsevier Saunders, 2012.
- *Agarwal A. *Gass' Atlas of Macular Diseases*. Edinburgh: Elsevier Saunders, 2012.
- *Yannuzzi LA. *The Retinal Atlas*. Saunders Elsevier, 2010.
- *Sadda SR. *Ryan's Retinal Imaging and Diagnosis*. Saunders Elsevier, c2013.
- *Bhavsar AR. *Surgical Techniques in Ophthalmology: Retina and Vitreous Surgery*. Elsevier, c2009.
- *Niederhuber JE, Armitage JO, Doroshow JH, Kastan MB, Tepper JE. *Abeloff's Clinical Oncology*, 5th ed. Churchill Livingstone Elsevier, c2014.

*Available online through the University of Arizona Health Sciences Library,
www.ahsl.arizona.edu.