VA Ophthalmology Clinic
Medical Student Curriculum and Orientation

Introduction

Welcome to the VA ophthalmology service!

This is a great rotation where you will see a lot of pathology and have opportunities to learn a great deal about the eye.

You'll primarily be working with the PGY-2 and PGY-3 residents, although you should feel free to bounce between the various residents and attendings on the floor. You should be proactive in asking questions when appropriate and examining patients. Try to examine as many patients as you can without interrupting workflow while the resident looks up patient records and fills out documentation. Practice using the slit lamp and work on your fundus exam by examining patients with a direct ophthalmoscope. Ask to borrow your resident's 90 diopter lens to try examining the fundus using the slit lamp or 20 diopter lens when using the indirect. If there is downtime, you can also observe what the techs do to work up patients. You will likely observe several procedures including lasers, injections, etc.

You are expected to take charge of your own learning, so feel free to look things up on your phone throughout the day during downtime. You can also look up topics in the *Wills Eye Manual*. Ask your resident, if you can borrow a copy in clinic. There will be a lot of new material and acronyms that may be unfamiliar to you, so you can carry the attached common acronyms list that was tailored for the VA rotation.

Remember than learning is more effective when it is effortful. Embrace the struggle.

Learning Objectives

1. Understand the components of an ophthalmology history and physical exam to guide appropriate management and/or triage for the diseases listed in the "Schedule" section below.
2. Work on the 8-point exam ophthalmology exam (https://www.aao.org/young-ophthalmologists/yo-info/article/how-to-conduct-eight-point-ophthalmology-exam). It takes time to learn the exam. An effective way of working on the exam is to focus on specific skills in specific clinics. See "Schedule" section below.
    a. Visual acuity
    b. Pupils
    c. Extraocular motility and alignment (Hirschberg)
    d. Intraocular pressures (by tonopen and palpation)
    e. Confrontation visual fields
    f. External exam
    g. Slit lamp exam
    h. Funduscopic exam
3. Self-directed learning
    a. Your ophthalmology rotation has relatively short days from 7AM to 5PM. Work hard while you are in clinic, and spend 1.5 hours per day studying ophthalmology at home.
    b. Identify and acknowledge gaps in personal knowledge and develop efficient strategies for filling gaps.
    c. A list of resources is attached below in the appendix. Also, feel free to ask residents and attendings about their experiences and what resources they recommend.
    d. Be able to discuss at least two topics listed below in the schedule or your own topics of interest each day. Familiarize yourself with the attached acronyms and the topics listed under each day of the week.
4. Conferences:
    a. Attend morning resident lectures held at the Moran Eye Center auditorium on the first floor starting at 0700 most weekday mornings. Ask Chandler Crane (chandler.crane@hsc.utah.edu) or Meghan Johnson (Meghan.johnson@hsc.utah.edu) to send you the resident lecture schedule for the week. We recommend briefly reviewing the lecture topic beforehand to get the most out of lecture. VA clinic starts at 0800 on Mondays, Tuesdays, Thursdays, and Fridays.
    b. Attend grand rounds on Wednesdays at 0800 in the Moran Eye Center auditorium on the first floor. There is no lecture on Wednesday mornings. VA clinic starts late at 0900.

Schedule

VA ophthalmology clinic is located on the 4th floor (south corridor: ophthalmology, north corridor: medical specialties, east corridor: GI/derm) and generally runs from 8am-5pm. While the location of the ophthalmology clinic does not change, the clinic rotates through various subspecialties throughout the week. For each day note the topics to learn and exam techniques to focus on. Work on visual acuity testing and slit lamp exam every day.

Monday: **Glaucoma AM** **Retina PM**	• Primary open angle glaucoma • Secondary open angle glaucoma • Acute angle closure glaucoma • Chronic angle closure glaucoma • CRVO vs. BRVO • CRAO vs. BRAO	✓ Red reflex testing ✓ Direct/indirect/90D ophthalmoscopy ✓ Cup:disc
Tuesday: **Retina all day**	• Age-related macular degeneration (wet vs. dry) • Diabetic retinopathy (non-proliferative vs. proliferative) • Hypertensive retinopathy findings • Applications of anti-VEGF intravitreal injections • Posterior vitreous detachment	✓ Direct/indirect/90D ophthalmoscopy ✓ Identify macula, fovea, and vessels
1st, 3rd, and 5th Wednesday of month: **Glaucoma AM** **General PM**	• Visual Field Testing (University of Iowa website has a great resource for this) • OCT RNLF interpretation • Pseudoexfoliation syndrome vs. pseudoexfoliation glaucoma • Gonioscopy • Dry eye syndrome • Cataracts (nuclear sclerotic cataract vs. cortical cataract vs. posterior subcapsular cataract)	✓ Confrontation visual field testing ✓ Pupil exam (RAPD) ✓ Checking intraocular pressure (tonopen and by palpation) ✓ Cup:disc
2nd and 4th Wednesday of month: **Oculoplastics all day**	• Blepharoptosis (AKA ptosis) • Dermatochalasis • Ectropion vs. Entropion • Trichiasis • Nasolacrimal duct obstruction • Blepharospasm vs. hemifacial spasm	✓ Motility and alignment (Hirschberg) ✓ External Exam including lid position in relation to pupil/iris/sclera
Thursday: **General AM,** **Neuro-ophthalmology PM**	• Amblyopia • Diplopia • RAPD (relative afferent pupillary defect) • Eye pain differential diagnosis • Ocular manifestations/complications of thyroid eye disease	✓ Confrontation visual field testing ✓ Pupils (RAPD) ✓ Motility and alignment (Hirschberg)

Friday: **General AM** **Cornea PM**	• Keratoconus • Fuch's corneal dystrophy • Corneal abrasion vs. corneal ulcer • Viral conjunctivitis vs. allergic conjunctivitis vs. bacterial conjunctivitis	✓ External exam including ocular surface ✓ Direct/indirect/90D ophthalmoscopy

Other topics to discuss/research during down time

Lippa LM. Ophthalmology in the medical school curriculum: reestablishing our value and effecting change. Ophthalmology. 2009;116:1235e1236. (https://www.aaojournal.org/article/S0161-6420(09)00039-6/pdf)

- Most important ocular side effects of systemic drugs.
    - i.e. Adrenergics/anticholinergics, topiramate, ethambutol, steroids, amiodarone, sildenafil, plaquenil, tamoxifen
- List the common ocular medications that can have systemic side effects
    - i.e. timolol and sulfas
- Describe when it is necessary to refer a patient urgently to ophthalmology
    - Globe rupture
    - Orbit: cellulitis (septal/preseptal); proptosis
    - Extraocular Muscles: 3rd, 4th, 6th nerve palsies; gross mal-alignment
    - Pupils: relative afferent pupillary defect, anisocoria, light/near dissociation, leukocoria
    - Confrontation Visual Fields: gross defects
    - Lids: ptosis, lid lag/stare, swelling, masses
    - Conjunctiva: tarsal/forniceal foreign body; hemorrhage; severe hyper-purulent conjunctivitis (gonococcal)
    - Cornea: infectious ulcers (bacterial or viral), foreign body
    - Anterior chamber: shallow chamber, angle closure
    - Fundus: normal anatomy vs. abnormal; disc edema Hollenhorst plaque
    - Amblyopia in child

Clinic Workflow

Patients will be initially screened in the technicians' rooms and then sent back to the front waiting area. Their charts will be placed in Jeannie's, the lead technician's, room on the desk to the left. As you wrap up seeing a patient with the resident, you can go back to Jeannie's room and grab the next patient's chart to review and take back to your resident.

We use paper charts that are scanned into Vista Imaging Display. The front is filled out by the techs and has a lot of useful information regarding HPI and histories. The back is information filled out by the tech and resident for that day's visit. To access Vista Imaging, log into CPRS, select your patient by typing in initial of last name and last 4 digits of their SSN. After selecting the patient, go to "Tools," scroll down to "Vista Imaging Display." In addition to previous chart notes, you will be able to see some scanned ancillary tests such as visual fields, OCT RNFL, OCT Macula, etc. These tests can also be viewed in more detail on the Zeiss app. (Login: md; Password: Password) Sometimes the patient may also have helpful notes in CPRS under "Eye Optometry."

Your resident may have you examine a patient while he/she is looking up notes or filling out documentation. You may get comfortable enough with the ophthalmology lingo, exam, and diagnoses to even scribe for the resident. Scribing will allow you to reinforce what you are learning.

After a couple of days in clinic, *if* you feel comfortable, (*and* there is an extra exam room) you may start seeing patients on your own and presenting to either the resident or attending. If you see patients on your own, work out with the residents regarding who will be staffing and putting in orders for each patient. Unless there is an extra exam room that the residents or technicians are not using, you will likely not have access to your own computer at the VA.

Appendix I

Recommended Ophthalmology Resources for Medical Students

Websites

- Moran CORE (Clinical Ophthalmology Resource for Education)
  http://morancore.med.utah.edu
  - Contains links to Utah's Moran Eye Institute Grand Rounds, resident lectures, surgical videos, etc. Excellent source of material curated by your very own University of Utah faculty, residents, and medical students.
- Root Eye Network
  https://timroot.com/
  - Great introductory website with many FREE useful videos, downloadable books, lectures, flashcards, etc.
- AAO Eye Wiki
  http://eyewiki.aao.org/Main_Page
  - Basically a Wikipedia style eye encyclopedia curated by American Academy of Ophthalmology (AAO). There are articles on nearly every basic ophthalmology topic. Unfortunately many things, such as pictures/diagrams, are restricted unless you are a member of AAO. You will likely use this site every day on ophthalmology rotations.
- Eye Rounds.org (From University of Iowa)
  http://webeye.ophth.uiowa.edu/eyeforum/
  - Excellent resource from one of the top 5 ophthalmology departments in the country. They have useful pages on nearly every eye condition, many of which are designed specifically to be at the med student level. You can also find videos of common eye surgeries to help you prepare for the OR. Check out their explanation of Visual Fields.
- The Eyes Have It: University of Michigan's version of Iowa's Eye Rounds
  http://kellogg.umich.edu/theeyeshaveit/
  - Great photo atlas of eye conditions with pertinent history/exam findings. They also have a free app that you can download and YouTube videos.
- Eye Guru:
  http://eyeguru.org/
  - Website designed by former residents for beginning residents. This has tutorials on the most common eye diseases, links to landmark trials in ophthalmology, etc.
- Pre-Ophtho
  https://www.pre-ophtho.com/
  - Website that catalogues useful resources (books, videos, podcasts, apps)
- American Academy of Family Physicians
  https://www.aafp.org/
  - Website with great review articles on ocular conditions and emergencies and management. Check out their outlines on these topics as well.

Apps (Android and Apple Stores)

- "The Eyes Have It" by University of Michigan (Free)
    - Use this app to systematically learn exam findings, differential diagnoses, treatments, etc. of common diseases. Learn systemic conditions with ophthalmic findings and ophthalmic side effects of systemic medications. Learn how to identify and treat various sequelae of eye trauma. You can even quiz yourself on your knowledge.
- "The Eye Handbook" by Cloud Nine Development (Free)
    - Residents sometimes use this app to check vision and color vision while on call. It has many components including Powerpoint slides on common diseases, scoring rubrics for various diseases, videos of surgeries, podcasts, eye atlas of various diseases, manual of many eye diseases (including definitions, symptoms, exam findings, treatment, ddx, follow up, etc.), pictures of what patients see when they have cataract, diplopia, etc.
- "Anu Reality EyeSim" Mobile by EON Reality, Inc. ($19.99)
    - This app is an investment, but it is worth it. Use this interactive interface to learn the detailed anatomy of the eye, orbit, visual fields, pupil exam, etc. You can rotate the virtual eye models and learn spatial relationships. Learning eye anatomy is the first step to understanding ophthalmology. If you know your anatomy, you will better understand diseases and differentials.

Books

- *The Wills Eye Manual*
    - This book is essentially the bible for "on-call" ophthalmology residents. It is concise and comprehensive, with roughly 1-2 pages of high yield info on nearly every eye condition. No matter what diseases you encounter on rotations, this book will at least contain "high-yield" info about them (clinical presentation, management, etc.). Has lots of good pictures as well. I would buy a used version online to save money. Many programs buy their residents the newest version upon starting residency as well.
- *Kanski's Clinical Ophthalmology* by Brad Bowling
    - Comprehensive text book available through Clinical Key if you are looking for something free. A great way to learn ophthalmology exam findings is by looking at atlases and pictures.
- *Basic Ophthalmology* by Richard A. Harper
    - Purple or black book that most ophthalmology departments let their rotating students use during clerkships. You can ask Meghan Johnson to borrow a copy. This book good clinical information regarding the most common eye pathologies (cataracts, glaucoma, macular degeneration, etc.). However, it doesn't cover more complex diseases that you might come across on clerkships.
- *Ophtho Book* by Tim Root
    - Yellow book that can be read easily in 1-2 days. Very basic/introductory, but useful for students just beginning to learn about ophthalmology. Affordable and worth purchasing, but also available for free in PDF form online at Tim Root's website.
- *Ophthalmology Made Ridiculously Simple* by Stephen Goldberg
    - Also a yellow book that can be read quickly. This is a step up from Root's Ophtho Book, but is still very introductory.
- *The Mass Eye & Ear Infirmary Illustrated Atlas of Ophthalmology*
    - This book is very similar to Wills Eye Manual in its content.
- *Review of Ophthalmology* by Neil J. Friedman MD and Peter K. Kaiser
    - Many residents use the book to review for yearly board exams. It is an outline of important ophthalmology topics. It is generally easier to understand if you already have some background knowledge on the topics reviewed.
- The Bloomberg Library on the 5th floor of Moran Eye Center
    - This library also a great resource for checking out some of the books listed above, including past editions of the BCSC series (Basic and Clinical Science Course—series of books released annually by AAO for resident learning). You could look at the ***BCSC Fundamentals*** book. Please email Elaine Peterson (elaine.peterson@hsc.utah.edu), if you are checking out a book. You may need special card access to enter the library, which Elaine could also help with.

Appendix II

List of Ophthalmology Acronyms

AC	Anterior chamber
ACIOL	Anterior chamber intraocular lens
APD, RAPD	(Relative) Afferent pupillary defect
ARMD, AMD	Age-related macular degeneration
AT, PFAT	Artificial tears, Preservative free artificial tears
BAT	Brightness acuity test
BCVA	Best corrected visual acuity
BRAO	Branch retinal artery occlusion
BRVO	Branch retinal vein occlusion
BULB	Bilateral upper lid blepharoplasty
cc	With correction
CCT	Central corneal thickness (ave is 550um)
C:D	Cup to disc
CE/IOL	Cataract extraction with intraocular lens implant
CF	Counting fingers (vision)
C_3F_8	Perfluoropropane (gas)
CL, CTL	Contact lens
CME	Cystoid macular edema
CNV, CNVM	Choroidal neovascularization (neovascular membrane)
CPC	Cyclophotocoagulation
CRAO	Central retinal artery occlusion
CRVO	Central retinal vein occlusion
CSME	Clinically significant macular edema
CSR, CSCR	Central serous (chorio) retinopathy
DCR	Dacryocystorhinostomy
DES	Dry eye syndrome
DFE	Dilated fundus exam
DME	Diabetic macular edema
DR	Diabetic retinopathy
DSAEK	Descemet stripping automated endothelial keratoplasty
DMEK	Descemet..endothelial keratoplasty
E	Esophoria
EL	Endolaser

EOM	Extraocular muscles (or extraocular movements)
ERM	Epiretinal membrane
ET	Esotropia
FTMH	Full thickness macular hole
GATT	Gonioscopy assisted transluminal trabeculotomy
Glx	Glaucoma
GVF	Goldmann visual field
HM	Hand motions
HSV	Herpes simplex virus
HVF	Humphrey visual field
HZO	Herpes zoster ophthalmicus
IOL	Intraocular lens
IOP	Intraocular pressure
IRF	Intra-retinal fluid
IRMA	Intraretinal microvascular abnormality
IVA	Intravitreal Avastin
IVE	Intravitreal Eylea
IVT	Intravitreal Triessence (AKA triamcinolone)
K	Cornea
KCN	Keratoconus
KP	Keratic precipitates
LASIK	Laser in situ keratomileusis
LH	Left hyperphoria
LHT	Left hypertropia
LP	Light perception
LPI	Laser peripheral iridotomy
MA	Microaneurysm
MAC	Macula
MGD	Meibomian gland dysfunction
MH	Macular hole
MP	Membrane peeling or macular pucker
	Manifest refraction
	Margin to reflex distance 1 (measured from upper lid margin to

MR, MRX	corneal light reflex)
MRD1	Margin to reflex distance 2 (measured from lower lid margin to corneal light reflex)
MRD2	
NAION	Non-arteritic anterior ischemic optic neuropathy
NLP	No light perception
NPDR	Nonproliferative diabetic retinopathy
NS	Nuclear sclerosis
NVA	Neovascularization of the angle
NVD	Neovascularization of the disc
NVE	Neovascularization elsewhere
NVG	Neovascular glaucoma
NVI	Neovascularization of iris (rubeosis iridis)
OCT	Optical coherence tomography
OD	Oculus dexter (right eye)
ON	Optic nerve
OS	Oculus sinister (left eye)
OU	Oculus uterque (both eyes)
PACG	Primary angle-closure glaucoma
PAM	Potential acuity meter
PAS	Peripheral anterior synechiae (iris attached to cornea at angle)
PC	Posterior chamber
PCIOL	Posterior chamber intraocular lens
PCO	Posterior capsule opacity
PDR	Proliferative diabetic retinopathy
PED	Pigment epithelial detachment
PEE	Punctate epithelial erosion
PERRL(A)	Pupils equal, round, reactive to light and accommodation
PF	Preservative free
PFAT	Preservative free artificial tears
PH	Pinhole
PI	Peripheral iridotomy
PK, PKP	Penetrating keratoplasty
POAG	Primary open-angle glaucoma
PPA	Peripapillary atrophy
PPV	Pars plana vitrectomy
PRK	Photorefractive keratectomy
PRP	Panretinal photocoagulation
PS	Posterior synechiae (pupil attached to lens capsule)
PSC	Posterior subcapsular cataract

PTK	Phototherapeutic keratectomy
PVD	Posterior vitreous detachment
PVR	Proliferative vitreoretinopathy
PUK	Peripheral ulcerative keratitis
PXE	Pseudoexfoliation
PXG	Pseudoexfoliation glaucoma
PXS	Pseudoexfoliation syndrome
RAPD	Relative afferent pupillary defect
RD	Retinal detachment
RH	Right hyperphoria
RHT	Right hypertropia
RK	Radial keratotomy
ROP	Retinopathy of prematurity
RNFL	Retinal nerve fiber layer
RP	Retinitis pigmentosa
RPE	Retinal pigment epithelium
RRD	Rhegmatogenous retinal detachment
SB	Scleral buckle
sc	Without correction
SF_6	Sulfur hexafluoride (gas)
SLE	Slit-lamp examination
SLT	Selective laser trabeculoplasty
SO, SiO	Silicone oil
SPK	Superficial punctate keratopathy
SRF	Subretinal fluid
TA	Tonometry by applanation
TID	Transillumination defect
Tp	Tonometry by tonopen
TBUT	Tear breakup time
TRD	Tractional retinal detachment
Ung	Ointment
VA	Visual acuity
VEGF	Vascular endothelial growth factor
VF	Visual field
VH	Vitreous hemorrhage
VZV	Herpes zoster

X **XT**	Exophoria Exotropia
YAG	Yttrium-aluminum-garnet laser used in posterior capsule opacity; also referred to as a neodymium (Nd):YAG laser