



STATE BOARD OF OPTOMETRY
2450 DEL PASO ROAD, SUITE 105, SACRAMENTO, CA 95834
P (916) 575-7170 F (916) 575-7292 www.optometry .ca.gov



Continuing Education Course Approval Checklist

Title:

Provider Name:

- Completed Application
 - Open to all Optometrists? Yes No
 - Maintain Record Agreement? Yes No
- Correct Application Fee
- Detailed Course Summary
- Detailed Course Outline
- PowerPoint and/or other Presentation Materials
- Advertising (optional)
- CV for EACH Course Instructor
- License Verification for Each Course Instructor
 - Disciplinary History? Yes No



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CONTINUING EDUCATION COURSE APPROVAL (Reg and Board Use Only)

\$50 Mandatory Fee

APPLICATION

Receipt #	Payor ID	Beneficiary ID	Amount
1-3323	4395914	4395914	50

Pursuant to California Code of Regulations (CCR) § 1536, the Board will approve continuing education (CE) courses after receiving the applicable fee, the requested information below and it has been determined that the course meets criteria specified in CCR § 1536(g).

In addition to the information requested below, please attach a copy of the course schedule, a detailed course outline and presentation materials (e.g., PowerPoint presentation). Applications must be submitted 45 days prior to the course presentation date.

Please type or print clearly.

Course Title Pharmacological Management of Glaucoma	Course Presentation Date 07/07/2017
---------------------------------------------------------------	-----------------------------------------------

Course Provider Contact Information

Provider Name Joseph Pruitt Allan (First) (Last) (Middle)		
Provider Mailing Address Street 11980 Mt Vernon Ave. City Grand Terrace State CA Zip 92313		
Provider Email Address pruitjoseph@gmail.com		
Will the proposed course be open to all California licensed optometrists?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
Do you agree to maintain and furnish to the Board and/or attending licensee such records of course content and attendance as the Board requires, for a period of at least three years from the date of course presentation?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	

Course Instructor Information

Please provide the information below and attach the curriculum vitae for each instructor or lecturer involved in the course. If there are more instructors in the course, please provide the requested information on a separate sheet of paper.

Instructor Name Joseph Pruitt Allan (First) (Last) (Middle)		
License Number 13429	License Type TLG	
Phone Number (909) 721-7751	Email Address pruitjoseph@gmail.com	

I declare under penalty of perjury under the laws of the State of California that all the information submitted on this form and on any accompanying attachments submitted is true and correct.

Signature of Course Provider

3/13/2017
 Date

- 1 **The Pharmacological Management of Glaucoma**
Joseph A. Pruitt, O.D., M.B.A., FAAO
Riverside-San Bernardino County Indian Health, Inc.
- 2 **History**
 - Phase I:
 - Miotics; Pilocarpine, 1877
 - Adrenergics; Epinephrine, 1920's
 - Systemic Carbonic Anhydrase Inhibitors: acetazolamide, 1954
- 3 **History**
 - Phase II
 - Beta-Blockers; timolol, 1979
 - Phase III
 - Alpha-Selective Agonists; apraclonidine, 1993
 - Topical Carbonic Anhydrase Inhibitors; dorzolamide, 1996
 - Prostaglandin analogues: latanoprost, 1997
 - Docosanoids: unoprostone, 2000
 - Prostanoids; bimatoprost, 2001
 -
 -
- 4 **History**
 - Phase IV
 - Neuroprotection
- 5 **Mechanism of Action**
 - Drugs increasing Aqueous Outflow
 -
 - Cholinergic agonists (miotics) = increased trabecular outflow
 - Adrenergic agonists (epinephrine, dipivefrin) = increased trabecular outflow > increased uveoscleral outflow
- 6 **Mechanism of Action**
 - Drugs that decrease Aqueous Production
 -
 - Adrenergic blocking agents (beta-blockers)
 -
 - Carbonic Anhydrase inhibitors
 -
- 7 **Mechanism of Action**
 - Drugs that increase Aqueous Outflow and/or decrease Aqueous Production
 - Alpha-2-agonists
 - Apraclonidine = decrease production + increase uveoscleral outflow
 - Brimonidine = decrease production + increase uveoscleral outflow
 - Prostanoids
 - Prostaglandin analogues = increased uveoscleral outflow
- 8 **Mechanism of Action**
 - Prostanoids continued
 -

– Prostaglandins = ???; increased uveoscleral outflow + trabecular outflow

9 Drugs

- Cholinergic Agonist (miotics)
 - Oldest class of glaucoma medications
 - Introduced in 1877 by von Weber
 - Acts directly on muscarinic receptors or indirectly by inhibiting Acetylcholine Esterase
 - Lowers IOP by increasing aqueous outflow
 - Works best with normal trabeculum

10 Drugs

- Cholinergic Agonists (continued)
 - Pilocarpine
 - ~20-30% IOP reduction (depending on concentration)
 - IOP becomes recalcitrant over time
 - In which case an increase in concentration is warranted
 - Additive with most all other drugs
 - Although, least with prostaglandins
 - Darker pigmented iridies typically require higher concentrations
 - Rarely used as a first-line drug

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- Cholinergic Agonist (continued)
 - Pilocarpine
 - Adverse Ocular effects
 - Accommodative spasm
 - Brow or head ache
 - Pupillary block with shallow anterior chamber
 - Miosis (decreased vision in low illumination)
 - Myokymia (with higher concentrations)
 - Chronic red eyes
 - *Retinal Detachments
 - » Controversial, but remains a risk for aphakes and myopes with predisposing conditions

12 Drugs

- Cholinergic Agonists (continued)
 - Echothiophate (Phospholine Iodide)
 - Indirect acting (does not mimic ACh)
 - Prolong duration (bid dosing)
 - Narrow therapeutic index; rarely used
 - Carbachol
 - Direct acting cholinomimetic
 - Longer duration of action the pilocarpine
 - Used by patients allergic or refractory to pilocarpine

13 Drugs

- Cholinergic Agonists (continued)
 - Contraindications
 - Cataract (especially on visual axis)
 - < 40 years old

- Neovascular or uveitic glaucoma
- H/O Retinal Detachment

14 **Drugs**

- Adrenergic Agonists
 - Non-selective agents
 - Epinephrine
 - Dipivalyl epinephrine (dipiverfrin)
 - Alpha-2-agonists
 - Apraclonidine
 - brimonidine

15 **Drugs**

- Adrenergic Agonists (continued)
 - Epinephrine
 - Non-selective (alpha 1 + betas 1 & 2)
 - IOP reduction 15-20% with BID dosing
 - Adverse drugs reactions
 - Rebound hyperemia
 - CME in up to 20% of aphakic patients

16 **Drugs**

- Adrenergic Agonists (continued)
 - Epinephrine (continued)
 - Systemic effects via absorption at nasal mucosa
 - Anxiety
 - Palpitations
 - Headache
 - Hypertension
 - Tachycardia
 - Risk of stroke

17 **Drugs**

- Adrenergic Agonists (continued)
 - Epinephrine (continued)
 - Contraindications
 - Concurrent systemic use of MAO inhibitors & tricyclics
 - Aphakes
 - Narrow angles
 - Cerebral/coronary insufficiency
 - Hypertension

18 **Drugs**

- Adrenergic Agonist (continued)
 - Dipivefrin (Propine)
 - Prodrug of epinephrine
 - Excellent corneal penetration secondary to being lipophilic; thus requires a weak concentration
 - Much safer than epinephrine
 - IOP reduction, adverse drug effects and contraindications presumably identical to epinephrine

19 **Drugs**

- Adrenergic Agonists (continued)

- Alpha-2-Receptor Agonists
 - Apraclonidine (Iopidine)
 - Selective Alpha 2 agonist; some alpha 1
 - Derived from clonidine, but no CNS penetration
 - Efficacy not influenced by age, race or iris color
 - Clinical use:
 - » Prevention of post-op spikes
 - » Short-term IOP control

20  **Drugs**

- Adrenergic Agonist
 - Alpha 2-Receptor Agonist
 - Apraclonidine (continued)
 - Adverse Effects:
 - » Conjunctival blanching
 - » Eyelid retraction
 - » Mydriasis
 - » Tachyphylaxis (loss of efficacy)
 - » Increased risk for hypersensitivity with prolonged use
 - » Dry mouth and/or dry nose (20-50%)
 - » Fatigue (~15%)
 - » Headache
 - » Sensation of head cold

21  **Drugs**

- Adrenergic Agonists
 - Alpha-2-Receptor Agonist
 - Brimonidine (Alphagan P)
 - Stronger selective alpha-2 agonist
 - Lipophilic; thus better CNS and corneal penetration
 - No loss of efficacy
 - IOP reduction ~18-25%
 - Neuroprotective?
 - » Inhibits glutamate-mediated injury?

22  **Drugs**

- Adrenergic Agonists
 - Alpha-2-Receptor Agonist
 - Brimonidine (Alphagan P)
 - Adverse Effects
 - » Conjunctival hyperemia
 - » Blurred vision
 - » FB sensation
 - » Dry Eye
 - » CNS adverse reactions (more so than apraclonidine)
 - Dry mouth
 - Fatigue/Drowsiness
 - Headache

23  **Drugs**

- Adrenergic Agonists

- Alpha-2-Receptor Agonist
 - Brimonidine (Alphagan P)
 - Contraindications:
 - » Patients taking MOA inhibitors
 - » Coronary insufficiency
 - » Cerebral insufficiency
 - » Recent myocardial infarction

24 **Drugs**

- Beta-Blockers
 - Primary target are beta receptors on ciliary body
 - Some formulations have 2 concentrations
 - 0.25% (blue cap) & 0.5% (yellow cap)
 - IOP reduction 0.5% \geq 0.25%
 - Proposed to be less effective during sleep
 - Beta-receptors thought to “shut off” during sleep
 - 10-20% of patients unresponsive to drug class

25 **Drugs**

- Beta-Blockers (continued)
 - Timolol (Timoptic)
 - Non-selective beta-blocker
 - “Gold standard” for comparison of newer agents
 - IOP reduction ranges from ~17% - 28%
 - Known for “short-term escape”
 - An exaggerated IOP reduction in the first 2-weeks of therapy
 - Known for “long-term drift”
 - A gradual loss of IOP reduction @ 3-6 months (or later)

26 **Drugs**

- Beta-Blockers
 - Timolol (continued)
 - Hypotensive effect for up to 2 weeks on d/c
 - Unocular administration causes contralateral effect in untreated eye
 - IOP reduction is minimized in patients already taking some form of beta-blocker
 - Various preparations:
 - Timoptic, Timoptic XE, Istalol

27 **Drugs**

- Beta-Blockers (continued)
 - Levobunolol (Betagan)
 - Non-selective beta-blocker
 - IOP reduction similar to timolol 0.5%
 - Carteolol
 - Non-selective beta-blocker
 - IOP reduction similar to timolol 0.5%

28 **Drugs**

- Beta-Blockers (continued)
 - Metipranolol (OptiPranolol)
 - Non-selective beta-blocker

- Efficacy similar to timolol 0.5% (perhaps slightly less?)
- Some corneal anesthetic effect
- Drug-induced anterior uveitis?
 - Uncommon with U.S. concentration of 0.3%
 - More common with European concentration of 0.6%
 - Sterilization/Packaging? Or truly higher concentration

29  **Drugs**

- Beta-Blockers (continued)
 - Betaxolol
 - Relative selectivity for beta-1 receptors
 - Less effect on IOP than non-selective
 - Calcium antagonistic effects
 - May reduce calcium in neuroprotection model
 - Tends to be the beta-blocker of choice in normal-tension GLC

30  **Drugs**

- Beta-Blockers
 - Betaxolol (continued)
 - Better preservation of visual field
 - mid 90's studies showed better mean sensitivities and less severe mean defects
 - More recent study suggests blue/yellow field preserved (using SWAP)
 - Considered to be the "safest" beta-blocker for least side effects

31  **Drugs**

- Beta-Blockers (continued)
 - Adverse Systemic Effects:
 - Cardiovascular
 - » In normal patients
 - 3-8 mmHg drop in systolic blood pressure
 - 1-5 mmHg drop in diastolic blood pressure
 - 2-4 beats/minute slower heart rate
 - Blunted exercise-induced tachycardia
 - » Effects are worse and serious those already susceptible cardiovascular systems
 - Pulmonary
 - » Bronchospasm
 - » Decreased Forced Expiratory Volume
 - » Effects should not manifest in normal patients

32  **Drugs**

- Beta-Blockers
 - Adverse Systemic Effects (continued)
 - CNS
 - » Depression? (disputed and not confirmed)
 - » Fatigue
 - » Lethargy
 - » Confusion
 - » Memory loss
 - » Dizziness
 - » Insomnia

»Somnolence

33 **Drugs**

- Beta-Blockers
 - Adverse Systemic Effects (continued)
 - Gastrointestinal
 - »Nausea
 - »Diarrhea
 - Metabolic
 - »Reduction in HDLs
 - »Masks signs of hypoglycemia
 - Sexual Dysfunction
 - »Impotence
 - »Decreased libido (disputed)
 - »

34 **Drugs**

- Beta-Blockers
 - Adverse Ocular Effects
 - Decreased tear production
 - Decreased goblet cell density
 - Corneal anesthesia
 -

35 **Drugs**

- Beta-Blockers
 - Contraindications
 - Congestive Heart Failure (CHF)
 - Possibly not if stable and treated???
 - Cardiac Arrhythmia
 - Symptomatic bradycardia (e.g. syncope or presyncope)
 - Bradycardia (< 55 bpm)
 - Implanted pacemaker
 - Airway Disease
 - Asthma
 - COPD

36 **Drugs**

- Beta-Blockers
 - Contraindications (continued)
 - Hyperthyroidism
 - “Thyroid storm” symptoms are masked by beta-blockers
 - Diabetes
 - Hypoglycemia symptoms are masked by beta-blockers
 - Older patients
 - High risk for undiagnosed and/or subclinical respiratory or cardiovascular disease
 - Depression???
 - Your call...

37 **Drugs**

- Carbonic Anhydrase Inhibitors (Oral)

- Decreases bicarbonate entry into posterior chamber, which reduces hypertonic concentration; thus less aqueous production
- Need ~99% inhibition of carbonic anhydrase to achieve an effect on IOP
 - Therefore, very high oral doses are required

38  **Drugs**

- Carbonic Anhydrase Inhibitors (Oral)
 - Acetazolamide (Diamox Sequels)
 - Good GI asorption with peak levels within 2-4 hours and maintained for 4-6 hours
 - IOP reduction parallels plasma drug levels
 - Adverse Effects:
 - Decreased libido
 - Depression
 - Fatigue
 - Malaise
 - Anorexia
 - Weight loss

39  **Drugs**

- Carbonic Anhydrase Inhibitors (Oral)
 - Acetazolamide (Diamox Sequels)
 - Adverse Effects (continued)
 - Numbness
 - Polyuria
 - GI upset
 - Metabolic acidosis
 - Hypokalemia (loss of potassium)
 - Renal calculi (kidney stones)
 - Transient myopia

40  **Drugs**

- Carbonic Anhydrase Inhibitors (Oral)
 - Acetazolamide (Diamox Sequels)
 - Contraindications
 - Liver Disease
 - Severe COPD
 - Renal disease
 - Pregnancy
 - Severe cardiac disease

41  **Drugs**

- Carbonic Anhydrase Inhibitor (Oral)
 - Methazolamide
 - IOP reduction is dose-dependent
 - Good PO absorption; peaks @ 2-3 hours and maintained for 8 hours
 - Greater ocular penetration than acetazolamide
 - Adverse Effects:
 - Best tolerated oral CAI
 - Less acidosis, association w/kidney stones, less paresthesia
 - Drowsiness
 - Polyuria

–Dermatitis

42 **Drugs**

- Carbonic Anhydrase Inhibitors (Oral)
 - Methazolamide
 - Contraindications
 - Essentially same as acetazolamide
 - Better for patients with tendency toward kidney stones
 - COPD- may be better tolerated since less metabolic acidosis

43 **Drugs**

- Carbonic Anhydrase Inhibitors (Topical)
 - High activity against carbonic anhydrase II and IV enzymes
 - Balanced lipid/water solubility for corneal penetration
 - Effect limited to treated eye
 - Effective during sleep

44 **Drugs**

- Carbonic Anhydrase Inhibitors (Topical)
 - Dorzolamide (Trusopt)
 - Sulfonamide derivative
 - TID preferred for monotherapy; BID adjunctive
 - IOP reduction ~21.8-24.4% (BID) & 22.2-26.2% (TID)
 - Peak effect: 2 hours
 - Should not be used along with oral CAI

45 **Drugs**

- Carbonic Anhydrase Inhibitors (Topical)
 - Dorzolamide (continued)
 - Adverse Effects
 - Stinging (secondary to acidic pH)
 - Burning
 - Blurred vision
 - Allergic blepharoconjunctivitis in ~10%
 - Bitter taste (25-30%)
 - headaches

46 **Drugs**

- Carbonic Anhydrase Inhibitor (Topical)
 - Brinzolamide (Azopt)
 - Selective inhibitor of CA II isoenzyme
 - Sulfonamide derivative
 - BID or TID dosage yield similar reductions
 - ~19.1% reduction ranging from -2.7 to -3.9 mmHg

47 **Drugs**

- Carbonic Anhydrase Inhibitor (Topical)
 - Brinzolamide (continued)
 - Adverse Effects
 - Much less ocular discomfort (<6%)
 - Itching
 - FB sensation
 - Dry eyes (< 2%)

48  **Drugs**

- Carbonic Anhydrase Inhibitor (Topical)
 - Contraindications
 - Severe Kidney Disease
 - Liver Disease (not critical)
 - COPD (not as critical)
 - CHF (not as critical)

49  **Drugs**

- Prostanoids
 - Includes prostaglandin analogues, docosanoids and prostamides
 - Pharmacologic and ocular effects are dose-dependent

50  **Drugs**

- Prostanoids
 - Latanoprost (Xalatan)
 - Effective during sleep
 - IOP reduction independent of race, sex, age, iris color, type of glaucoma (with exception of inflammatory types) and/or previous therapy
 - Shelf life of ~6 weeks unrefrigerated
 - Dosage QD (not critical to be QHS)
 - IOP reduction ~25-35%; thus effective as monotherapy
 - Patent recently expired 3/2011

51  **Drugs**

- Prostanoids
 - Latanoprost (continued)
 - Adverse Effects:
 - Conjunctival hyperemia
 - Stinging, burning and tearing
 - Punctate corneal erosions
 - Iris pigmentation darkens
 - » Thought to be permanent
 - Eyelid pigmentation
 - Hypertrichosis
 - » Reversible once discontinued
 - Anterior uveitis
 - CME
 - Migraines

52  **Drugs**

- Prostanoids
 - Latanoprost (continued)
 - Contraindications
 - History of uveitis
 - Prior "incision surgery" or YAG capsulotomy
 - Previous episodes of recurrent HSV keratitis
 - *Relative* contraindication is unilateral therapy

53  **Drugs**

- Prostanoids
 - Travoprost (Travatan Z)
 - Average IOP reduction between 7 to 8 mmHg

- Mean IOP reduction of up to 1.8-2.4 mmHg GREATER in blacks patients
- Rumored to have "slippage" after ~6-12 months (unsubstantiated)
- Dosage QD "evening" not bedtime

54 **Drugs**

- Prostanoids
 - Travoprost (continued)
 - Adverse Effects
 - Conjunctival hyperemia
 - FB sensation
 - Tearing
 - Dry Eyes
 - Increased pigmentation in iris and periorbital tissue
 - Increased pigmentation and growth of eyelashes

55 **Drugs**

- Prostanoids
 - Brimatoprost (Lumigan)
 - Synthetic analogue of fatty acid prostamides
 - Prostamides are present in ocular tissues
 - Prostamides presumably lower IOP by the same mechanism as prostaglandins
 - Dosage QHS

56 **Drugs**

- Prostanoids
 - Brimatoprost (continued)
 - Adverse Effects
 - Conjunctival hyperemia
 - FB sensation
 - Growth and darkening of eyelashes
 - » Latisse
 - Pigmentation of periocular skin

57 **Drugs**

- Prostanoids
 - Tafluprost (Zioptan)
 - FDA approved for the treatment of OHTN & POAG Feb. 2012
 - **per Merck*
 - Average IOP reduction at 3 months -6 to -8 mmHg
 - Average IOP reduction at 6 months -5 to -8 mmHg
 - Adverse Effects
 - » Conjunctival Hyperemia (~4-20%) *

58 **Drugs**

- Prostanoids
 - Unoprostone (Rescula)
 - Originally on market 2000
 - Reintroduced 2012-2013
 - Discontinued March 31, 2015

59 **Drugs**

- Prostanoids

- VESNEO (latanoprostene bunod ophthalmic solution 0.024%)

- Per B&L: Upon instillation in the eye, latanoprostene bunod is rapidly metabolized to two actives; latanoprost acid, a prostaglandin analog, and nitric oxide. Nitric oxide is an important physiological signaling molecule, which plays a key role in IOP regulation in healthy eyes. *VESNEO* is thought to increase aqueous humor outflow by acting on both the uveoscleral (non-conventional) pathway via latanoprost acid, and trabecular meshwork and Schlemm's canal (conventional pathway) via nitric oxide signaling

- Awaiting FDA approval

- The FDA has set an action date of July 21, 2016 to complete its review, as per the Prescription Drug User Fee Act (PDUFA)

- -

- <http://www.bausch.com/our-company/newsroom/2015-archive/fda-acceptance-of-new-drug-application-for-novel-glaucoma-candidate#.VucRDzjn-Uk>

60  **Drugs**

- Combination Formulations

- Cosopt

- timolol 0.5% & dorzolamide 2%

- Dosed BID

- As effective as timolol 0.5% BID & dorzolamide 2% TID

- Mean IOP changes similar to Xalatan

- IOP reduction ~25-35%

- Contraindications are the sum of each drug

61  **Drugs**

- Combination Formulations

- Combigan

- brimonidine 0.2% + timolol 0.5%

- NOTE: not Alphagan P (either 0.15% or 0.1%)

- Dosed q12h (*BID*)

- As effective as both meds given separately

- Better tolerated than 0.2% brimonidine TID

- Better tolerated than Cosopt

62  **Drugs**

- Combination Formulations

- Simbrinza

- Brinzolamide 1.0%/Brimonidine 0.2%

63 

64 

65  **Drugs**

- Combination Formulations

- Xalacom and Extravan
 - Latnoprost or travoprost combined with timolol 0.5%
 - Dosing schedules not clarified at this time
 - FDA approval delayed for "Xalacom"
 - Although has been available in Europe for years...
 - IOP reduction may equal to; or less than, if separate drugs used together
 - Extravan may be closer to FDA approval

66 **Conclusion**

- Managing IOP remains a staple in glaucoma management
- Consider compliance and quality of life, an the frequently overlooked, cost
- "Above all else, do no harm"
 - Manage appropriately utilizing all therapeutics available
 - Do not let ANYONE go blind in your chair
 - Refer whenever appropriate and/or necessary

The Pharmacological Management of Glaucoma

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- Phase IV
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 - » CNS adverse reactions (more so than apraclonidine)
 - Dry mouth
 - Fatigue/Drowsiness
 - Headache

Drugs

- Adrenergic Agonists
 - Alpha-2-Receptor Agonist
 - Brimonidine (Alphagan P)
 - Contraindications:
 - » Patients taking MOA inhibitors
 - » Coronary insufficiency
 - » Cerebral insufficiency
 - » Recent myocardial infarction

Drugs

- Beta-Blockers
 - Primary target are beta receptors on ciliary body
 - Some formulations have 2 concentrations
 - 0.25% (blue cap) & 0.5% (yellow cap)
 - IOP reduction 0.5% ≥ 0.25%
 - Proposed to be less effective during sleep
 - Beta-receptors thought to “shut off” during sleep
 - 10-20% of patients unresponsive to drug class

Drugs

- Beta-Blockers (continued)
 - Timolol (Timoptic)
 - Non-selective beta-blocker
 - “Gold standard” for comparison of newer agents
 - IOP reduction ranges from ~17% - 28%
 - Known for “short-term escape”
 - An exaggerated IOP reduction in the first 2-weeks of therapy
 - Known for “long-term drift”
 - A gradual loss of IOP reduction @ 3-6 months (or later)

Drugs

- Beta-Blockers
 - Timolol (continued)
 - Hypotensive effect for up to 2 weeks on d/c
 - Unocular administration causes contralateral effect in untreated eye
 - IOP reduction is minimized in patients already taking some form of beta-blocker
 - Various preparations:
 - Timoptic, Timoptic XE, Istalol

Drugs

- Beta-Blockers (continued)
 - Levobunolol (Betagan)
 - Non-selective beta-blocker
 - IOP reduction similar to timolol 0.5%
 - Carteolol
 - Non-selective beta-blocker
 - IOP reduction similar to timolol 0.5%

Drugs

- Beta-Blockers (continued)
 - Metipranolol (OptiPranolol)
 - Non-selective beta-blocker
 - Efficacy similar to timolol 0.5% (perhaps slightly less?)
 - Some corneal anesthetic effect
 - Drug-induced anterior uveitis?
 - Uncommon with U.S. concentration of 0.3%
 - More common with European concentration of 0.5%
 - Sterilization/Packaging? Or truly higher concentration

Drugs

- Beta-Blockers (continued)
 - Betaxolol
 - Relative selectivity for beta-1 receptors
 - Less effect on IOP than non-selective
 - Calcium antagonistic effects
 - May reduce calcium in neuroprotection model
 - Tends to be the beta-blocker of choice in normal-tension GLC

Drugs

- Beta-Blockers
 - Betaxolol (continued)
 - Better preservation of visual field
 - mid 90's studies showed better mean sensitivities and less severe mean defects
 - More recent study suggests blue/yellow field preserved (using SWAP)
 - Considered to be the "safest" beta-blocker for least side effects

Drugs

- Beta-Blockers (continued)
 - Adverse Systemic Effects:
 - Cardiovascular
 - In normal patients
 - 3-8 mmHg drop in systolic blood pressure
 - 1-5 mmHg drop in diastolic blood pressure
 - 2-4 beats/minute slower heart rate
 - Blunted exercise-induced tachycardia
 - Effects are worse and serious those already susceptible cardiovascular systems
 - Pulmonary
 - Bronchospasm
 - Decreased Forced Expiratory Volume
 - Effects should not manifest in normal patients

Drugs

- Beta-Blockers
 - Adverse Systemic Effects (continued)
 - CNS
 - Depression? (disputed and not confirmed)
 - Fatigue
 - Lethargy
 - Confusion
 - Memory loss
 - Dizziness
 - Insomnia
 - Somnolence

Drugs

- Beta-Blockers
 - Adverse Systemic Effects (continued)
 - Gastrointestinal
 - Nausea
 - Diarrhea
 - Metabolic
 - Reduction in HDLs
 - Masks signs of hypoglycemia
 - Sexual Dysfunction
 - Impotence
 - Decreased libido (disputed)

Drugs

- Beta-Blockers
 - Adverse Ocular Effects
 - Decreased tear production
 - Decreased goblet cell density
 - Corneal anesthesia

Drugs

- Beta-Blockers
 - Contraindications
 - Congestive Heart Failure (CHF)
 - Possibly not if stable and treated???
 - Cardiac Arrhythmia
 - Symptomatic bradycardia (e.g. syncope or presyncope)
 - Bradycardia (< 55 bpm)
 - Implanted pacemaker
 - Airway Disease
 - Asthma
 - COPD

Drugs

- Beta-Blockers
 - Contraindications (continued)
 - Hyperthyroidism
 - "Thyroid storm" symptoms are masked by beta-blockers
 - Diabetes
 - Hypoglycemia symptoms are masked by beta-blockers
 - Older patients
 - High risk for undiagnosed and/or subclinical respiratory or cardiovascular disease
 - Depression???
 - Your call...

Drugs

- Carbonic Anhydrase Inhibitors (Oral)
 - Decreases bicarbonate entry into posterior chamber, which reduces hypertonic concentration; thus less aqueous production
 - Need ~99% inhibition of carbonic anhydrase to achieve an effect on IOP
 - Therefore, very high oral doses are required

Drugs

- Carbonic Anhydrase Inhibitors (Oral)
 - Acetazolamide (Diamox Sequels)
 - Good GI absorption with peak levels within 2-4 hours and maintained for 4-6 hours
 - IOP reduction parallels plasma drug levels
 - Adverse Effects:
 - Decreased libido
 - Depression
 - Fatigue
 - Malaise
 - Anorexia
 - Weight loss

Drugs

- Carbonic Anhydrase Inhibitors (Oral)
 - Acetazolamide (Diamox Sequels)
 - Adverse Effects (continued)
 - Numbness
 - Polyuria
 - GI upset
 - Metabolic acidosis
 - Hypokalemia (loss of potassium)
 - Renal calculi (kidney stones)
 - Transient myopia

Drugs

- Carbonic Anhydrase Inhibitors (Oral)
 - Acetazolamide (Diamox Sequels)
 - Contraindications
 - Liver Disease
 - Severe COPD
 - Renal disease
 - Pregnancy
 - Severe cardiac disease

Drugs

- Carbonic Anhydrase Inhibitor (Oral)
 - Methazolamide
 - IOP reduction is dose-dependent
 - Good PO absorption; peaks @ 2-3 hours and maintained for 8 hours
 - Greater ocular penetration than acetazolamide
 - Adverse Effects:
 - Best tolerated oral CAI
 - Less acidosis, association w/kidney stones, less paresthesia
 - Drowsiness
 - Polyuria
 - Dermatitis

Drugs

- Carbonic Anhydrase Inhibitors (Oral)
 - Methazolamide
 - Contraindications
 - Essentially same as acetazolamide
 - Better for patients with tendency toward kidney stones
 - COPD- may be better tolerated since less metabolic acidosis

Drugs

- Carbonic Anhydrase Inhibitors (Topical)
 - High activity against carbonic anhydrase II and IV enzymes
 - Balanced lipid/water solubility for corneal penetration
 - Effect limited to treated eye
 - Effective during sleep

Drugs

- Carbonic Anhydrase Inhibitors (Topical)
 - Dorzolamide (Trusopt)
 - Sulfonamide derivative
 - TID preferred for monotherapy; BID adjunctive
 - IOP reduction ~21.8-24.4% (BID) & 22.2-26.2% (TID)
 - Peak effect: 2 hours
 - Should not be used along with oral CAI

Drugs

- Carbonic Anhydrase Inhibitors (Topical)
 - Dorzolamide (continued)
 - Adverse Effects
 - Stinging (secondary to acidic pH)
 - Blurring
 - Blurred vision
 - Allergic blepharoconjunctivitis in ~10%
 - Bitter taste (25-30%)
 - headaches

Drugs

- Carbonic Anhydrase Inhibitor (Topical)
 - Brinzolamide (Azopt)
 - Selective inhibitor of CA II Isoenzyme
 - Sulfonamide derivative
 - BID or TID dosage yield similar reductions
 - ~19.1% reduction ranging from -2.7 to -3.9 mmHg

Drugs

- Carbonic Anhydrase Inhibitor (Topical)
 - Brinzolamide (continued)
 - Adverse Effects
 - Itchless ocular discomfort (~6%)
 - Itching
 - FB sensation
 - Dry eyes (~2%)

Drugs

- Carbonic Anhydrase Inhibitor (Topical)
 - Contraindications
 - Severe Kidney Disease
 - Liver Disease (not critical)
 - COPD (not as critical)
 - CHF (not as critical)

Drugs

- Prostanoids
 - Includes prostaglandin analogues, docosanoids and prostamides
 - Pharmacologic and ocular effects are dose-dependent

Drugs

- Prostanoids
 - Latanoprost (Xalatan)
 - Effective during sleep
 - IOP reduction independent of race, sex, age, iris color, type of glaucoma (with exception of inflammatory types) and/or previous therapy
 - Shelf life of ~6 weeks unrefrigerated
 - Dosage QD (not critical to be QHS)
 - IOP reduction ~25-35%; thus effective as monotherapy
 - Patent recently expired 3/2011

Drugs

- Prostanoids
 - Latanoprost (continued)
 - Adverse Effects
 - Conjunctival hyperemia
 - Stinging, burning and tearing
 - Punctate corneal erosions
 - Iris pigmentation darkens
 - Thought to be permanent
 - Eyelid pigmentation
 - Hypertrichosis
 - Reversible once discontinued
 - Anterior uveitis
 - CME
 - Migraines

Drugs

- Prostanoids
 - Latanoprost (continued)
 - Contraindications
 - History of uveitis
 - Prior "incision surgery" or YAG capsulotomy
 - Previous episodes of recurrent HSV keratitis
 - Relative contraindications include laser therapy

Drugs

- Prostanoids
 - Travoprost (Travatan Z)
 - Average IOP reduction between 7 to 8 mmHg
 - Mean IOP reduction of up to 1.8-2.4 mmHg GREATER in blacks patients
 - Rumored to have "slippage" after ~6-12 months (unsubstantiated)
 - Dosage QD "evening" not bedtime

Drugs

- Prostanoids
 - Travoprost (continued)
 - Adverse Effects
 - Conjunctival hyperemia
 - FB sensation
 - Tearing
 - Dry Eyes
 - Increased pigmentation in iris and periorbital tissue
 - Increased pigmentation and growth of eyelashes

Drugs

- Prostanoids
 - Brimatoprost (Lumigan)
 - Synthetic analogue of fatty acid prostanoids
 - Prostanoids are present in ocular tissues
 - Prostanoids presumably lower IOP by the same mechanism as prostaglandins
 - Dosage QHS

Drugs

- Prostanoids
 - Brimatoprost (continued)
 - Adverse Effects
 - Conjunctival hyperemia
 - FB sensation
 - Growth and darkening of eyelashes
 - » Latisse
 - Pigmentation of periorcular skin

Drugs

- Prostanoids
 - Tafluprost (Zioptan)
 - FDA approved for the treatment of OHTN & POAG Feb. 2012
 - *per Merck*
 - Average IOP reduction at 3 months -6 to -8 mmHg
 - Average IOP reduction at 6 months -5 to -8 mmHg
 - Adverse Effects
 - » Conjunctival Hyperemia (~4-20%)*

Drugs

- Prostanoids
 - Unoprostone (Rescula)
 - Originally on market 2000
 - Reintroduced 2012-2013
 - Discontinued March 31, 2015

Drugs

- Prostanoids
 - VESNEO (latanoprostene bunod ophthalmic solution 0.024%)
 - *Per B&L:* Upon instillation in the eye, latanoprostene bunod is rapidly metabolized to two active isomers: latanoprost acid, a prostaglandin analog, and etioic acid. Nitric oxide is an important physiological signaling molecule, which plays a key role in IOP regulation in healthy eyes. VESNEO is thought to increase aqueous humor outflow by acting on both the mesodermal (non-conventional) pathway via latanoprost acid, and trabecular meshwork and Schlemm's canal (conventional) pathway via nitric oxide signaling
 - Awaiting FDA approval
 - The FDA has set an action date of July 21, 2016 to complete its review, as per the Prescription Drug User Fee Act (PDUFA)

Drugs

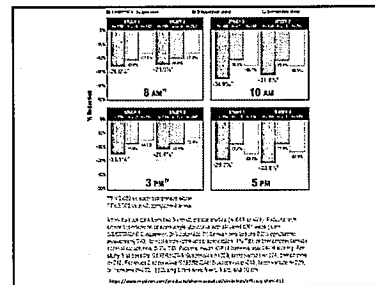
- Combination Formulations
 - Cosopt
 - timolol 0.5% & dorzolamide 2%
 - Dosed BID
 - As effective as timolol 0.5% BID & dorzolamide 2% TID
 - Mean IOP changes similar to Xalatan
 - IOP reduction ~25-35%
 - Contraindications are the sum of each drug

Drugs

- Combination Formulations
 - Combigan
 - brimonidine 0.2% + timolol 0.5%
 - NOTE: not Alphagan P (either 0.15% or 0.1%)
 - Dosed q12h (BID)
 - As effective as both meds given separately
 - Better tolerated than 0.2% brimonidine TID
 - Better tolerated than Cosopt

Drugs

- Combination Formulations
 - Simbrinza
 - Brinzolamide 1.0% / Brimonidine 0.2%



Treatment Arm	Baseline	IOP (mm Hg)		
		Week 8	Week 12	Week 16
PGA + Simvastatin ^a	Baseline ^b	24.5	22.9	21.2
	Week 8	19.4	15.8	17.2
Suspension (N=63)	Baseline ^b	24.3	22.6	21.3
	Week 8	21.5	20.3	20.0

(N=92)

Least squares means at each time point from the treatment difference analysis. All P-values are at the 0.05 level. Baseline values are from the previous study visit. PGA = Primary Glaucoma Assessment; Simvastatin = Simvastatin; Suspension = Suspension; Week 8 = Week 8; Week 12 = Week 12; Week 16 = Week 16.

- ### Drugs
- Combination Formulations
 - Xalacom and Extravan
 - Latanoprost or travoprost combined with timolol 0.5%
 - Dosing schedules not clarified at this time
 - FDA approval delayed for "Xalacom"
 - Although has been available in Europe for years...
 - IOP reduction may equal to, or less than, if separate drugs used together
 - Extravan may be closer to FDA approval

- ### Conclusion
- Managing IOP remains a staple in glaucoma management
 - Consider compliance and quality of life, an the frequently overlooked, cost
 - "Above all else, do no harm"
 - Manage appropriately utilizing all therapeutics available
 - Do not let ANYONE go blind in your chair
 - Refer whenever appropriate and/or necessary

Joseph A. Pruitt, O.D., M.B.A., FAAO

Objective:

Education:

Nova Southeastern University, Fort Lauderdale-Davie, Florida Master of Business Administration, 2011	2008-2011
West Los Angeles Veteran Affairs Healthcare Center, Los Angeles, California Residency Certificate, Geriatric/Primary Care, 2008	2007-2008
Illinois College of Optometry, Chicago, Illinois Doctor of Optometry, 2007	2003-2007
California State Polytechnic University, Pomona, California Bachelor of Science, Biology, 2003	2000-2003
University of Memphis, Memphis, Tennessee Major in Biology	1999-2000

Licenses:

Tennessee #2753 • Active • Injectable Certification • Therapeutic Certification	Date of Issue: July 10, 2007
California #13429T • Active • Therapeutic and Pharmaceutical Agent + Lacrimal Irrigation and Dilation + Glaucoma (TLG) Certified	Date of Issue: Sept. 28, 2007
Georgia #OPT002454 • Active • Diagnostic and Therapeutic Pharmaceutical Agent Certified	Date of Issue: June 12, 2008
Minnesota #3130 • Active • Diagnostic Pharmaceutical Agent (DPA) Certified • Therapeutic Pharmaceutical Agent (TPA) Certified	Date of Issue: June 17, 2008

Board Certification:

American Board of Certification in Medical Optometry • Board certified	Date of recertification: Feb 2018
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Certifications:

Drug Enforcement Agency (DEA) Certified	Date of Expiration: Mar 2020
Cardiopulmonary Resuscitation (CPR) & Automated External Defibrillator (AED)	Recommended Renewal: Mar 2017
Bausch & Lomb Overnight Orthokeratology • Certification Number: 20060406002	Date of Issue/Completion: April 6, 2006

Paragon Corneal Refractive Therapy (CRT)

Date of Issue/Completion: Dec. 28, 2007

- Certification Number: 161000

Advance Competence in Medical Optometry (ACMO)

Date Taken: June 13, 2008

- Administered by the National Board of Examiners in Optometry (NBEO)
- Examination only made available to candidates meeting specific clinical experience requirements/pre-requisites
- Passed examination

Employment:

Riverside San Bernardino County Indian Health, Inc (RSBCIHI) <ul style="list-style-type: none">• Director of Eye Care• Staff Optometrist	Oct. 2014- present
Riverside San Bernardino County Indian Health, Inc (RSBCIHI) <ul style="list-style-type: none">• Staff Optometrist	July 2014- Oct. 2014
Minneapolis Veteran Affairs Health Care System <ul style="list-style-type: none">• Low Vision/Staff Optometrist• Optometric Residency Coordinator<ul style="list-style-type: none">◦ Spearheaded and implemented program• Student Externship Coordinator<ul style="list-style-type: none">◦ Spearheaded and implemented program	Nov 2008- June 2014
Wal-Mart Vision Center (Red Wing & Rochester, MN) <ul style="list-style-type: none">• Associate Optometrist	Jul 2008- Nov 2008
EyExam of California <ul style="list-style-type: none">• On-call/Fill-in Optometrist	Oct 2007- June 2008

Faculty Appointments:

Western University of Health Science / College of Optometry, Pomona, California <ul style="list-style-type: none">• Clinical Assistant Professor of Optometry• RSBCIHI Externship Site Program Director<ul style="list-style-type: none">◦ As part of being RSBCIHI Eye Care Director	Jan 2015 - present
University of the Incarnate Word-Rosenberg School of Optometry, San Antonio, Texas <ul style="list-style-type: none">• Clinical Assistant Professor• Minneapolis VA HCS Externship Site Program Director	May 2012- June 2014
Midwestern University-Arizona College of Optometry, Glendale, Arizona <ul style="list-style-type: none">• Adjunct Clinical Assistant Professor• Minneapolis VA HCS Externship Site Program Director	May 2012- June 2014
Southern College of Optometry, Memphis, Tennessee <ul style="list-style-type: none">• Adjunct Faculty• Minneapolis VA HCS Externship Site Program Director	Dec 2010- June 2014
University of Missouri, St. Louis College of Optometry, St. Louis, Missouri <ul style="list-style-type: none">• Adjunct Assistant Professor• Minneapolis VA HCS Externship Site Program Director	Jul 2009- June 2014

Experience:

Riverside-San Bernardino Indian Health, Inc <ul style="list-style-type: none">• Director of Eye Care<ul style="list-style-type: none">◦ Oversee all organizational Eye Care activities	Oct 2014 - present
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- Staff Optometrist
- Riverside-San Bernardino Indian Health, Inc Jul 2014 – Oct 2014
- Staff Optometrist
- Minneapolis Veteran Affairs Medical Center Nov 2008- June 2014
- Staff Optometrist
 - Primary Eye Care
 - Low Vision
 - Sole low vision eye care provider
 - Polytrauma/Traumatic Brain Injury (TBI) Ocular Health & Vision Assessments
 - VISN 23 Low Vision Continuum of Care Conference (May 2009)
 - Faculty
 - Planning committee
 - Established Associated Health Education Affiliation Agreement with University of Missouri, St. Louis College of Optometry, Ferris State University Michigan College of Optometry, & Southern College of Optometry for the optometric externship program
 - Externship program director
 - Established Associated Health Education Affiliation Agreement with the Illinois College of Optometry for the optometry residency program
 - Residency in Primary Care/Brain Injury and Vision Rehabilitation
 - Residency program director
 - Designed the program's curriculum
 - Secured all necessary approvals and funding
 - After the initial site visit, program received full ACOE accreditation
- Wal-Mart Vision Center (Red Wing & Rochester, MN) Jul 2008- Nov 2008
- Associate Optometrist
- Residency:
- West Los Angeles Veteran Affairs Healthcare Center Jul 2007- June 2008
- Geriatrics/Primary Care
 - Primary Care including Diabetic exams
 - Low Vision evaluations/exams
 - Nursing home/in-patient exams
 - Medically justified specialty contact lenses exams/ fittings
 - Lecture Internal Medicine's and Endocrinology's Residents & Interns on Diabetic Retinopathy
 - Given during Chief Resident rotation
 - Precept Southern California College of Optometry's interns
- Optometric Externships:
- Atlantic Eye Institute, Jacksonville Beach, FL Feb-May 2007
- OD/MD private practice with an emphasis on Contact Lenses and Primary Care
 - Observed multiple surgical procedures:
 - Cataract Extraction
 - Blepharoplasty
 - Strabismus recession and resection
- Memphis Veterans Affairs Medical Center (VAMC), Memphis, TN Nov 2006-Feb 2007
- Emphasis on Primary Care
 - Assisted in direct care in a high patient volume

medical optometric eye clinic

- Assisted in optometric injections and fluorescence angiographies procedures

Illinois Eye Institute (IEI), Chicago, IL

Aug-Nov 2006

- Emphasis on Pediatrics/Binocular Vision, Advance Care, and Low Vision
- Performed comprehensive eye exams on pediatric patients (infants-11yrs of age)
- Performed comprehensive eye exams on "at risk/2nd chance" children one day a week at Maryville Academy
- Constructed, tailored and performed successful binocular vision/vision therapy treatments to 4 children over a 10 week period
- Assisted in the treatment of advance glaucoma with attending University of Chicago ophthalmologist
- Performed problem specific examinations one day per week in IEI's Emergency/Urgent Care/Walk-in clinic
- Performed full Low Vision examinations including Low Vision device selection and training

Body of Christ Optometry Clinic, Tegucigalpa, Honduras

May-Aug 2006

- Emphasis on Primary and Advance Care
- Performed full-scope optometric care in a high patient volume medical clinic geared towards the underprivileged
- Also worked closely with a local ophthalmologist
 - Observed and assisted in Cataract Extraction and Incision and Curettage procedures
 - Provided pre and post-surgical care

Primary Care Clinical Education

Illinois Eye Institute, Chicago, IL

Aug 2005-May 2006

Volunteer Optometric Assistant

Body of Christ Optometry Clinic, Tegucigalpa, Honduras

Jun-Aug 2004

- Assisted staff optometrist in direct patient care in the clinic and multiple remote satellite outreach locations

Professional Affiliations/Memberships:

- Accreditation Council on Optometric Education
 - Consultant, 2014-present
- American Academy of Optometry (AAO)
 - Fellow; Class of 2009
- American Optometric Association (AOA)
- Armed Forces Optometric Society (AFOS)
- European Academy of Optometry and Optics (EAOO)
 - Candidate for Fellowship
- Fellowship of Christian Optometrists (FCO)
- Minneapolis VAMC Medical Staff Association
 - Steering Committee, member 2010-2014
- National Association of Veteran Affairs Optometrists (NAVAO)
 - Newsletter Committee, member 2010-2014
- National Optometric Association (NOA)
 - Minnesota's NOA State Representative 2010-2012
 - National Optometric Student Association (NOSA)
 - NOSA National Vice-President: 2006-2007
 - NOSA-ICO President: 2005-2006
 - NOSA-ICO Vice-President: 2004-2005

- Volunteer Optometric Service to Humanity (VOSH)
- Journal of Rehabilitation Research and Development
 - Peer Reviewer, 2013-2014

Activities:

- VOSH Medical Mission Trip, Bamenda, Cameroon (May 2010)
- Mayo Medical School/Brighter Tomorrow's Winter Warmth Festival (Jan 2009 & Jan 2010)
 - Fun day of activities for children battling cancer and their families
 - Volunteer
- Veteran Affairs Disaster Emergency Medical Personnel System (DEMPS)
 - Volunteer (Aug 2009-present)
- FCO Optometry Mission Trip, Port Au Prince, Haiti (Feb 2007)
- SVOSH Medical Mission Trip, Addis Addaba, Ethiopia (Mar-Apr 2006)
- FCO Optometry Mission Trip, Tegucigalpa, Honduras (Apr 2003 & Nov 2004)

Honors/Rewards:

- Recognition of Excellence in Teaching as Clinical Assistant Professor, Western University Health Sciences/College of Optometry (2015-2016 Academic Year)
- Nomination for Medical Staff Clinical Excellence Award (2012 & 2013)
- Recognition for Outstanding Dedication and Service as Adjunct Assistant Professor, University of Missouri – St. Louis (2010-2011 Academic Year)
- Journal of the American Optometric Association: Optometry's Eagle Award (Nov 2010)
- Certificate of Appreciation (July 2009)
 - Department of Veterans Affairs – VISN 23
 - Awarded for participation in VISN 23 Blind and Low Vision Continuum of Care Conference
- Recognition for Clinical Excellence (May 2007)
- Derald Taylor Low Vision Award (May 2007)
- Clinical Dean's List (summer 2005; summer & fall 2006, winter & spring 2007)
- Academic Dean's List (fall 2004)
- Wildermuth Leadership Award/Scholarship (Aug 2006)
- Vistakon Acuvue Eye Health Advisor Citizenship Scholarship (Jan 2006)
- NOSA Service Award/Scholarship (Aug 2004)

Publications:

Pruitt JA. *The Management of Homonymous Hemianopsia Secondary to Hemispheric Ischemic Cerebral Vascular Accident. Accepted for publication by Review Optometry (July 2010)*

Rittenbach TL, Pruitt JA. A Roundup of Recently Approved Ophthalmic Drugs (and their Use in Practice.) *Rev Optom.* 2014. 151(2):22-28.

Pruitt JA. Management strategies for patients with AION. *Rev Optom.* 2011. 148(6):57-65.

Pruitt JA. Neuro-Optometric Rehabilitation Association Program Summary. *Optimum VA: The Official Newsletter of the National Association of VA Optometrists Summer 2010.*

Pruitt JA, Ilsen P. On the frontline: What an optometrist needs to know about myasthenia gravis. *Optometry* 81(9): 454-460.

Pruitt JA, Sokol T, Maino D. Fragile X Syndrome and the Fragile X-associated Tremor/Ataxia Syndrome. *Eye Care Review: Ophthalmology, Optometry, Opticianry* 4(2): 17-23

Posters/Presentations

Pruitt JA. The Curious Case of the Functionally Legally Blind Patient with 20/25 (6/7.5) Visual Acuity. *Accepted into American Optometric Association Annual Meeting: Optometry's Meeting (2012) Poster Session.*

Pruitt JA, Prussing N. Successfully Treated Horizontal Diplopia Returns with Subsequent Traumatic Brain Injury. *Accepted into American Optometric Association Annual Meeting: Optometry's Meeting (2012) Poster Session.*

Pruitt JA, Prussing N. The Curious Case of the Functionally Legally Blind Patient with 20/25 (6/7.5) Visual Acuity. European Academy of Optometry and Optics Annual Meeting (2012) Poster Session.

Pruitt JA, Prussing N. Successfully Treated Horizontal Diplopia Returns with Subsequent Traumatic Brain Injury. European Academy of Optometry and Optics Annual Meeting (2012) Case Presentation Session.

Pruitt JA, Prussing N. Traumatic Brain Injury Resulting in Horizontal Diplopia Resolved 5 Years Later with 12 Weeks of Vision Therapy. Minnesota Optometric Association Annual Meeting (2012) Poster Session.

Pruitt JA, Wiley LM. Overcoming Mental Barriers in Visual Rehabilitation. American Optometric Association Annual Meeting: Optometry's Meeting (2011) Poster Session.

Pruitt JA, Prussing N. Traumatic Brain Injury Resulting in Horizontal Diplopia Resolved 5 Years Later with 12 Weeks of Vision Therapy. European Academy of Optometry and Optics Annual Meeting (2011) Poster Session.

Pruitt JA. Overcoming Mental Barriers in Visual Rehabilitation. European Academy of Optometry and Optics Annual Meeting (2011) Case Presentation Session.

Pruitt JA, Wiley LM. Overcoming Mental Barriers in Visual Rehabilitation. Minnesota Optometric Association Annual Meeting's (2011) Poster Session

Pruitt JA, Ilsen P, Yeung C. Ptosis Crutch: Success Treating Myogenic Ptosis Secondary to Myasthenia Gravis. American Optometric Association (AOA) 2008 Optometry Meeting Poster Session

Pruitt JA, Ilsen P. Ptosis Crutch: Success Treating Myogenic Ptosis Secondary To Myasthenia Gravis. Southeastern Congress of Optometry (SECO) 2008 Multimedia Poster Session

Lectures and Other:

Riverside-San Bernardino County Indian Health, Inc.: Eye Care Rounds (Nov 2016)

- Ptosis Crutch: Success Treating Myogenic Ptosis Secondary to Myasthenia Gravis
- CA Board of Optometry-approved CE

Riverside-San Bernardino County Indian Health, Inc.: Eye Care Rounds (Sept 2016)

- Visual Fields
- CA Board of Optometry-approved CE

Riverside-San Bernardino County Indian Health, Inc.: Eye Care Rounds (July 2016)

- Ethical Concerns with Short-term Mission Trips
- CA Board of Optometry-approved CE

Riverside-San Bernardino County Indian Health, Inc.: Eye Care Rounds (July 2016)

- Systemic Urgencies and Emergencies
- CA Board of Optometry-approved CE

Riverside-San Bernardino County Indian Health, Inc.: Eye Care Rounds (Mar 2016)

- Episcleritis, Scleritis, and Iritis
- CA Board of Optometry-approved CE

Illinois College of Optometry: Practice Opportunities Symposium (Mar 2011)

- Represented and presented on VA Optometry
- Participated in panel discussion on "Residency-trained Optometrists"

University of Minnesota: Pre-Optometry Club (Oct. 2010)

- Presentation on the profession of Optometry
- Presented and represented VA Optometry and NOA

Illinois College of Optometry: Capstone Ceremony (May 2010)

- Represented and presented on VA Optometry

Illinois College of Optometry: Practice Opportunities Symposium (Mar 2010)

- Participant in Residency-trained Speaker's Panel
- Represented and presented on VA Optometry

Illinois College of Optometry: White Coat Ceremony/Smart Business Program (Sept 2009)

- Participant on Recent Graduate Speaker's Panel