

Vision and eye issues affecting individuals with Down syndrome

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Q1. At what age and how often do I need to have my child's eyes examined?

Q2. What eye problems do I need to watch out for?

Q3. Why do so many people with DS wear glasses?

Q4. Why do doctors use dilating drops during the eye examination?

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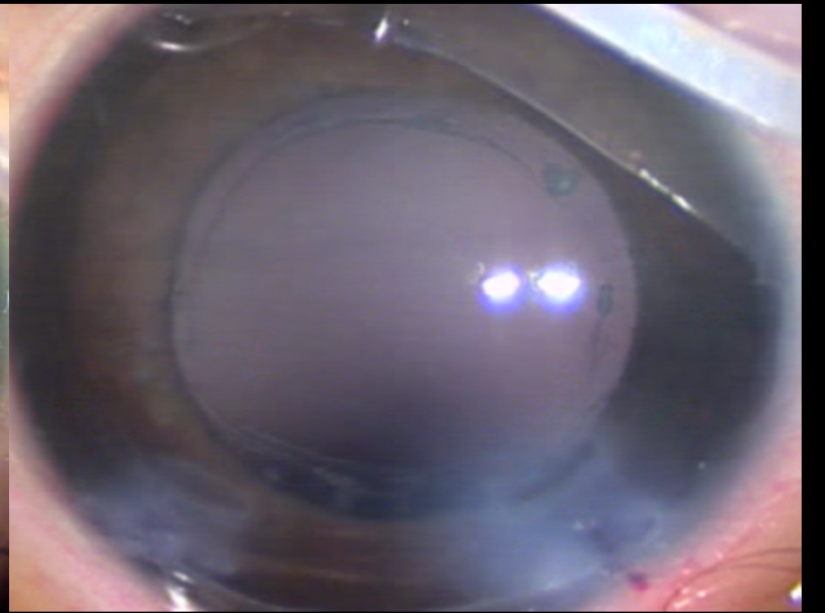
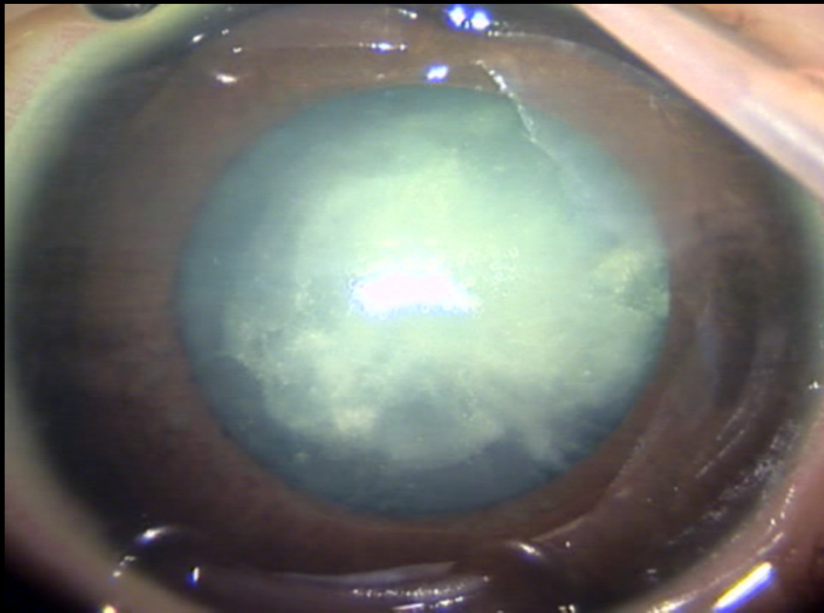
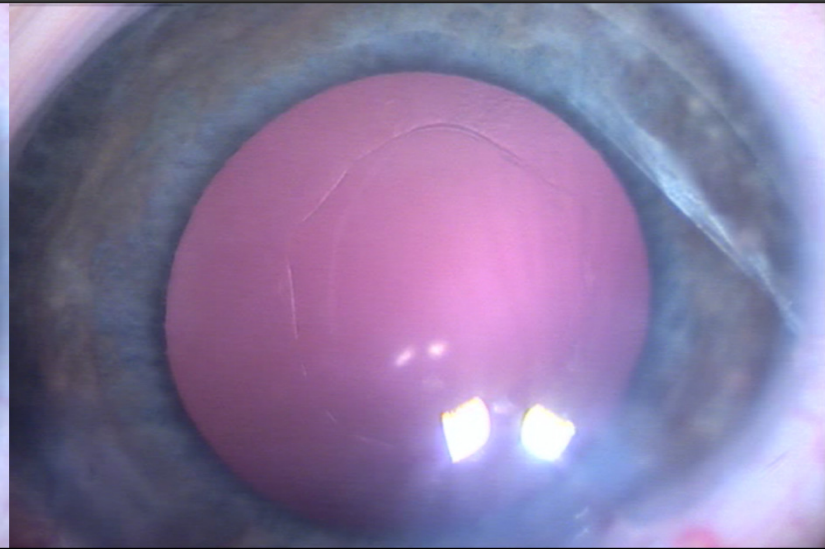
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Q4. Why do doctors use dilating drops during the eye examination?

When should we get an eye exam?



- See pediatric ophthalmologist by 6 months of age.
- 1 – 5 years of age – every year
- 5 – 13 years of age – every 2 years
- 13 – 21 years of age – every 3 years



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What do I need to look out for?

- Eye misalignment
- Squinting
- Nystagmus
- Head tilting
- Eye drainage
- Eye rubbing

What do I need to look out for?

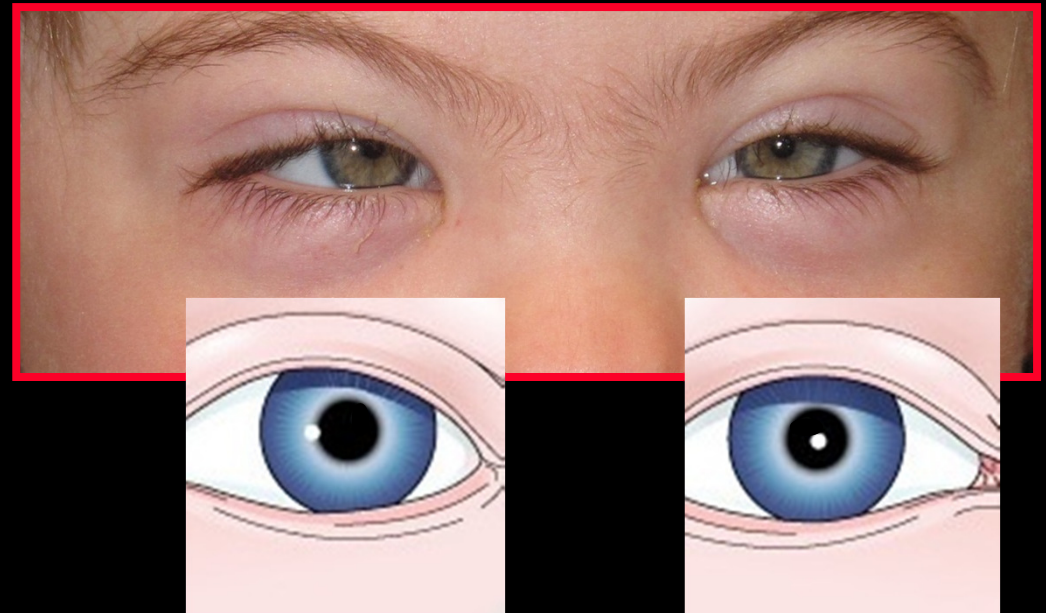
- Eye misalignment - **Strabismus**
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Pseudostrabismus: “false” or “fake” eye misalignment



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Eye Misalignment - **Strabismus**

- Eye crossing is “**Esotropia**”
- Outward turning of an eye is “**Exotropia**”
- Vertical misalignment

Accommodative Esotropia



Nonaccommodative Esotropia



Pre-op

Post-op

Nonaccommodative Esotropia

Pre-op

Post-op



How successful is surgery?

- For people without DS, surgery is successful in 80-90% of cases.
- For people with DS, Cincinnati Children's case-control study data indicates similar outcomes.

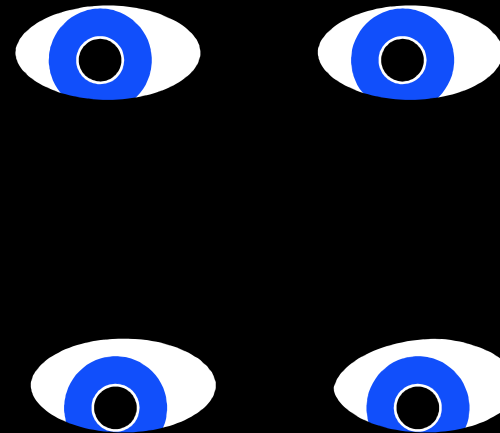
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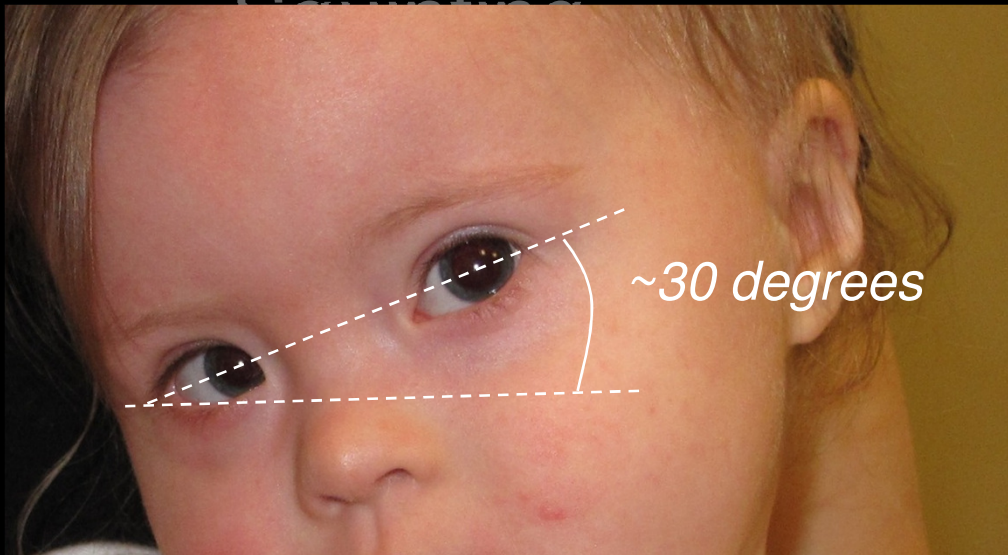
Nystagmus

- Occurs in about 10% of children with DS but only 1/1000 without DS.
- Usually improves with age.
- May be due to significant eye disease that needs early treatment.
- Usually not associated with neurological disorder.

Head tilting or “**torticollis**”

- Eye misalignment

Conjunctivae



Head tilt corrected with eye surgery



Pre-op



Post-op

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Eye drainage

- If the eyeball is not red then usually due to a **blocked tear duct** or “nasolacrimal duct obstruction.”
- Usually begins before 3 months of age
- Worse with colds and ear infections

Blocked tear duct surgery



Blocked tear duct

- Treatment
 - Massage
 - Topical antibiotics
 - Kill bacteria but do not relieve the blockage
 - Nothing works like “Drāno”.
 - Surgery

Blocked tear duct surgery

- Tear duct probing and irrigation
 - Less successful in children with DS
- Balloon dacryoplasty
- Tear duct stent
- Dacryocystorhinostomy (DCR)

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Eye rubbing caused by **Blepharitis**

- Dry or oily skin accumulation at the base of the lashes



Eye rubbing caused by **Blepharitis**

- May have associated “**chalazion**” or “**hordiolium**”
- Treatment
 - Warm compresses
 - Baby shampoo scrubs
 - Topical or oral antibiotics
 - Other topical medications
 - Surgery



Keratoconus may be caused by eye rubbing.

- 0.5 – 18% of adolescents with DS
- Cornea becomes thin and cone-shaped
- Associated with eye-rubbing
- Decreased visual acuity due to severe astigmatism and corneal opacification
- Risk of corneal perforation



Keratoconus Treatment

Typical

- Glasses
- Soft contacts
- Rigid contacts
- Corneal Transplant

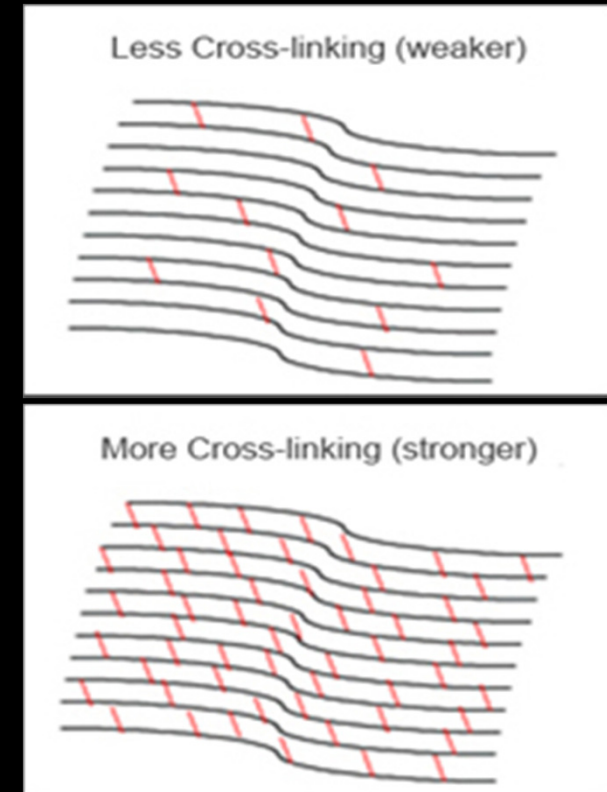
Down Syndrome

- Glasses
- Corneal Transplant

Corneal collagen crosslinking

Keratoconus Intervention Collagen Crosslinking

- Slows progression of disease
- Riboflavin and UV light
- Favorable results in European literature
- Not FDA approved



Corneal Collagen Crosslinking

US Trials

- Multicenter clinical trial – topical anesthesia only
- Drs. Erin Stahl and Scott Olitsky (Kansas City) – single center trial using general anesthesia

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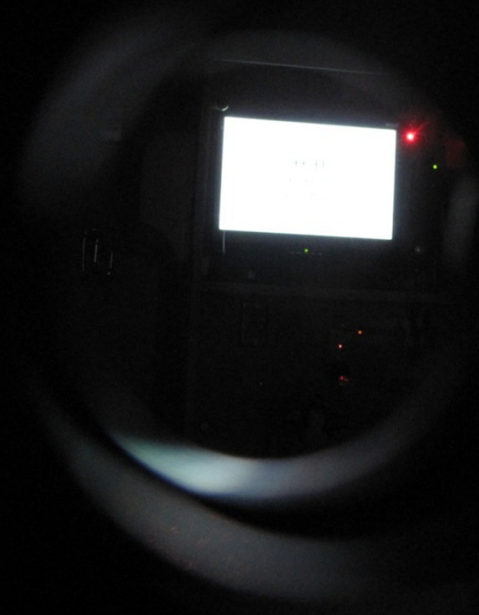
Q3. Why do so many people with DS wear glasses?

Q4. Why do some cases of strabismus require the glasses examination?

- Because they look cool!
 - Refractive errors
 - Farsightedness
 - Nearsightedness
 - Astigmatism
 - Anisometropia
 - Accommodative insufficiency
 - Esotropia



Refractive Errors



H B
P H T
V L N E

H B
P H T
V L N E

H B
P H T
V L N E

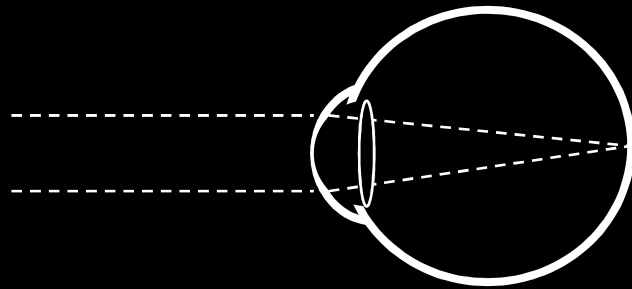
HB
PHT
VLNE



Refractive Errors in DS

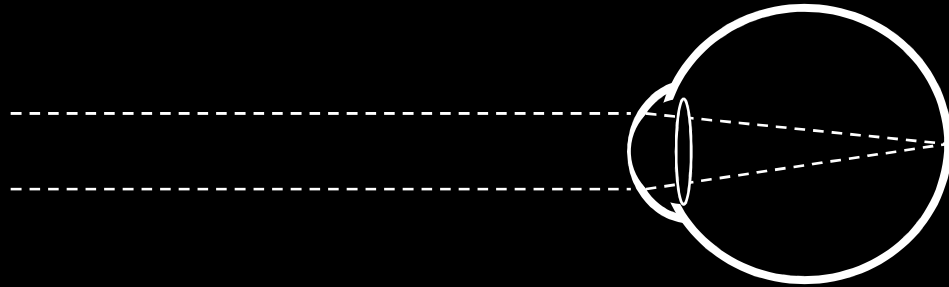
- Almost all babies are born farsighted (small eye) but outgrow it as the eye enlarges with age.
- Birth to 2 years old – Most children with DS have farsightedness similar to typical children.
- Failure of **emmetropization** during childhood.

Refractive Errors

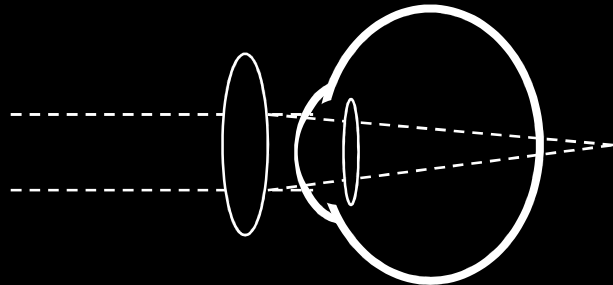


Normal eye

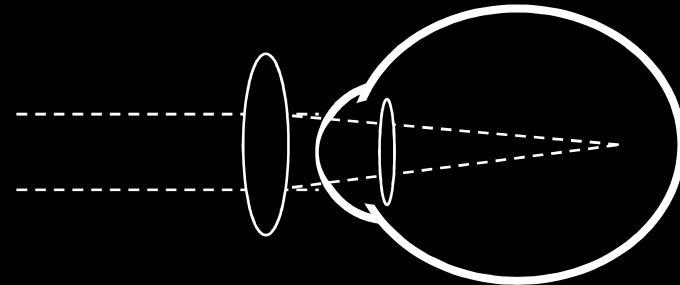
Refractive Errors



Normal eye



Farsighted - Hyperopia



Nearsighted - Myopia

Refractive Errors in DS

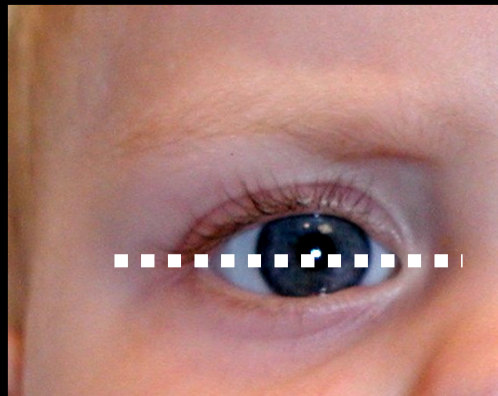
- Teenagers and young adults
 - Most have significant refractive error
 - Persistent farsightedness
 - Acquired nearsightedness
 - Astigmatism



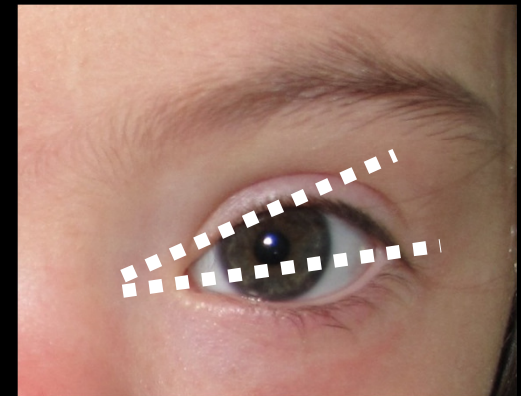
Refractive Errors - Astigmatism

- Oblique astigmatism

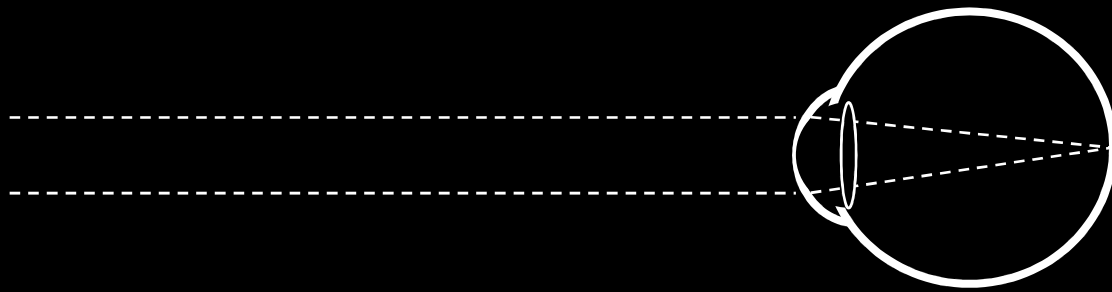
Typical



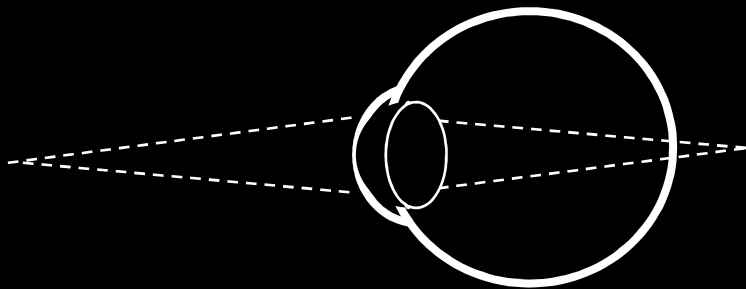
DS



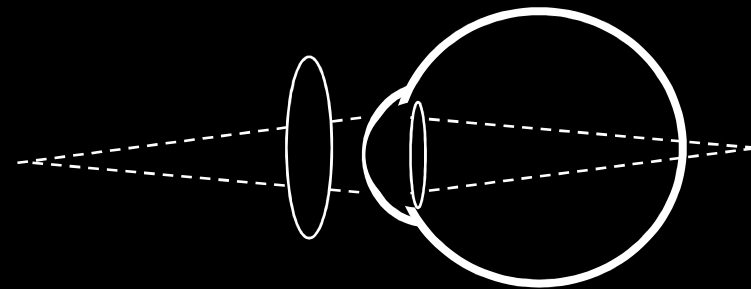
Accommodation



Normal eye



Normal accommodation



Abnormal accommodation

Accommodative Insufficiency

- Most children with Down syndrome
- Detect with dynamic retinoscopy
- Bifocals may *improve* accommodation



Tips on Glasses for toddlers and preschoolers

- Need a **good fit!**
 - Erin's World frames (specs4us.com) & others
- **Consistency** is key!
 - Set aside time
 - Can start 5 minutes per day and work up
 - Books, toys, songs - keep hands busy
 - Wear glasses at PT, OT, Speech and pre-school
- **Strap** or no strap?





Refractive Surgery in DS

- If vision is expected to be much better with glasses but glasses cannot be worn.
- Refractive errors
 - Nearsighted
 - Farsighted
 - Astigmatism

Refractive Surgery in DS

- Laser surgery:
 - LASIK
 - PRK
- Incisional surgery
 - Clear lens exchange
 - Phakic intraocular lens implant
- Investigational, little data

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Dilating Drops

- Necessary to examine for cataract and focusing power of eye (refraction)
- Providers
 - Ophthalmologist (M.D.)
 - Pediatric Ophthalmologist (aapos.org)
 - Optometrist (O.D.)
 - Optician