ADDING LOW VISION REHABILITATION TO YOUR PRIMARY CARE PRACTICE

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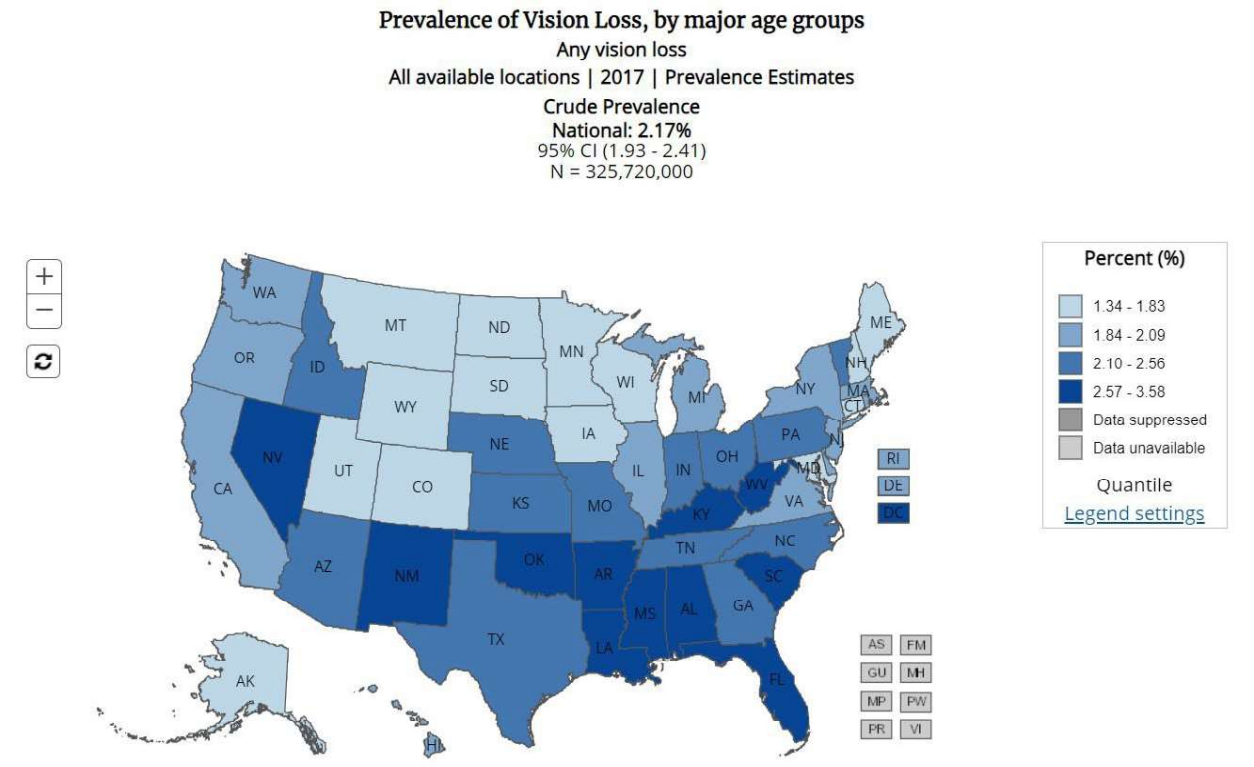
FINANCIAL DISCLOSURE

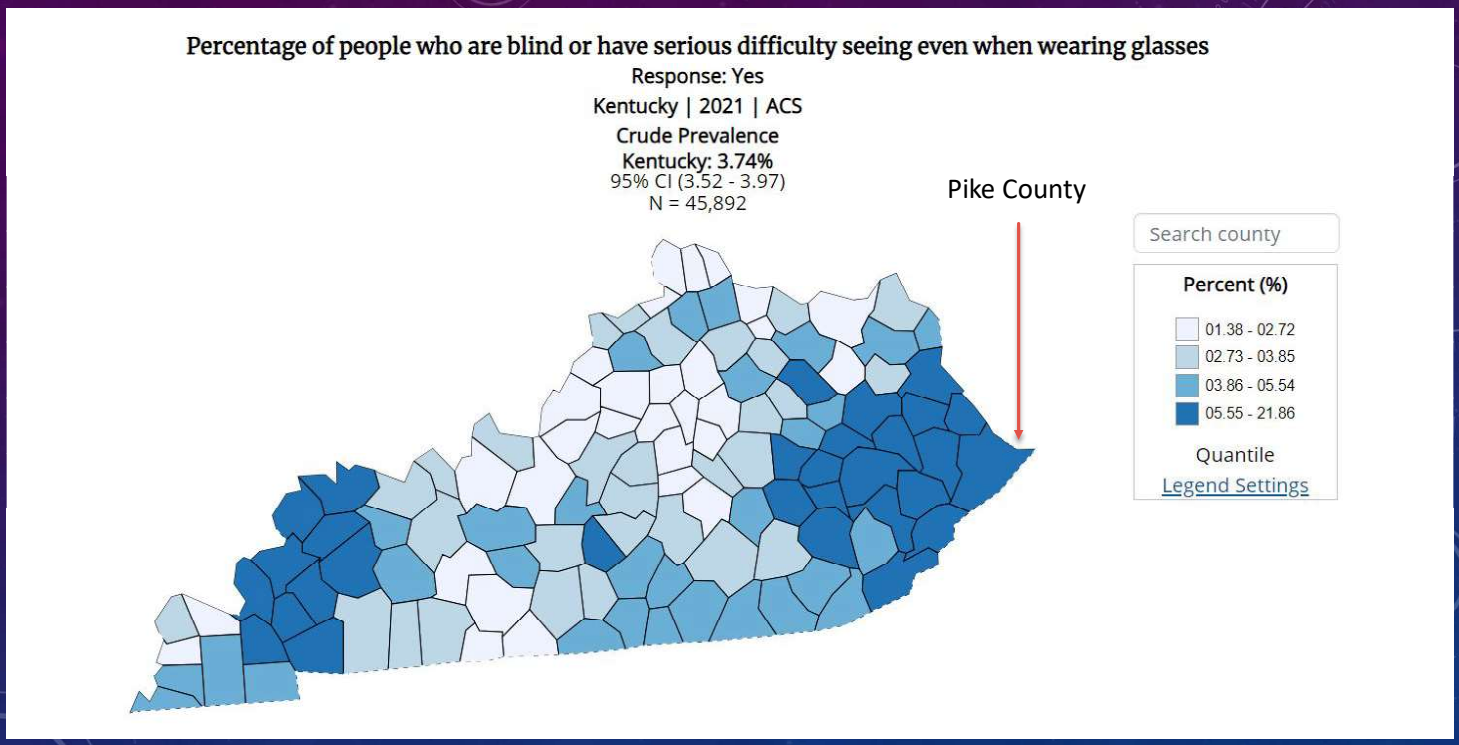
- No relevant financial relationships to disclose

OUTLINE

- Prevalence of Visual Impairment in Kentucky
- Importance of Adding Low Vision to Primary Care
- Adjusting Exam Elements
- Finding Necessary Magnification and Adds
- Basics of Low Vision Rehabilitation Options
  - High Adds/microscopes
  - Handheld Magnifiers
  - Stand Magnifiers
  - Telescopes
  - Electronic Options (smartphones, etc.)
  - Contrast and Non-Optical Recommendations



Vision & Eye Health Surveillance System (VEHSS), Centers for Disease Control and Prevention, Vision Health Initiative, [online] [accessed Apr 5, 2024]. URL: https://www.cdc.gov/visionhealth/vehss/project/index.html



Vision & Eye Health Surveillance System (VEHSS), Centers for Disease Control and Prevention, Vision Health Initiative, [online] [accessed Apr 5, 2024]. URL: https://www.cdc.gov/visionhealth/vehss/project/index.html

WHO NEEDS LOW VISION REHABILITATION SERVICES?

- Patients with vision that is not adequate for their needs
- Generally, patients who are 20/40 or worse
  - These patients tend to have difficulty reading and with distance tasks
- Patients who have noticed their visual field loss

IMPORTANCE OF OFFERING LOW VISION REHABILITATION SERVICES

- Other eye care providers around you likely are not providing this service
  - "Compared to those moderately actively practicing LVR, twice as many…reported that they never prescribe near-reading add power of 4D or greater for patients with mild vision loss"[1] (statistically significant)
  - Among those not practicing LVR, 11% of participants never prescribe any Low Vision Rehabilitation for patients with a visual acuity of 20/50 to 20/70
  - Most common barriers mentioned by optometrists were the cost of devices or that patients are not interested
  - A third say it is not feasible to stock magnifiers in office

1. Malkin, A. G., Ross, N. C., Chan, T. L., Protosow, K., & Bittner, A. K. (2020). U.S. Optometrists' Reported Practices and Perceived Barriers for Low Vision Care for Mild Visual Loss. *Optometry and vision science : official publication of the American Academy of Optometry*, *97*(1), 45–51. https://doi.org/10.1097/OPX.0000000000001468

IMPORTANCE OF OFFERING LOW VISION REHABILITATION SERVICES

- If you don't provide (or refer for) low vision services, your patients aren't receiving help that would potentially enhance their quality of life (especially vision-related quality of life)[2]
  - Without help, patients may be unable to read/do finances/correctly take medicines, etc.

2. Liu, J., Dong, J., Chen, Y., Zhang, W., Tong, S., & Guo, J. (2021). Low vision rehabilitation in improving the quality of life for patients with impaired vision: A systematic review and meta-analysis of 52 randomized clinical trials. *Medicine*, *100*(19), e25736. https://doi.org/10.1097/MD.0000000000025736

HOW SHOULD I ADJUST VISUAL ACUITY IF I SUSPECT VISUAL IMPAIRMENT?

- It is best to have a movable/portable chart (or be able to move the patient to be able to see the chart at a closer distance); you can always convert it to your usual visual acuity by multiplying
- Remember that visual acuity involves single letters; if the patient wants to read, it will be more difficult
  - **2X more difficult is the standard**; if you want your patient to read paragraphs fluently that are the equivalent of 20/40, then you need them to be able to see 20/20 individual letters
  - Generally best to record in M size if possible as the working distance is included in the measurement and it's easier to determine magnification needed (ex: 0.4m/2M)
    - If you need a quick conversion to Snellen, can compare the denominator to the numerator; for 0.4m/2M, the denominator is 5X larger, so would be 20/100

NOW I HAVE TO REFRACT A PATIENT WHO LIKELY HAS LOW VISION; WHAT CAN I DO?

- For all patients with low vision, a good refraction is an essential foundation
- Usually best to start with retinoscopy
- Remember to **use larger lens changes to make refraction easier**
- **Bracket to get a reversal**

MORE REFRACTION RECOMMENDATIONS

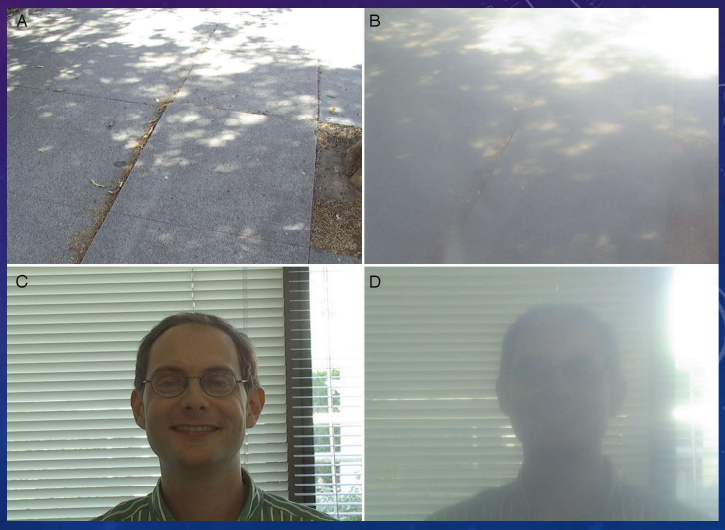
- Use the “just noticeable difference”
- The just noticeable difference is equal to the denominator of the Snellen fraction divided by 100
  - If the patient is 20/100, it is best to give options with 1 diopter between the choices (+0.50 or -0.50 over what is in the frame, +1.00 vs nothing, etc.)
  - If they are 20/50, it is best to give options with 0.50 diopters between the choices
- Polycarbonate lenses are best; bifocals usually better than Progressive lenses

I COMPLETED REFRACTION AND MY PATIENT HAS LOW VISION; HOW CAN I HELP?

- The first step to helping your patient is to ask about their goals for their vision:
  - Do they want help with reading?
    - What do they want to read? Newspaper? Books? Mail? PC? Phone?
  - Do they want help with driving?
  - Do they have trouble distinguishing faces, seeing the TV, or watching birds?
  - Do they want help with sewing, woodworking, metalworking, etc. that needs to be handsfree?
  - Do they want help playing board games, card games, or with reading music?
  - Do they have any current strategies to help them?

I COMPLETED REFRACTION AND MY PATIENT HAS LOW VISION; HOW CAN I HELP?

- Next, ask about problems with their vision:
  - Ask if they have fallen recently; this will give an idea of their mobility
  - Do they have issues with glare?
  - Do they have issues in low lighting or with contrast?
  - Do they have problems staying on the same line or signing paperwork?



LOW VISION REHABILITATION

- After you know their goals, you can separate them into three categories:
  - **Near goals**
  - Intermediate goals
  - **Distance goals**
- Each of these goals have devices tailored towards improving the patient's ability to perform these activities
  - **Near: Microscopes, Handheld Magnifiers, and Stand Magnifiers**
  - Intermediate: Telemicroscopes
  - **Distance: Telescopes** and Mounted Telescopes
  - Depending on the electronic device, they may be able to help with all three types of goals

LOW VISION REHABILITATION

- After you know their problems, you can help them with non-optical recommendations:
  - Glare: Filters and lighting recommendations
  - Contrast: Increased lighting, increased contrast options
  - Signature: Line guide/signature guide/typoscope
  - Mobility: Scanning recommendations, possible orientation and mobility referral, possibly visual field enhancement
  - All: Recommend local/online support groups, consider community organizations

MAGNIFICATION RECOMMENDATIONS; A QUICK GUIDE

- You want your patient to be able to see half of the size in individual letters to be able to read the books they want to read fluently – 1.0M print size is a good general reading goal (a 1.0M letter is 1.45 millimeters tall and roughly 8-point font, equivalent to 20/50 at 40 cm)
  - Therefore, if your patient can see 20/25 individual letters at near, you would expect them to be able to read 20/50 sized print fluently at that same near distance
- **If the patient likes to or needs to read books/items with larger or smaller letters, a larger or smaller goal should be chosen respectively**
- Remember to balance magnification and field of view; try to give an add at or a bit above what is predicted to be needed

MAGNIFICATION RECOMMENDATIONS; A QUICK GUIDE

- If your presbyopic patient can see a 6M letter at 36 centimeters, what can be done to help them see a 1M letter?
  - **You can bring the chart 6X closer to 6 cm!** Then the patient should be able to see a 1M letter, if given the correct add for that distance (1/0.06m=**16.67D**)
  - **You can multiply the add currently used by 6X!** The current add/accommodation being used is 1/0.36m, so 2.77D. 2.77D *6X=**16.67D**. Same answer!

CASE 1

- A fully presbyopic patient can see a 1M sized letter at 40 centimeters. What add does this patient need in order to read 0.5M individual letters? How about in order to read 0.5M print fluently?

CASE 1

- A patient can see a 1M sized letter at 40 centimeters. What add does this patient need in order to read 0.5M individual letters? How about in order to read 0.5M print fluently?
  - 1. Bring it twice as close to see it 2X better, so 20 centimeters. You need 1/0.2m as your add, which means a **5D add**
  - 2. Find the current add used and multiply the add by 2. Current add is 1/0.4m=2.5D. 2.5D*2 is a **5D add**
  - **In order for the patient to read fluently, you need to double the add, so 5D*2=10D add!**

READING WITH MICROSCOPES

- Microscopes are essentially high-powered reading glasses; they are used for near only
- Once the add needed for the patient to see is above +4.00D, you need to consider base in prism for binocularity if it is present; also can consider covering an eye
  - Otherwise, the patient may see double!
  - The “typical” prism given is the add + 2 Base In prism for each eye, so for a +4 add, you would need 6 Base In prism on each eye for a total of 12 Base In
- After +10D of add, it becomes too close for binocularity

PROS AND CONS OF MICROSCOPES

- Pros:
  - Reading glasses are handsfree
  - Reading glasses are simple to use and well understood by patients; “the glasses option”
  - Easy to occlude the worse seeing eye
  - Good field of view
- Cons:
  - If high powered, the patient may have to hold the item closer to them than they will accept
  - It can be difficult to get good lighting if it is high powered
  - May have to switch glasses to use

READING WITH HANDHELD MAGNIFIERS

- Another option for reading would be a handheld magnifier, which should be **the same power of diopters** as the add needed for a microscope
  - For example, the patient from Case 1 would need a +10D handheld magnifier used with distance correction
- Can come with an LED to improve lighting on the material; non-illuminated are much cheaper
- Recommendations for demonstration
  - Start with magnifier on the page and pull back until the image is clear
  - Use the distance portion of the patient’s glasses

READING WITH HANDHELD MAGNIFIERS

- Pros:
  - Handheld magnifiers work better than many other options when maintaining distance is more important and the patient can hold the magnifier well, especially for **short term reading**
  - Generally less expensive
- Cons:
  - The patient needs good manual dexterity to hold the magnifier
  - Can be tiring to arms after long term use

STAND MAGNIFIERS

- Stand magnifiers and dome magnifiers are most useful for prolonged reading
- Usually work best when at lower dioptric values
- Many come with an LED to help with lighting; dome magnifiers are cheaper
- Labeling is inconsistent between brands; “higher power” may provide less magnification
- Recommendations for demonstration
  - **Patients need to use near correction with these**
  - Recommend a writing stand so that the patient does not have to lean over to read; often best to use a newspaper/magazine for demonstration
  - Tell the patient to pretend that the magnifier is glued to the reading material

STAND MAGNIFIERS

- Pros:
  - Longer working distance than microscopes
  - Require less dexterity than handheld magnifiers
- Cons:
  - Not handsfree
  - Working distance is still fairly close
  - Can require some trial and error to demonstrate since labeling is not consistent

DISTANCE ACTIVITIES

- For patients who have goals at distance, telescopes are usually the best available option
- Telescopes bring the distance target closer, but limit the field of view significantly
  - Higher magnification limits the field of view more
  - Keplerian has better field of view than Galilean
- Telescopes provide the amount of magnification they are labeled as; a 2X telescope will allow the patient to see letters that are 2X smaller

DISTANCE ACTIVITIES

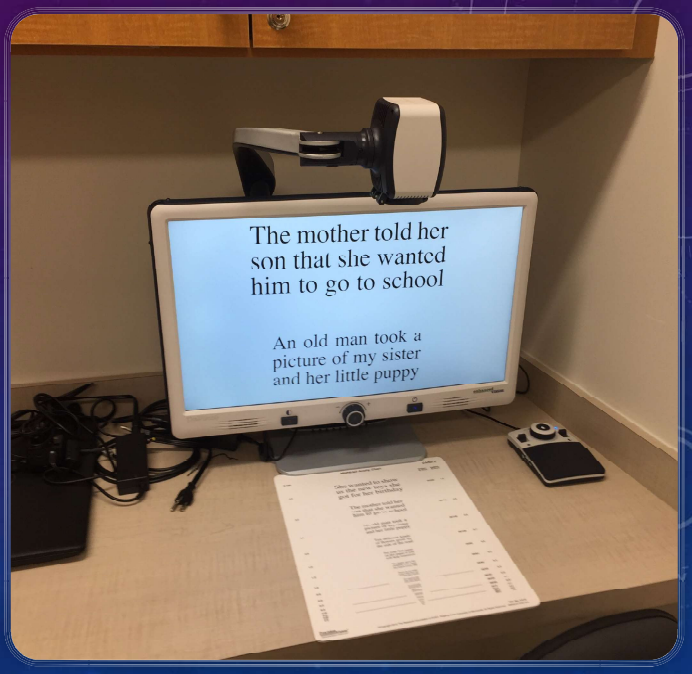
- Telescopes can be mounted or handheld, focusable or fixed-focus, and monocular or binocular
- Recommendations for demonstration
  - Start with a low magnification and end with the goal; focus the telescope for yourself at the patient's current distance
  - Use the better seeing eye and the patient can use the focusing hand to occlude the other eye
  - Have the patient obtain a view through the telescope at the chart and obtain visual acuity
  - Have the patient move between the chart and an object in the room

DISTANCE ACTIVITIES

- General goal is for the patient to see 20/40 through the telescope
  - 20/40 is good enough to recognize people's faces and most signs
  - The power of telescope required to reach 20/40 will need less stability and will have a greater field of view than what would be needed for 20/20

ELECTRONIC MAGNIFICATION

- Especially best for very reduced VAs (20/400 and worse), very poor contrast sensitivity (less than 1.0 Log CS), or both
  - Also try with good distance VAs when the patient struggles to read
- Greatly enhanced contrast options versus optical devices
- Can be handsfree
- Can do a quick “trial“ in office using a smartphone or computer
- Usually significantly more expensive than other options



ELECTRONIC MAGNIFICATION OPTIONS

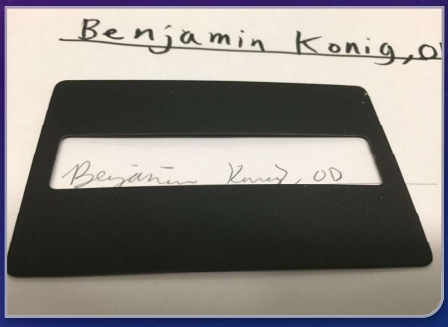
- CCTVs
  - Great for ease of reading/long-term reading
  - Most are easy to use and designed for people who are not comfortable with technology
  - Handheld vs. portable vs. desktop
- Smart Devices
  - Can be used as a replacement for a handheld or portable CCTV, but the patient has to be comfortable with them
- Head Mounted Displays
  - Versatile; can be used for many different activities
  - Greater need for consideration of comfort and aesthetics
  - Still have a somewhat niche application, consistent device updates, etc.

CONTRAST ENHANCEMENT AND GLARE

- Consider using a filter when your patient complains of glare
  - No literature supporting use of specific filters for specific low vision conditions
  - Filters can occasionally increase contrast sensitivity and improve visual acuity
- Lighting recommendations
  - Have to balance having enough light with preventing glare; daylight LED usually works best
  - Avoid fluorescent lighting as lighting concentrated in blue increases glare
  - Gooseneck lamps are good; recommend lighting beside the patient pointed at the material rather than overhead lighting or over shoulder lighting
  - Not just for reading; also important for stairs, steps, etc.

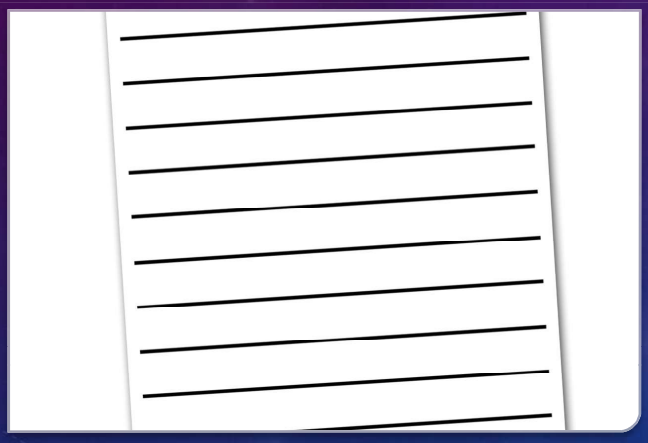
NON-OPTICAL TECHNIQUES: READING

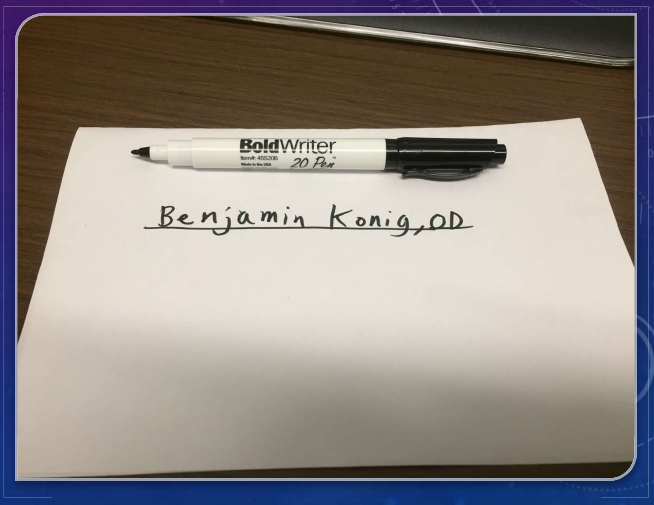
- Use a line guide/typoscope
- Draw colored line at end of text on affected side
- Turn page sideways and read vertically
- Read upside down



Working with people with hemianopsia would be interesting because they have definite goals they want to achieve

NON-OPTICAL TECHNIQUES: IMPROVE CONTRAST





NON-OPTICAL TECHNIQUES: OTHER SENSES

SMARTPHONE APPLICATIONS

- iOS devices have a built-in text magnification, magnifier app, zoom function, and screenreader
- Android devices have screenreading and text magnification built in and may have other options
- SeeingAI by Microsoft provides text reading, scene description, currency identification, and other options
  - iOS and recently Android!
- Lookout by Google
  - Android; good scene description
- Magnifier & Microscope [Cozy]
  - Android; Good magnification app with filters, contrast sliders, and brightness sliders as not every Android phone has a magnification app
  - Free

SMARTPHONE APPLICATIONS

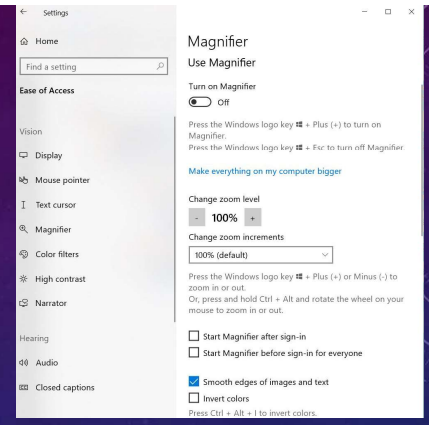
- BeMyEyes
  - App that allows a blind person to connect (using their phone camera) with a volunteer sighted person to help with tasks
  - https://www.bemyeyes.com/
  - Free
- WayAround – Tag and Scan
  - Allows you to create labels with NFC tags and the app will read what they are
  - App is free, but the NFC stickers/labels cost $29.99 for a 25 pack (other options include buttons, etc).
  - Can purchase off brand NFC tags for local use

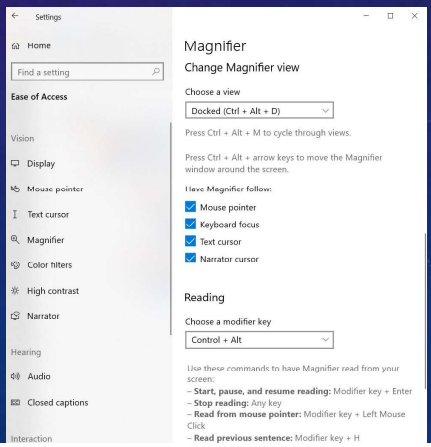
COMPUTER REMINDERS

- Windows – Ease of Access in Settings
  - Can change text size, text cursor, mouse pointer, app size, among others
  - Mouse utilities within PowerToys download may be helpful; may become standard features
- Mac – Accessibility
  - Similar features to other iOS products (Zoom, VoiceOver)
- Specialty Software:
  - ZoomText: Screen magnifier with text-to-speech option
  - JAWS: Screenreading software; PC only
  - Kurzweil: Screenreading software; Mac only
  - NVDA: Great free option and gives more control than built in Narrator; PC only

EASE OF ACCESS: MAGNIFIER

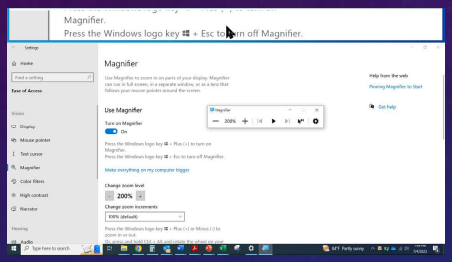
- Through Magnifier, can turn on the magnifier setting
  - Windows and Plus key to turn on the magnifier
  - Windows and Esc key to turn off the magnifier
  - Zoom level can be changed; Windows and Plus key zoom in, Windows and Minus key zoom out
  - Can start Magnifier automatically on signing in
  - Can use Magnifier docked, as a lens view, or to magnify the whole screen



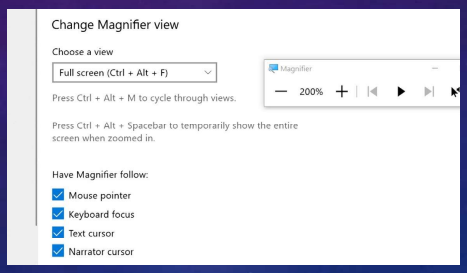


EASE OF ACCESS: MAGNIFIER

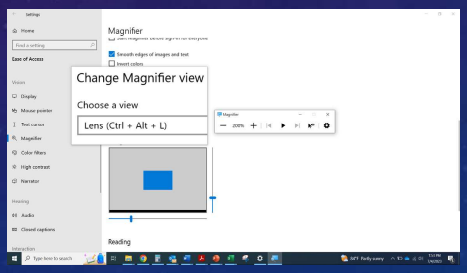
Docked



Full Screen



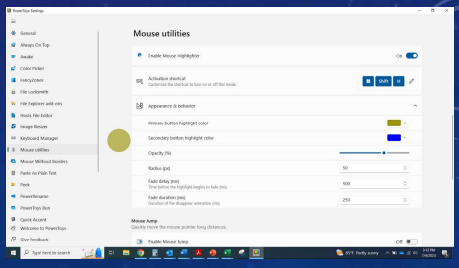
Lens



Note: Several of these options slow down mouse movement/lower mouse sensitivity in a noticeable way.

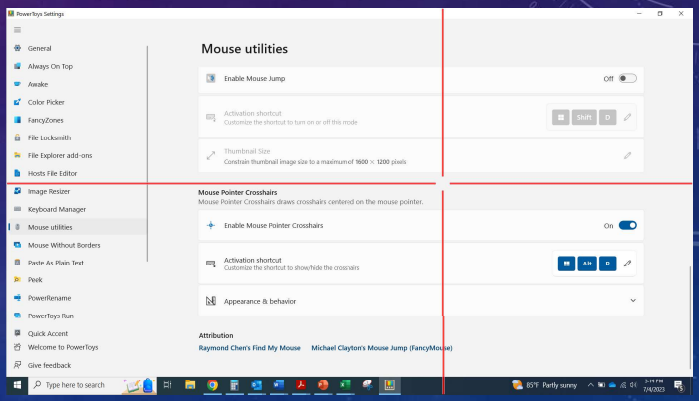
MOUSE UTILITIES WITHIN MICROSOFT POWERTOYS

- Find My Mouse
  - Use the left ctrl button (or can change it to shaking the mouse) to bring up a circle centered on the mouse pointer, and then hit a key or click to take it away
  - Can change colors, opacity, size, etc.
- ii. Mouse Highlighter
  - Makes a highlighted circle where you click
    - Different color for left click versus right click; can change colors, opacity, size, etc.
  - Makes it easier to tell where you are clicking
  - Shortcut: windows key + shift + h



MOUSE UTILITIES WITHIN MICROSOFT POWERTOYS

- iii. Mouse Pointer Crosshairs
  - Brings up crosshairs centered on the mouse; good if the mouse is lost frequently
  - Can change colors, opacity, size, etc.
  - Shortcut: windows key + alt + p



An 80-year-old patient with a history of wet AMD presents to the exam with complaint of not having enough lighting when reading. When asked, his goals were to see the scoreboard for Kentucky basketball on television and to read medicine labels and labels in the store. His entering vision was 20/200 OD and OS. Following refraction with +1.00 DS OU, he improved to 20/100 OD and OS. When near vision testing was performed with the patient's current add of +4.00, he read 2M letters.

What kinds of devices would be best to meet the patient's near goals?

An 80-year-old patient with a history of wet AMD presents to the exam with complaint of not having enough lighting when reading. When asked, his goals were to see the scoreboard for Kentucky basketball on television and to read medicine labels and labels in the store. His entering vision was 20/200 OD and OS. Following refraction with +1.00 DS OU, he improved to 20/100 OD and OS. When near vision testing was performed with the patient's current add of +4.00, he read 2M letters.

What magnification does the patient need at near in comparison to his current add to read newspaper (1M) print?

An 80-year-old patient with a history of wet AMD presents to the exam with complaint of not having enough lighting when reading. When asked, his goals were to see the scoreboard for Kentucky basketball on television and to read medicine labels and labels in the store. His entering vision was 20/200 OD and OS. Following refraction with +1.00 DS OU, he improved to 20/100 OD and OS. When near vision testing was performed with the patient's current add of +4.00, he read 2M letters.

What add will he need for reading, considering that he needs to see twice as well at near?

An 80-year-old patient with a history of wet AMD presents to the exam with complaint of not having enough lighting when reading. When asked, his goals were to see the scoreboard for Kentucky basketball on television and to read medicine labels and labels in the store. His entering vision was 20/200 OD and OS. Following refraction with +1.00 DS OU, he improved to 20/100 OD and OS. When near vision testing was performed with the patient's current add of +4.00, he read 2M letters.

What magnification and what type of telescope would be recommended?

An 80-year-old patient with a history of wet AMD presents to the exam with complaint of not having enough lighting when reading. When asked, his goals were to see the scoreboard for Kentucky basketball on television and to read medicine labels and labels in the store. His entering vision was 20/200 OD and OS. Following refraction with +1.00 DS OU, he improved to 20/100 OD and OS. When near vision testing was performed with the patient's current add of +4.00, he read 2M letters.

What about his lighting complaint?

THANKS! ANY QUESTIONS?

- If you have any patients with low vision or would like to consult with me about aiding the functional vision of a patient, I would be happy to help!
- Phone: 931-286-2226
- Email: benkonig@upike.edu

FURTHER RESOURCES

- https://kcc.ky.gov/Vocational-Rehabilitation/seeking-services/Blind-Services/Pages/Blind-Services-Division.aspx
- https://lighthouseguild.org/support-services/telesupport-groups/
- https://hadleyhelps.org/learn?topic_id=12
- https://kentucky-acb.org/