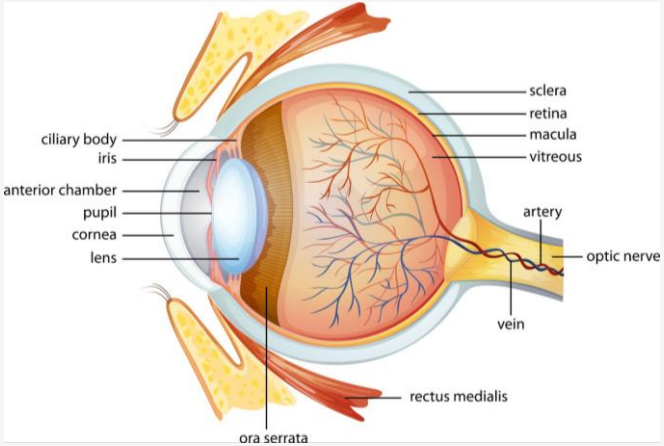


Are you looking ahead?

Strategies to incorporate low vision into your everyday assessment.

Carmen McClelland
mcclellandcarmen@gmail.com

Objectives

1. Attendees will have a more global understanding of the prevalence of specific visual impairments and what it means for the aging population.

2. Attendees will become aware of the current research around visual impairments and other comorbidities.

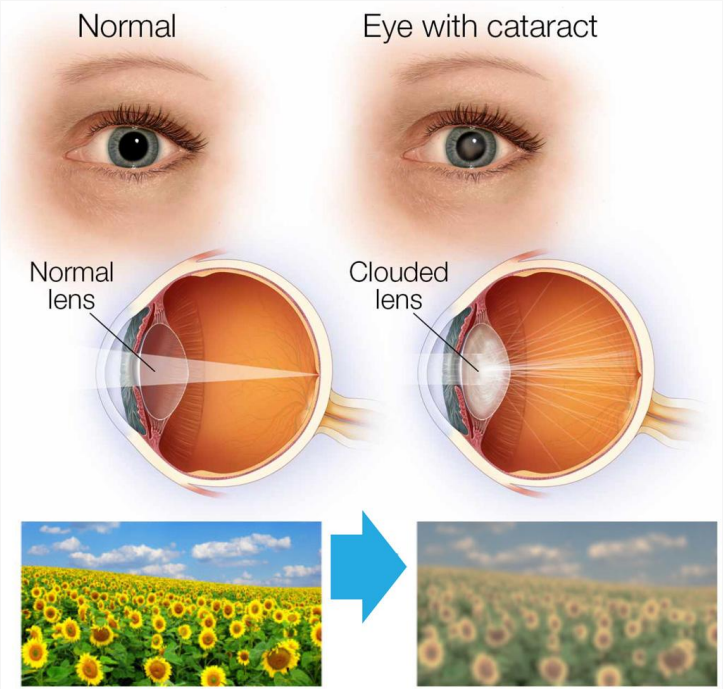
3. Attendees will learn about both low tech and high-tech low vision strategies and devices to incorporate into their recommendations.

Financial Disclaimer

I have nothing to disclaim.

Cataracts

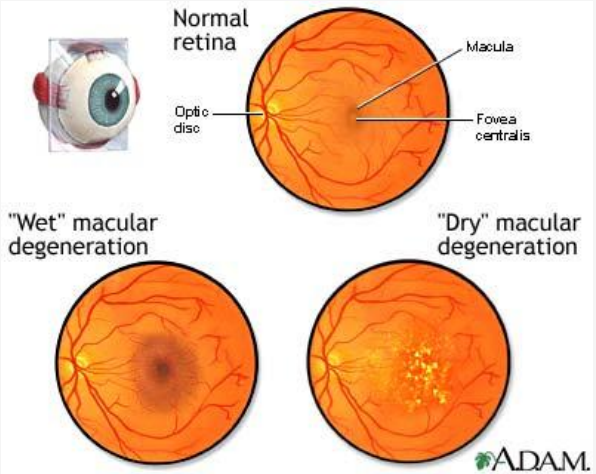
- Not considered a low vision impairment because it can be fixed, but it is equally important.
- Leading cause of vision loss in the United States
- Usually starting around 40, proteins clump together and blur vision



(Centers for Disease Control and Prevention, 2018)

Macular Degeneration

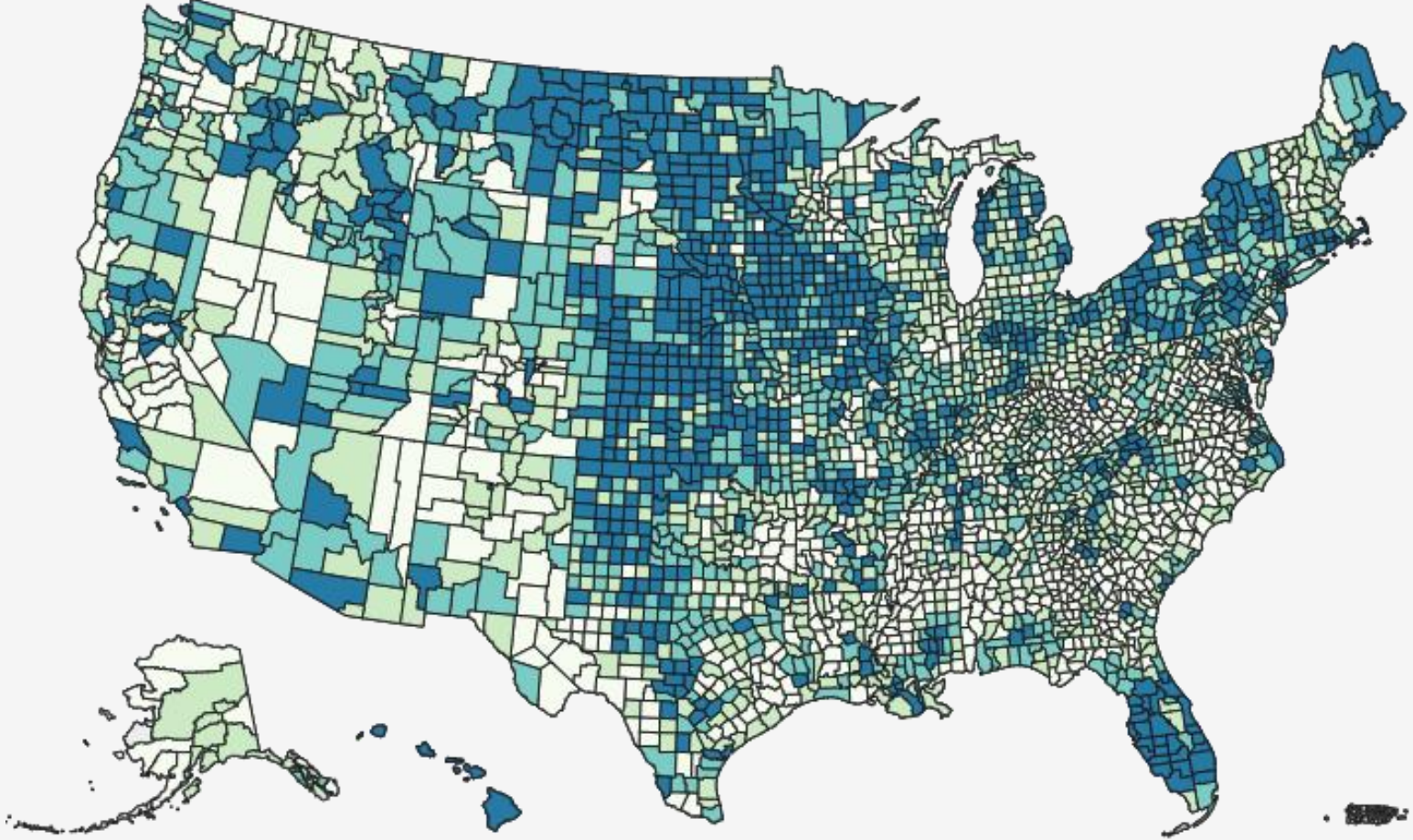
- Leading cause of vision loss for Americans aged 65 and older.
- Economic of both indirect, direct costs, productivity costs of late-stage AMD in Bulgaria, Germany, and the U.S (Paudel et al. 2024)
  - Bulgaria: $512.5 million
    - Reduced well being76%
  - Germany: $8.6 billion
    - Reduced well being 67%
  - U.S.: $49.4 billion
    - Loss of productivity 43%
- Rates do fluctuate based on race/ethnicity (Fisher et al, 2016)
  - Caucasian
  - Hispanic and Chinese
  - African American



(Centers for Disease Control and Prevention, 2018)

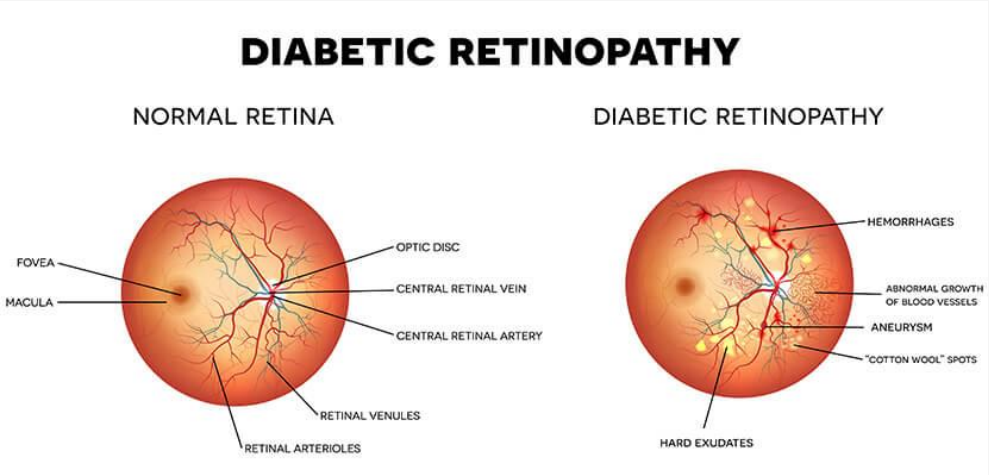
Macular Degeneration Risk Factors

Risk Factors
Smoking
Poor nutrition
Cardiovascular disease
Family history


Legend
5.14 - 9.83
9.83 - 12.14
12.14 - 15.16
15.16 - 32.57

Diabetic Retinopathy

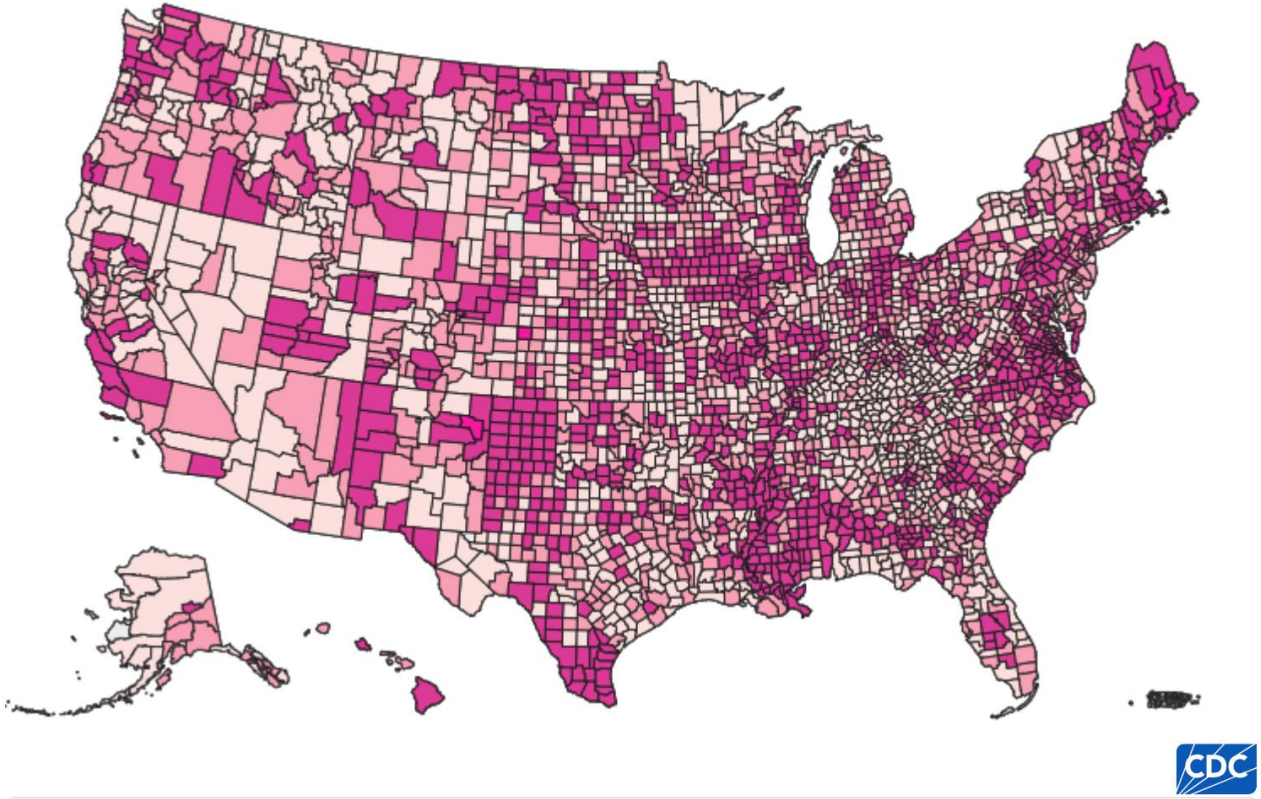
- Leading cause of blindness in American adults
- Nonproliferative retinopathy vs proliferative retinopathy
- Limited symptoms in non-proliferative
- Rates do fluctuate based on race/ethnicity (Wong et al, 2006)
  - African Americans
  - Hispanic
  - Caucasians
  - Chinese



(Centers for Disease Control and Prevention, 2018)

Diabetic Retinopathy Risk Factors

Risk Factors
High blood pressure
Poorly controlled blood glucose levels
High cholesterol
Both type 1 and type 2
Weight management



Legend

- 14.97 - 23.11
- 23.11 - 27.68
- 27.68 - 44.84

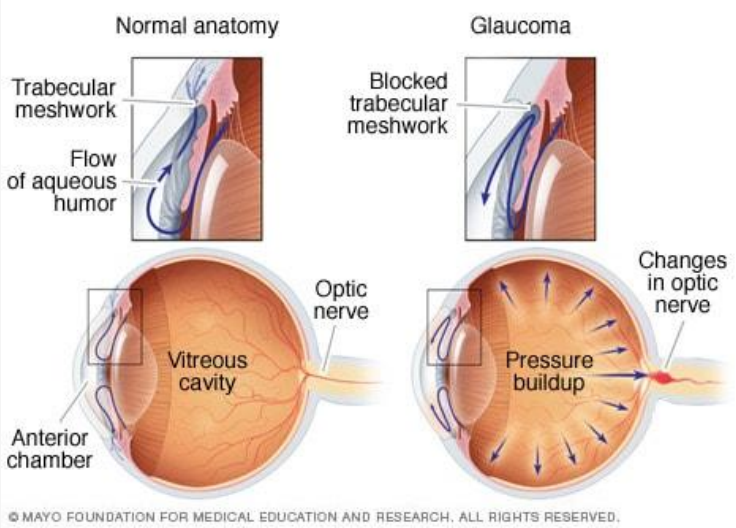
Glaucoma

Four types:

- Open-angle glaucoma (most common)
- Vision loss happens slow with cause unknown
- Angle-closure glaucoma, also called closed-angle glaucoma
    - Fluid is blocked and can't get out of the eye. Vision loss happens very quickly
- Congenital glaucoma
- Secondary glaucoma

Leading cause of blindness in African Americans

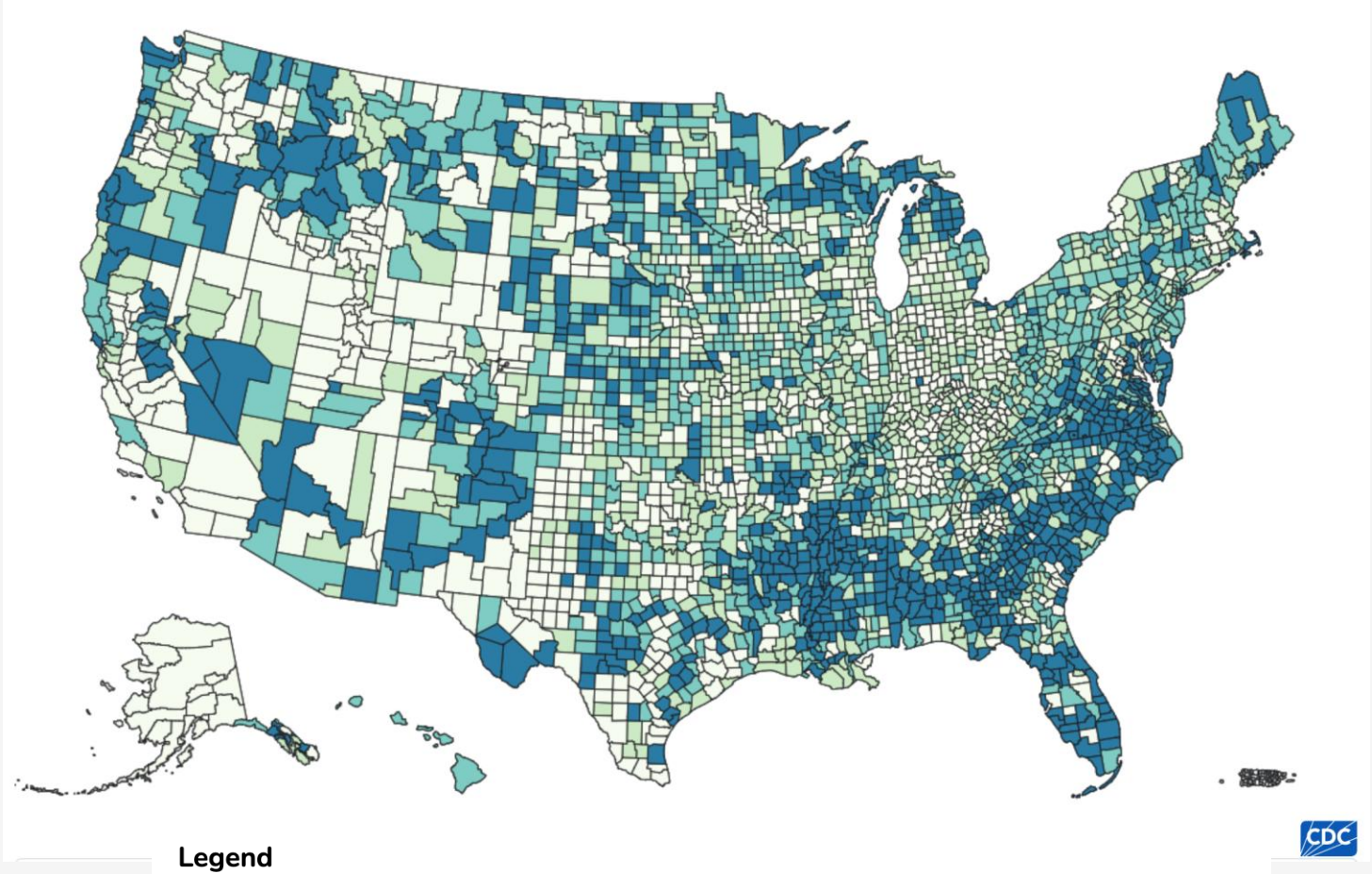
6x more likely to result in blindness than in European Americans (Siegfried & Shui, 2022)

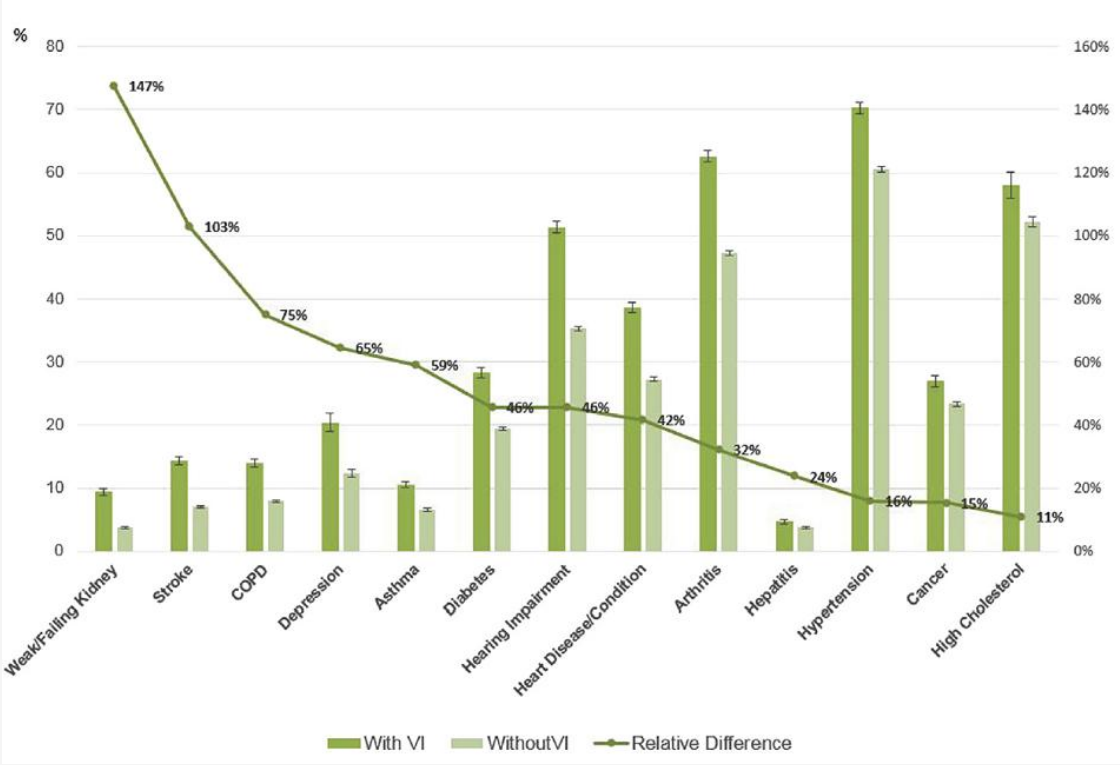


Risk Factors for Glaucoma

Risk Factors
Family history
Male sex
High IOP
High blood pressure
Can develop secondary to diabetes and hypothyroidism

(Shan et al, 2022)


CDC
Legend
0.14 - 0.42
0.42 - 0.47
0.47 - 0.53
0.53 - 1.08



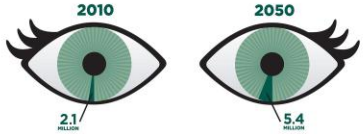
(Crews et al., 2017)

- 1 in 4 adults with general vision impairment report psychological distress.
- Rates of falls double when you have a vision impairment.
- 1 in 4 adults over 65 experience a fall, the leading cause of injury in older adults.
- In 2017, the total U.S. economic burden of vision loss and blindness was $134.2 billion.

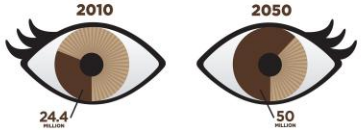
The Most Common Eye Diseases: NEI Looks Ahead

Between 2010 and 2050, the estimated number of people affected by the most common eye diseases will double.

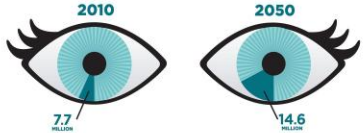
AGE-RELATED MACULAR DEGENERATION



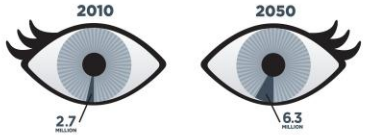
CATARACT



DIABETIC RETINOPATHY



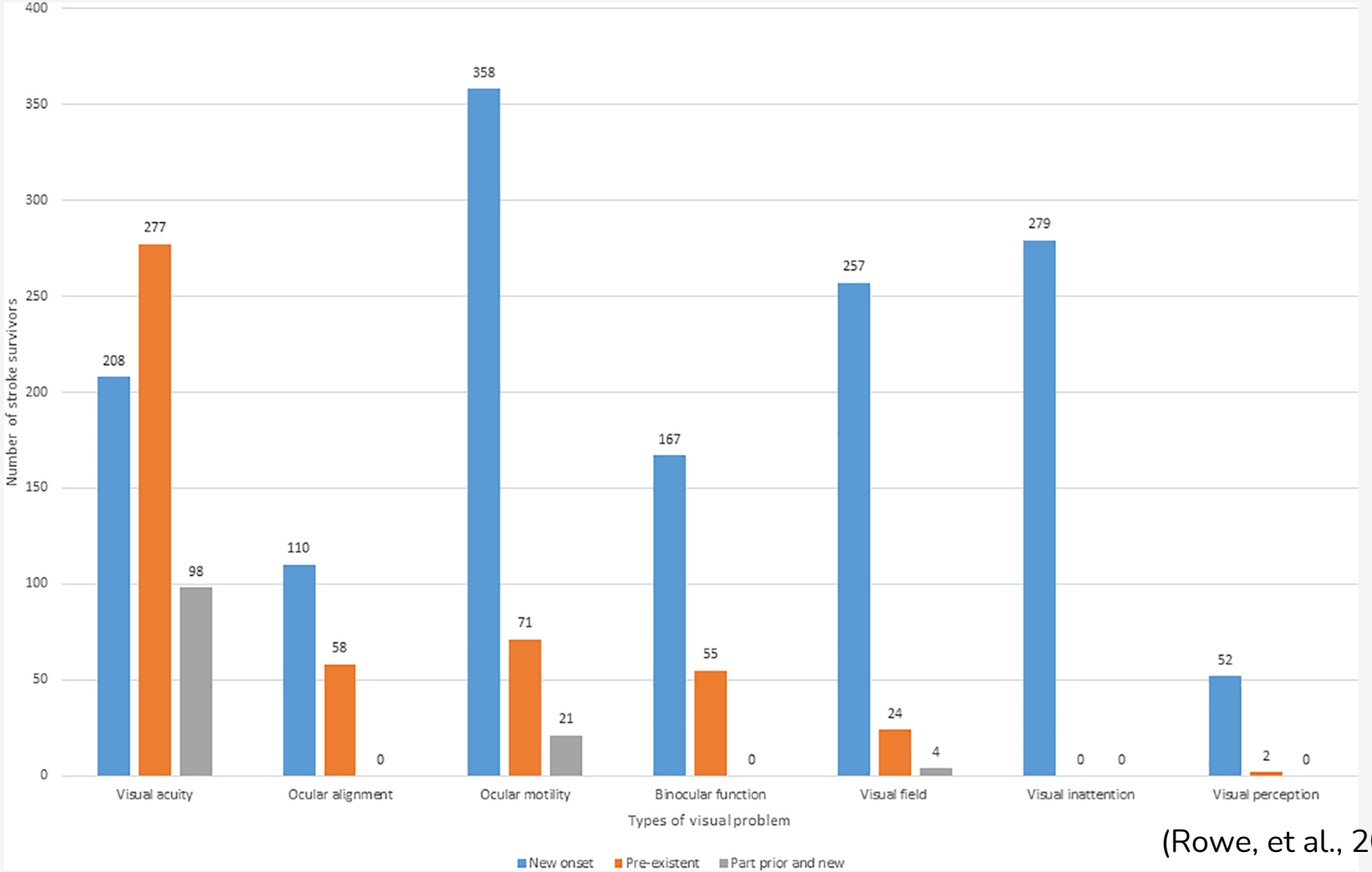
GLAUCOMA



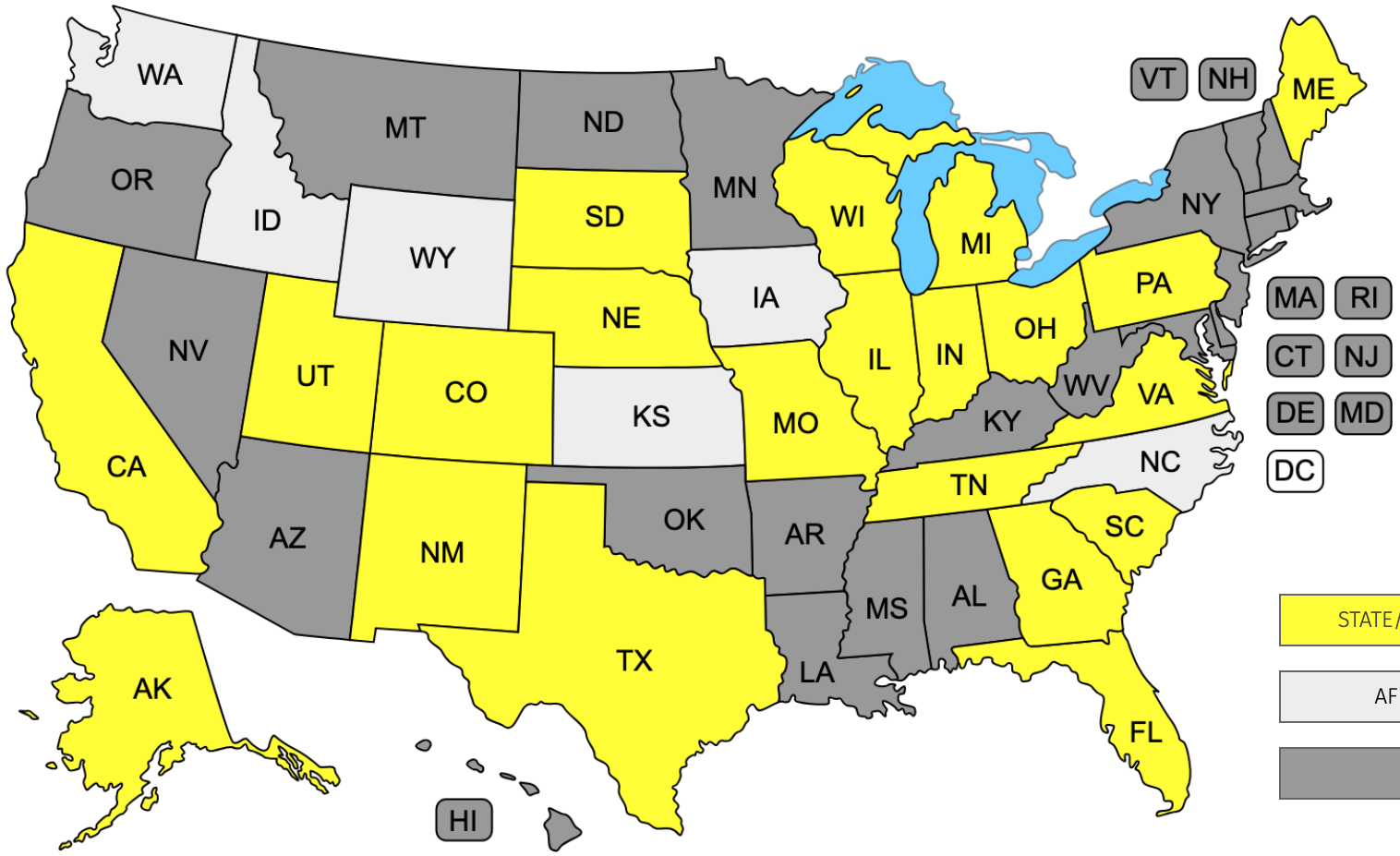
Each eye represents a total of 80 million people, the estimated number of Americans who will be 65 and older in 2050, the population most affected by these diseases.

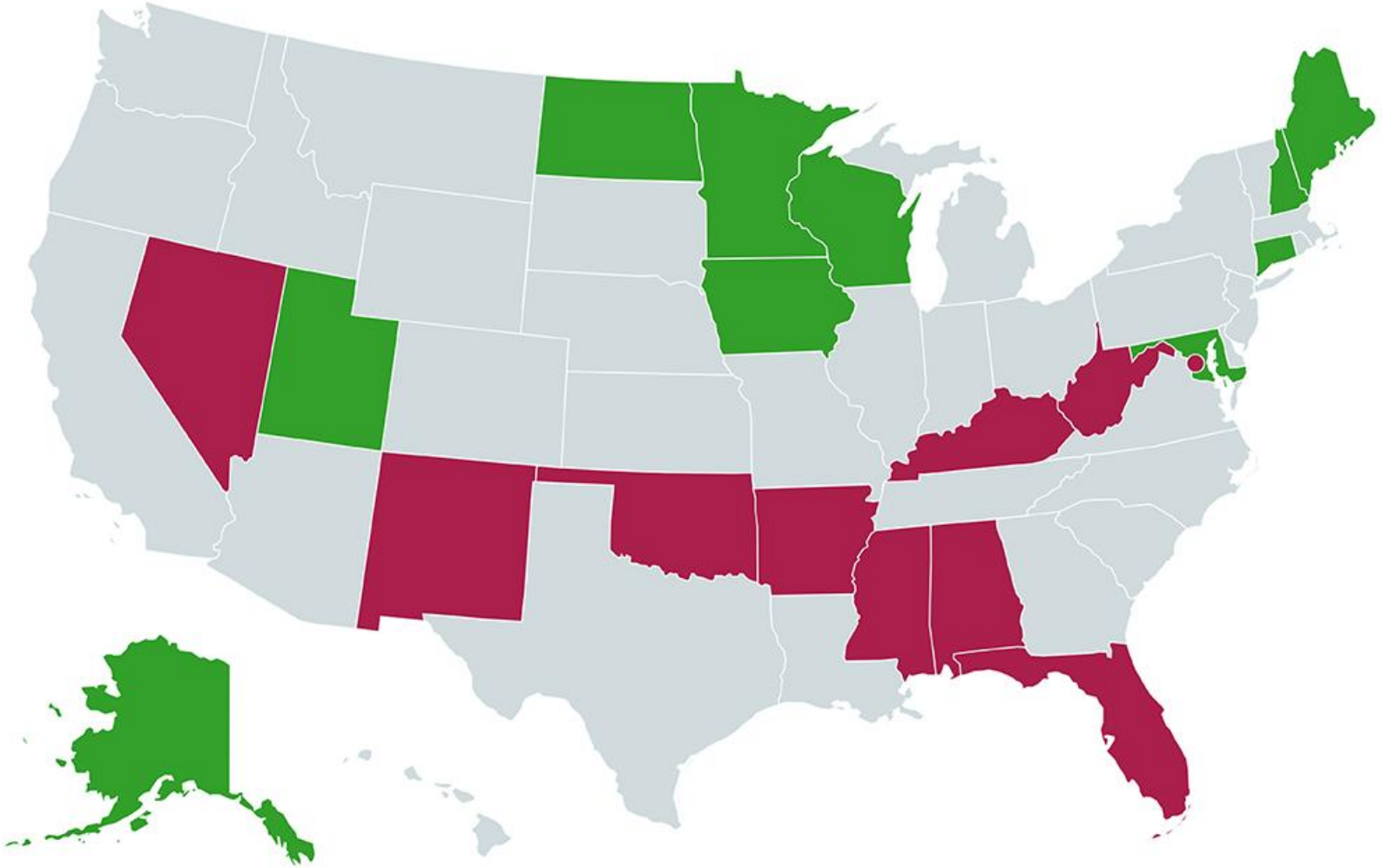
For more information on eye disease, visit **http://nei.nih.gov/health**.

NIH National Eye Institute



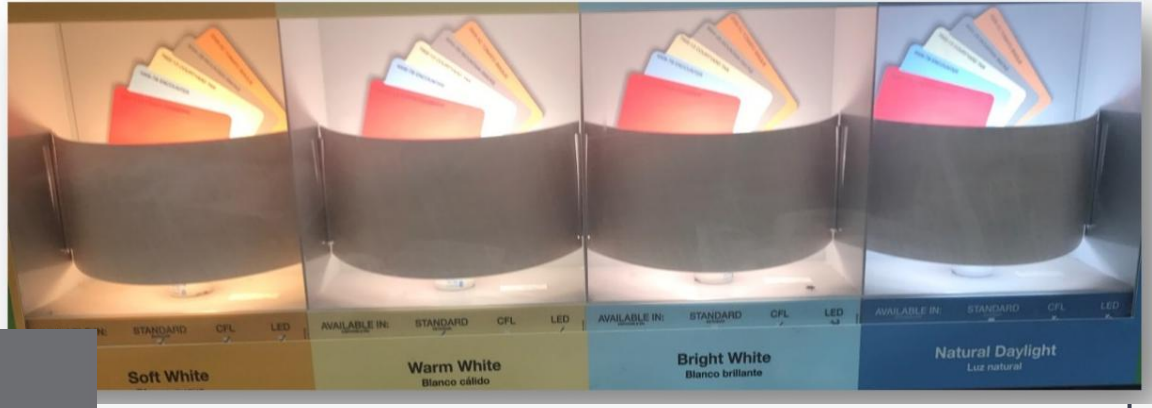
(Rowe, et al., 2019)


WA
OR
CA
ID
NV
MT
WY
UT
AZ
CO
NM
ND
SD
NE
KS
OK
TX
MN
IA
MO
AR
LA
WI
IL
MS
MI
IN
KY
TN
AL
OH
WV
GA
FL
SC
NC
VA
PA
NY
VT
NH
ME
MA
RI
CT
NJ
DE
MD
DC
AK
HI
STATE/REGIONAL PROJECT
AFFILIATE PROJECT
NO PROJECT



(Centers for Disease Control and Prevention, 2018)

Now for some strategies…



Not all light is created the same.

Contrast

Contrast

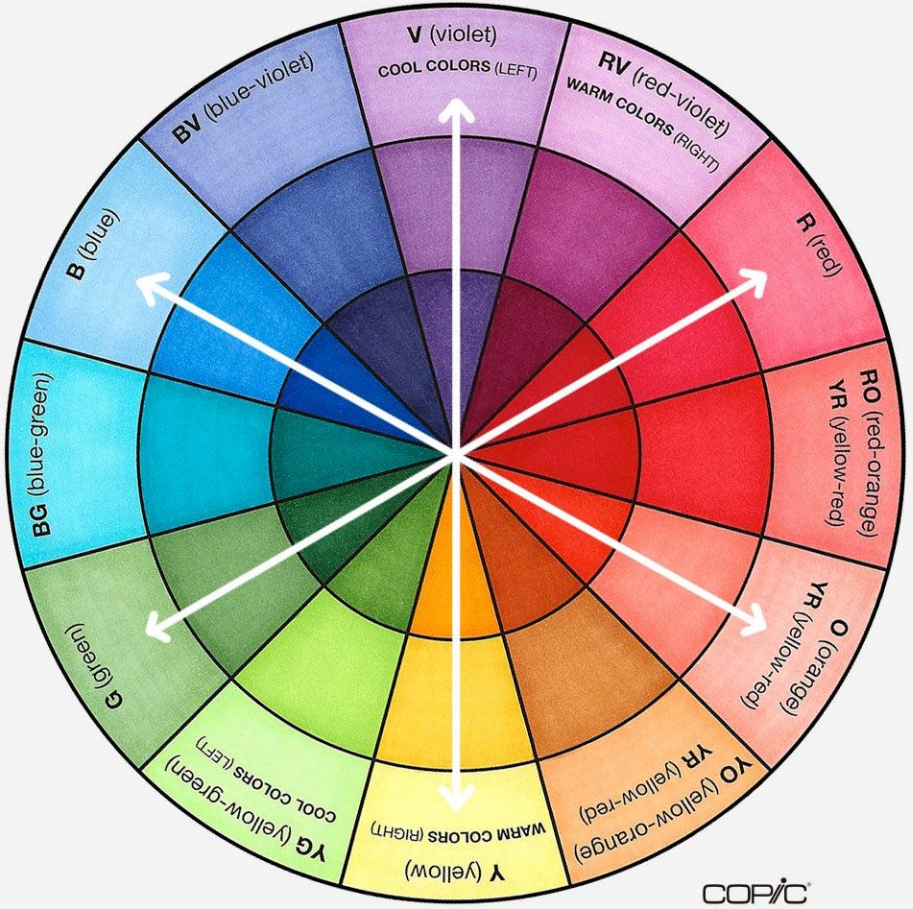
McClelland 2025

Complementary

Complementary colors are directly across from each other on the color wheel.

These can be any two colors, but it's most commonly seen between primaries and secondaries. Below are some examples in reference to Copic markers.

Blue and Orange	(B14, YR15)
Blue-Violet and Yellow-Orange	(BV13, Y35)
Violet and Yellow	(V05, Y17)
Red-Violet and Yellow-Green	(RV06, YG07)
Red and Green	(R43, G12)
Red-Orange and Blue-Green	(R05, BG05)



B	O
BV	YO
V	Y
RV	YG
R	G
RO	BG

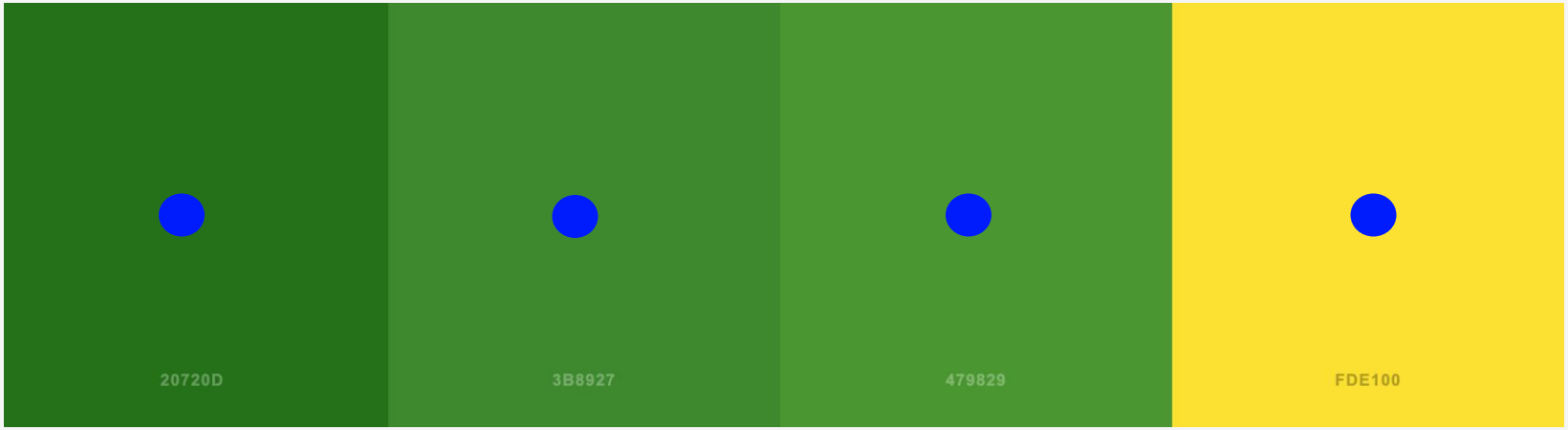
SchemeColor and Colorhexa

Very dark magenta

Dark magenta

Dark violet

Pure or mostly pure blue

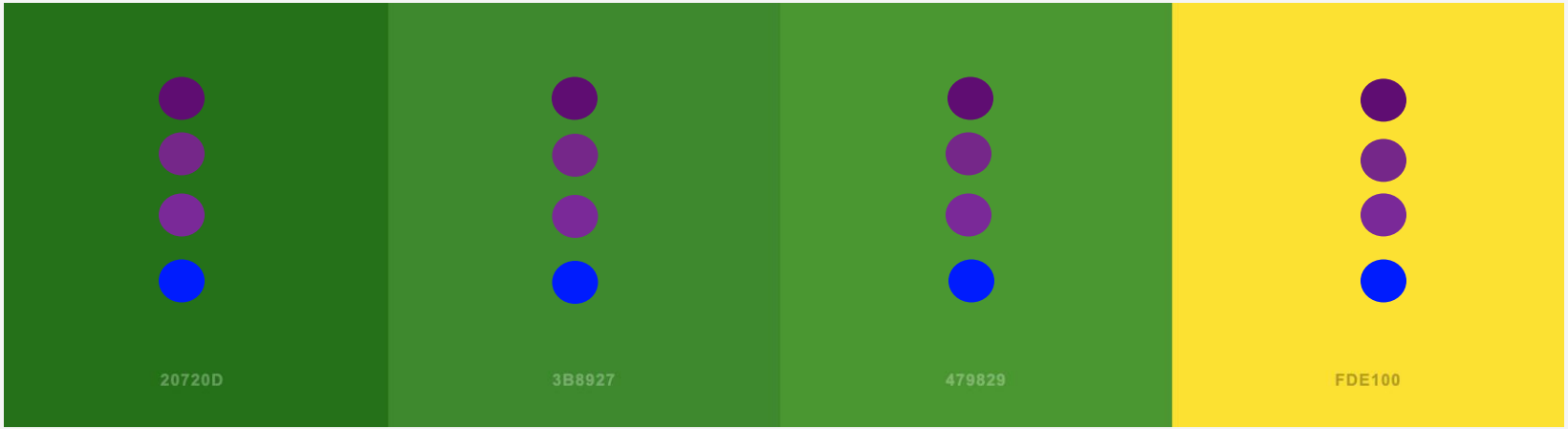


Very dark magenta

Dark magenta

Dark violet

Pure or mostly pure blue


20720D
3B8927
479829
FDE100

HALOS

Tactile Icon Stickers

KEYPAD

QR code description

HALOS

Tactile Icon Stickers

STARTS & STOPS

Start

Stop, Cancel

On/Off

Timer

Clock

QR code description

HALOS

Tactile Icon Stickers

COOKING

Bake, Roast

Broil

Convection

Warming

Defrost

Auto/Smart

Increase

Decrease

Power Level

Light

QR code description

HALOS

Tactile Icon Stickers

WASHING

Heavy Load

Normal Load

Light Load

Temperature

Hot

Medium

Cold

Auto/Smart

Rinse

Spin

MaxAid

St. Louis Society for the Blind and Visually Impaired

Anchors

When you’re reading this text, I want you to think about where your eye is catching. Did your eyes reach the red line yet?

Already being done

1.0	20/50	8 pt font	small column newsprint	Size
1.2	20/60	10 pt font	paperback books; newsprint	Size
1.3	20/65	12 pt font	Grade 4-7 children's books	Size
1.6	20/80	14 pt font	Grade 1-3 children's books	Size
2.0	20/100	16 pt font	computer display type	Size
2.15	20/108	18 pt font	Pre-K/K Children's books	Size
2.5	20/125	20 pt font	Books for ages 7-8	Size
3.0	20/150	24 pt font	Large Print Books	Size
4.0	20/200	33 pt font	Sub-headlines; children's books	Size
8.0	20/400	66 pt font	Newspaper headlines	Size

Credit: Teaching Students with VI

Colored Filters

- Can reduce glare.
- Heighten color discrimination.
- Reduce headache.

Visual Rehab

References

- Centers for Disease Control and Prevention. About Common Eye Disorders and Diseases. https://www.cdc.gov/vision-health/about-eye-disorders/index.html. Accessed March 1, 2025.
- Crews, J. E., Chou, C. F., Sekar, S., & Saaddine, J. B. (2017). The Prevalence of Chronic Conditions and Poor Health Among People With and Without Vision Impairment, Aged≥ 65 Years, 2010–2014. *American journal of ophthalmology*, *182*, 18-30.
- Fisher, D., Klein, B., Wong, T., Rotter, J., Li, X., Shrager, S., Burke, G., Klein, R., Cotch, M. (2016). Incidence of Age-Related Macular Degeneration in a Multi-Ethnic United States Population: The Multi-Ethnic Study of Atherosclerosis. *American Journal of Ophthalmology*, 123(6), 1297-308. doi: 10.1016/j.ophtha.2015.12.026.
- Paudel, N., Brady, L., Stratieva, P., Galvin, O., Lui, B., Vanden Brande, I., Malkowski, J., Rebeira, M., MacAllister, S., O'Riodran, T., Daly, A. (2024). Economic Burden of Late-Stage Age-Related Macular Degeneration in Bulgaria, Germany, and the US. *JAMA Ophthalmology*, 142(12), 1123–1130. doi:10.1001/jamaophthalmol.2024.4401

References Continued

- Siegfried, C., & Shui, Y,. (2022). Racial Disparities in Glaucoma: From Epidemiology to Pathophysiology. *Missouri Medicine,* 119(1), 49-54.
- Shan, S., Wu, J., Cao, J., Feng, Y., Zhou, J., Luo, Z., Song, P., Rudan, I. (2024). Global Health Epidemiology Research Group (GHERG). Global incidence and risk factors for glaucoma: A systematic review and meta-analysis of prospective studies. *Journal of Global Health,* 8(14), 1-14. doi: 10.7189/jogh.14.04252.
- Rowe, F. J., Hepworth, L. R., Howard, C., Hanna, K. L., Cheyne, C. P., & Currie J.(2019) High incidence and prevalence of visual problems after acute stroke: An epidemiology study with implications for service delivery. *PLoS One,* Mar 6;14(3):e0213035. doi: 10.1371/journal.pone.0213035.
- Wong, T., Klein, R., Islam, F., Cotch, M., Folsom, A., Klein, B., Sharrett, A., Shea, S. (2006). Diabetic retinopathy in a multi-ethnic cohort in the United States. *American Journal of Ophthalmology,* 141(3), 446-455. doi: 10.1016/j.ajo.2005.08.063.

slidesgo