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Future of Vision Treatment and Research

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- Grateful patients
- US Patent #10575723 (application #15/550,021) Larry Kagemann, Joel Schuman, Sayoko Moroi, U Pitt and U Michigan (initiated 5/29/2000; notification 2/12/2020)



Focus on Eye Health National Summit

AN EYE TO THE FUTURE

Topics

1. Telehealth options for glaucoma

Communities

Preparing for COVID-19

Healthcare professionals

- Develops guidance for healthcare professionals
- Conducts clinical outreach and education



Healthcare systems

- Develops preparedness checklists for health systems
- Provides guidance for PPE supply planning, healthcare system screening, and infection control
- Leverages existing telehealth tools to redirect persons to the right level of care



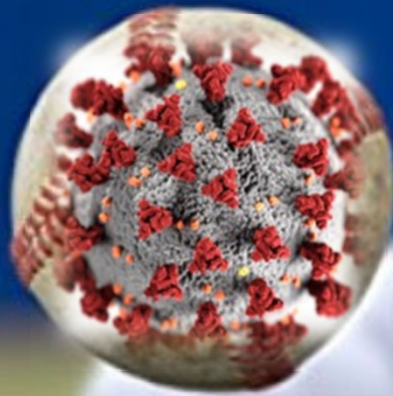
2. Vision parameters as markers for cognitive function in late mid-aged women



Image from:

<https://scopeblog.stanford.edu/2017/08/22/strong-association-found-between-vision-loss-and-cognitive-decline/>

Curveball



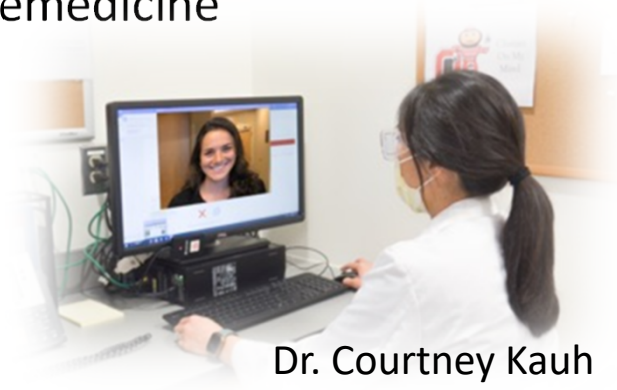


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1. Telehealth options (Telemedicine for Ophthalmology Info Statement, AAO 2018)

1. Live audio-video (synchronous) telemedicine



2. Store-and-forward (asynchronous) telemedicine



3. Remote physiological monitoring (RPM)



4. Mobile health (mHealth)



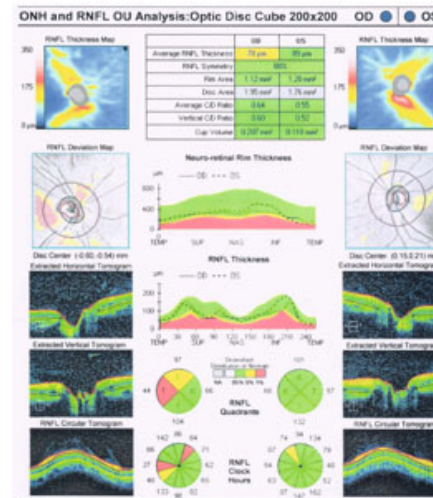
Hybrid telehealth appointments for glaucoma care:

Drive through IOP check

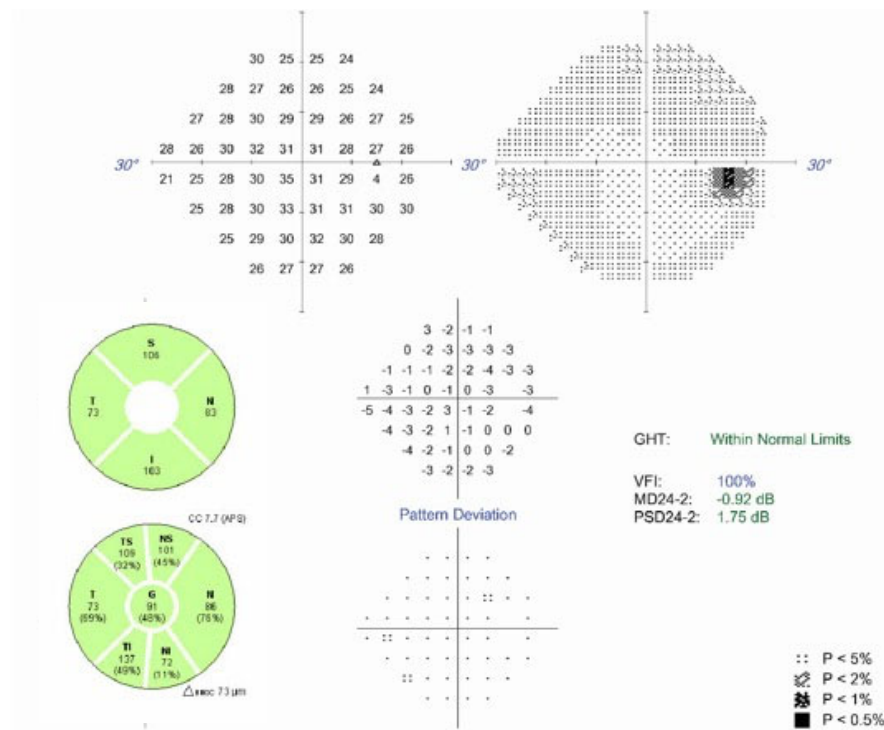
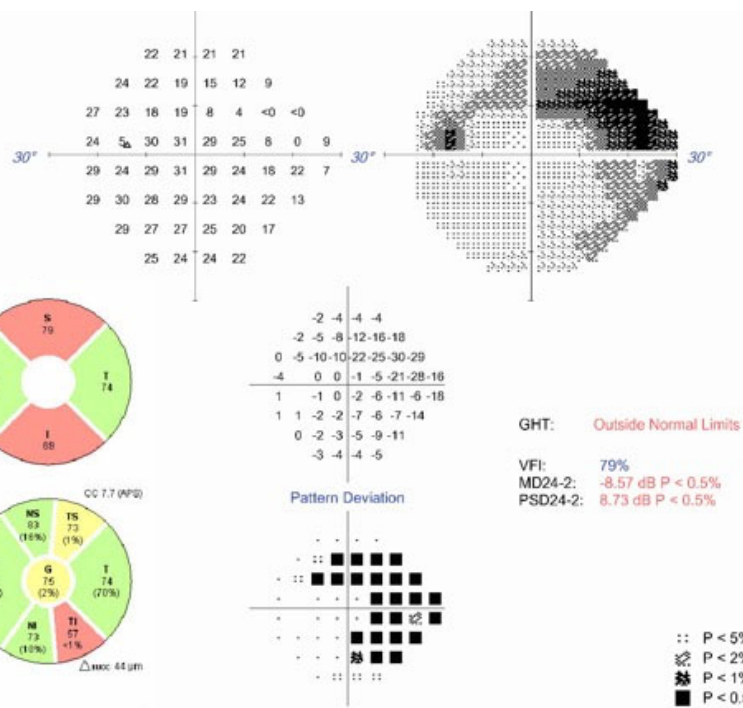


Dr. Shelly Jain & Amber

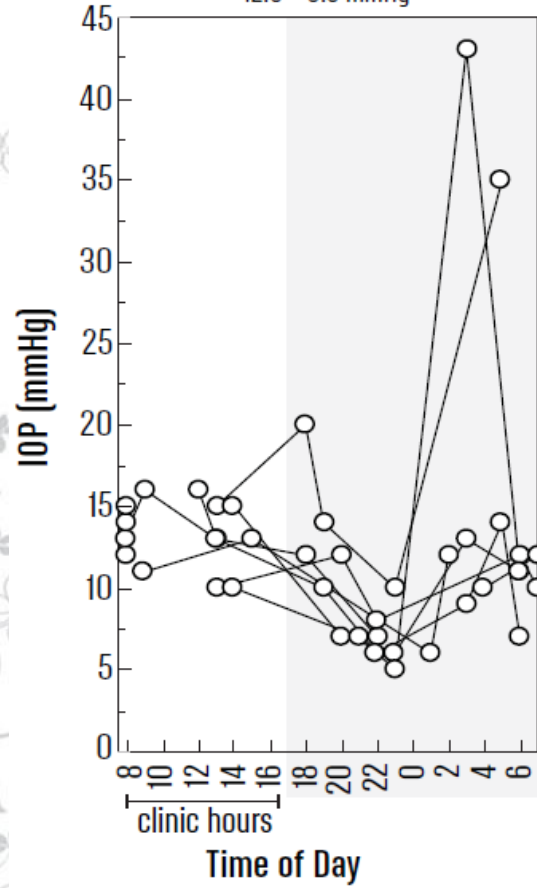
Testing appointment (vision, IOP, visual field and imaging) + live audio-video appointment



72 yo active general surgeon, progression OS. CCT 551 OD; 545 OS.
 IOPs 10-16 mmHg (fixed combo dorz+tim OU, travoprost OU).

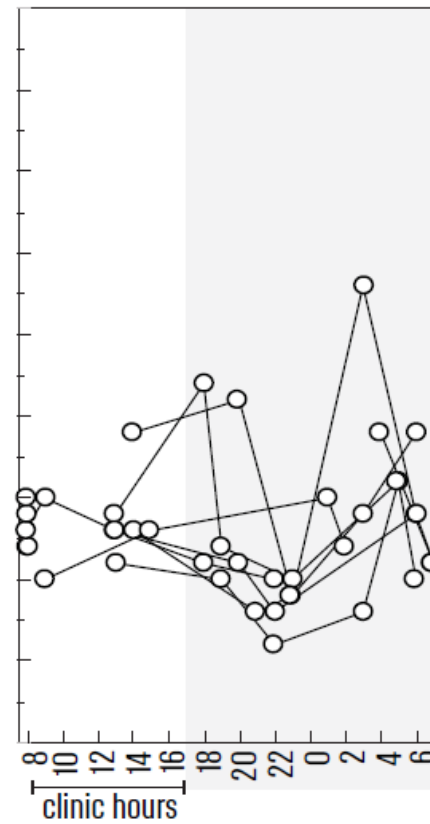


Brinzolamide + Brimonidine +
Latanoprostene Bunod
12.6 ± 6.9 mmHg



OS

Brinzolamide + Brimonidine +
Latanoprostene Bunod
13.2 ± 4.3 mmHg



OD



Telehealth in glaucoma management

Benefits:

- Decrease exposure times of patient and staff
- Acquire data (e.g., vision, IOP, imaging, visual field)
- Decrease wait times compared to in person office visits
- New technologies to acquire data

Limitations:

- Requires specific technology equipment
- Requires minimum broad band access
- Expense of equipment
- Impact on doctor-patient relationship (?)
- Learning curve for patients, staff, health systems, insurance coverage





2. Vision parameters as markers for cognitive function in late mid-aged women

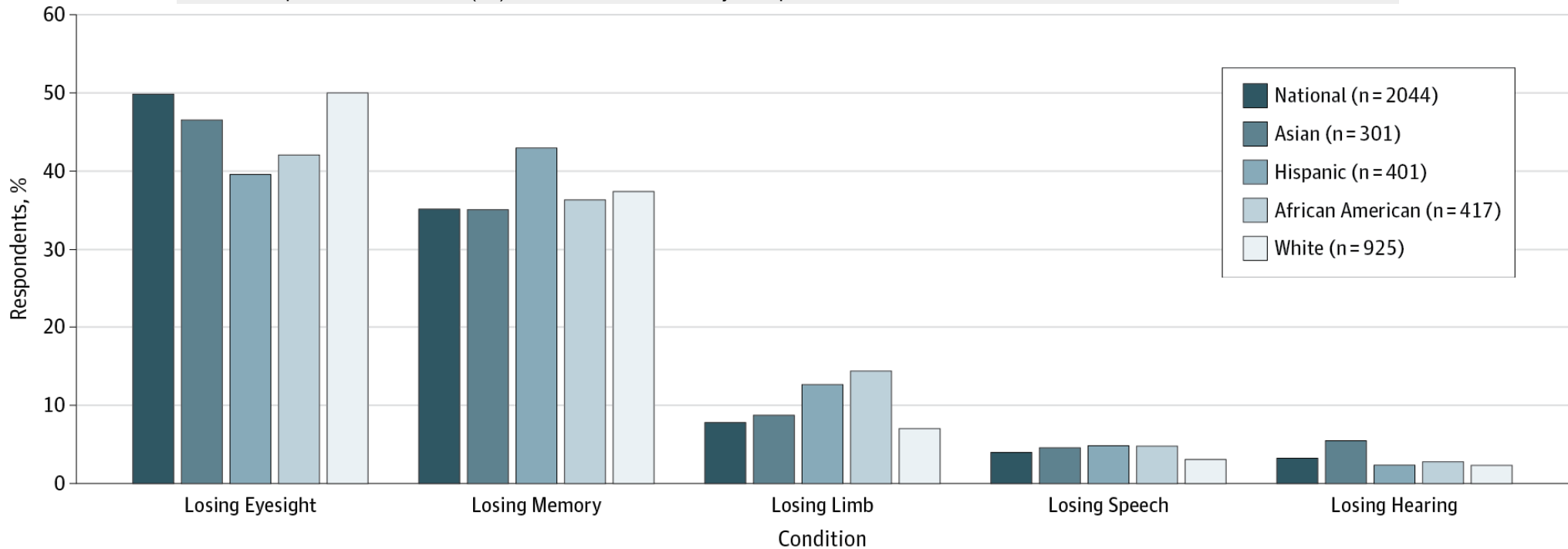


Image from:
<https://scopeblog.stanford.edu/2017/08/22/strong-association-found-between-vision-loss-and-cognitive-decline/>



From: **Public Attitudes About Eye and Vision Health**

JAMA Ophthalmol. 2016;134(10):1111-1118. doi:10.1001/jamaophthalmol.2016.2627



Conditions With the Greatest Effect on Day-to-Day Life (Zogby Analytics conducted survey.
 Funding: Research to Prevent Blindness, Alliance for Eye and Vision Research

Evidence of vision impairment and cognitive decline

Tran EM, et al. JAMA Ophthal 138(6):624, 2020

Key Points

Question Is visual impairment associated with women's risk for developing dementia?

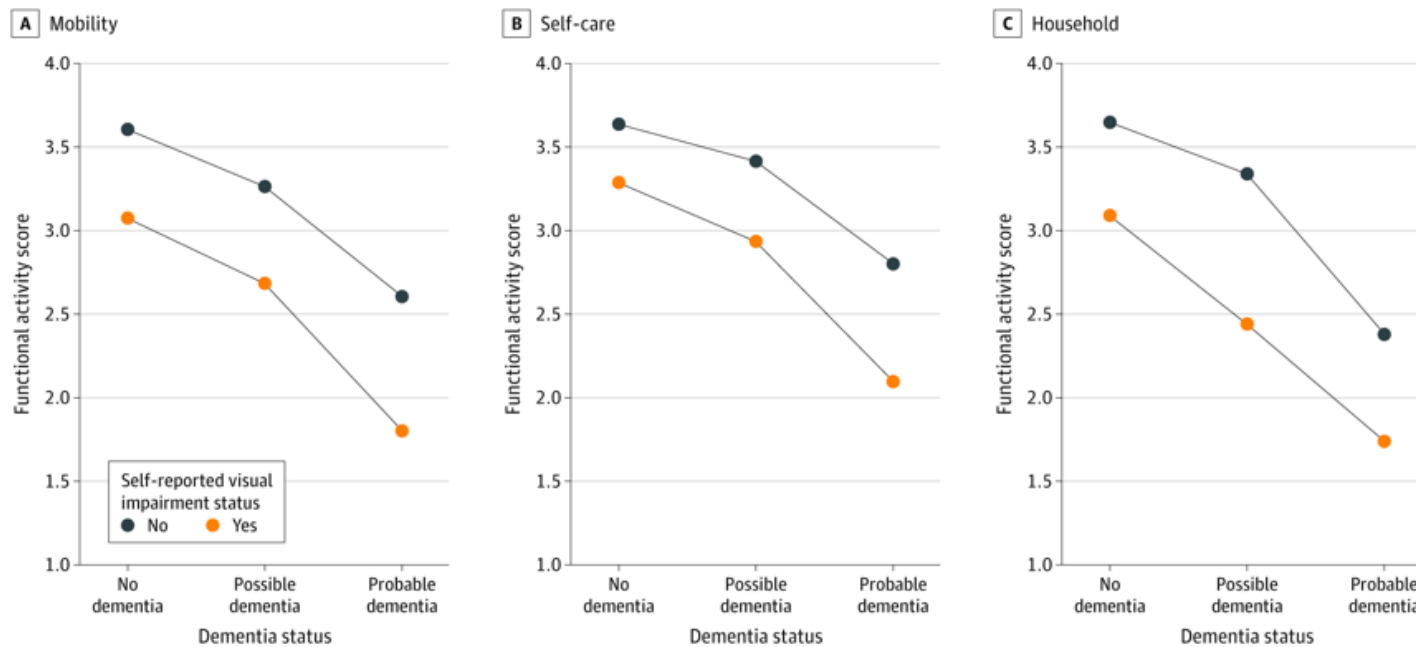
Findings In this cohort study of 1061 older women, baseline objectively measured visual impairment was associated with a 2- to 5-fold increased risk of dementia over a median 3.8 years of follow-up; 3.1% of participants without objective visual impairment developed dementia vs 8.2% of those with visual acuity of 20/40 or worse. More severe visual impairment was associated with increasingly elevated risk of incident dementia.

Meaning These results suggest that visual impairment may be a risk factor for dementia; findings are limited by sample size, and more research is needed in a larger population.



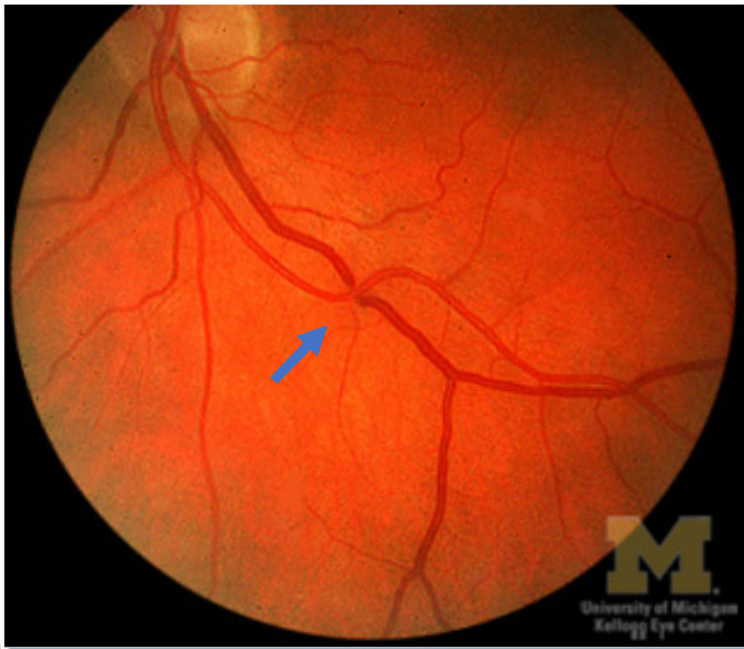
From: **Association of Co-occurring Dementia and Self-reported Visual Impairment With Activity Limitations in Older Adults**

JAMA Ophthalmol. 2020;138(7):756-763. doi:10.1001/jamaophthalmol.2020.1562



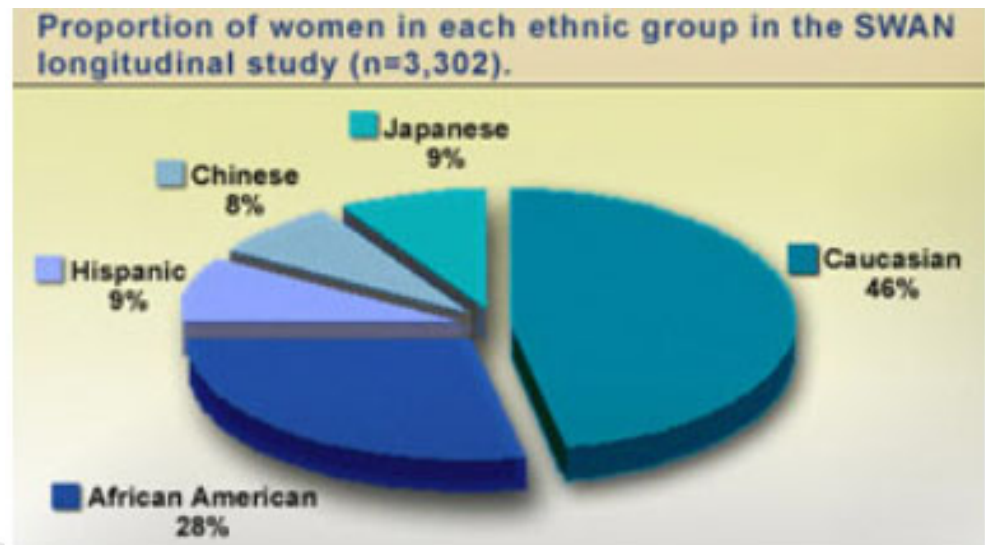
Interactions Between Dementia and Self-reported Vision Impairment in Anticipating Activity Limitations Functional ability scores correspond to the marginal predicted proportions from multivariable Poisson regression models. The marginal predicted proportions were divided by the number of survey items making up each of the 3 outcomes to make the scale equivalent across outcomes.

Question: Is hypertensive retinopathy associated with cognitive function?

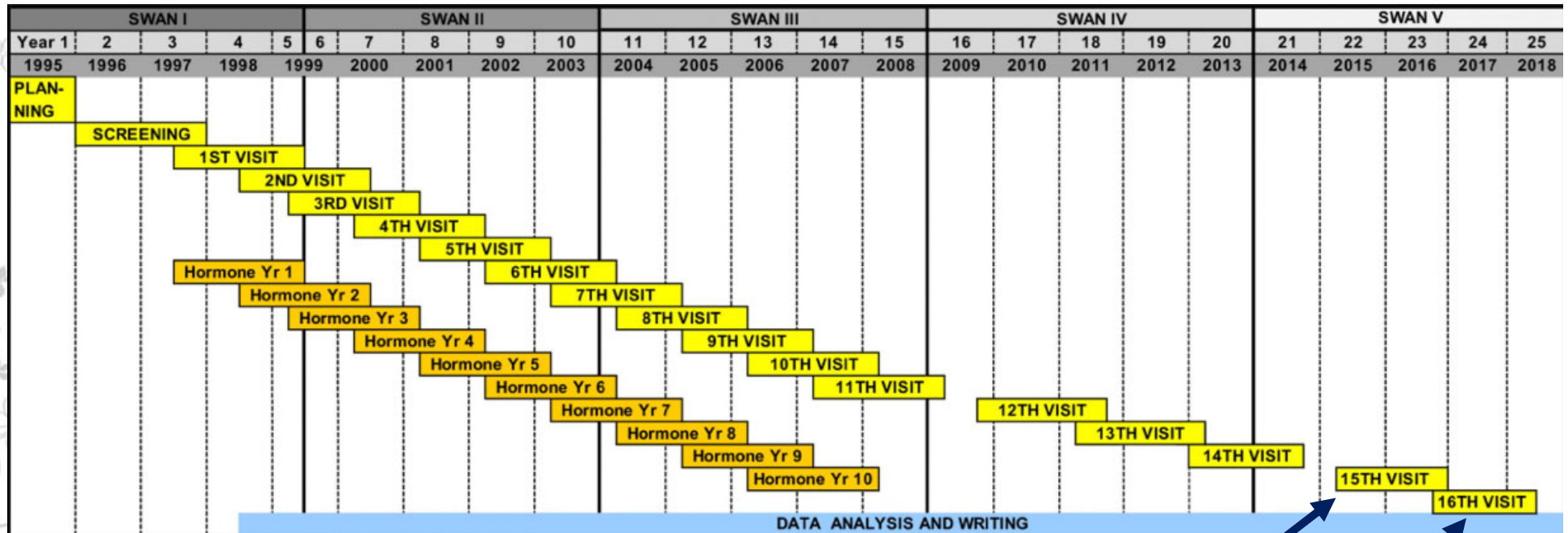


What is SWAN?

- Multi-site, longitudinal study to examine women's health during the middle years
- Age at recruitment 42 – 52 years
- Parameters: physical, biological, psychological and social changes
- University of Michigan studied vision as an ancillary parameter



SWAN Study Timeline



Cognitive tests
Age 64.9 ± 2.7

Eye exams
Age 66.0 ± 2.7



Methods

Cognitive tests on Visit 15

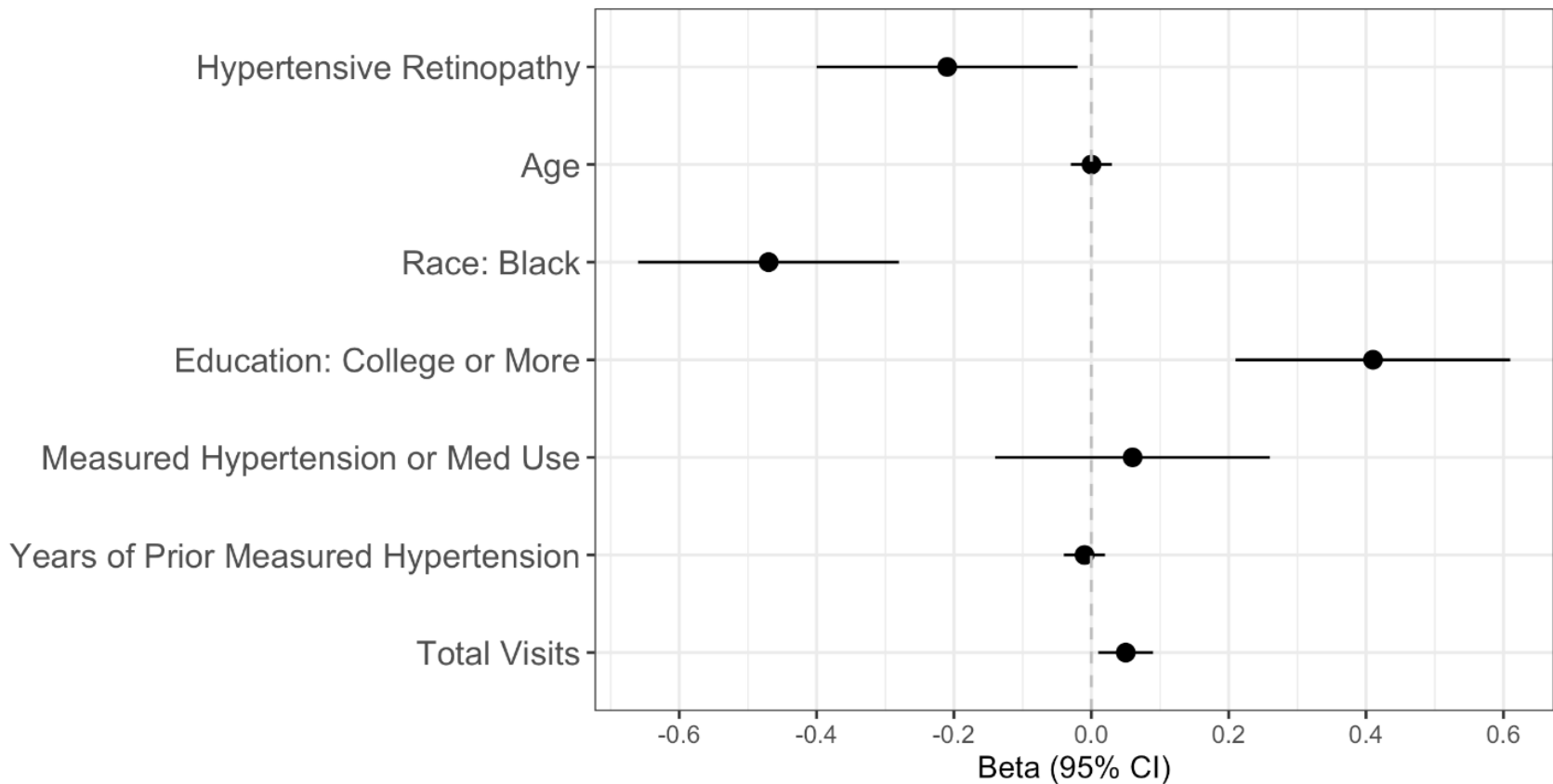
- East Boston Memory Test = assessment of verbal episodic memory immediately and after 10-minute delay
- Digit span backwards = assessment of working memory
- Symbol digits modalities test = assessment of memory by attention, perceptual speed, motor speed, and visual scanning (limitation as depends on vision)

Ophthalmologic exam (Visit 16) to assess:

- Refractive error
- Dry eye
- Cataract
- Glaucoma
- Diabetic retinopathy
- Hypertensive retinopathy
- Macular degeneration
- Other



Results: Forest plot of cognitive z-score



Interpretation: Hypertensive (HTN) retinopathy was associated with lower cognitive scores while adjusting for demographics, education, systemic HTN, use of blood pressure meds, and study visit.



Sierra C. Frontiers in Cardiovasc Med 7(5). 2020

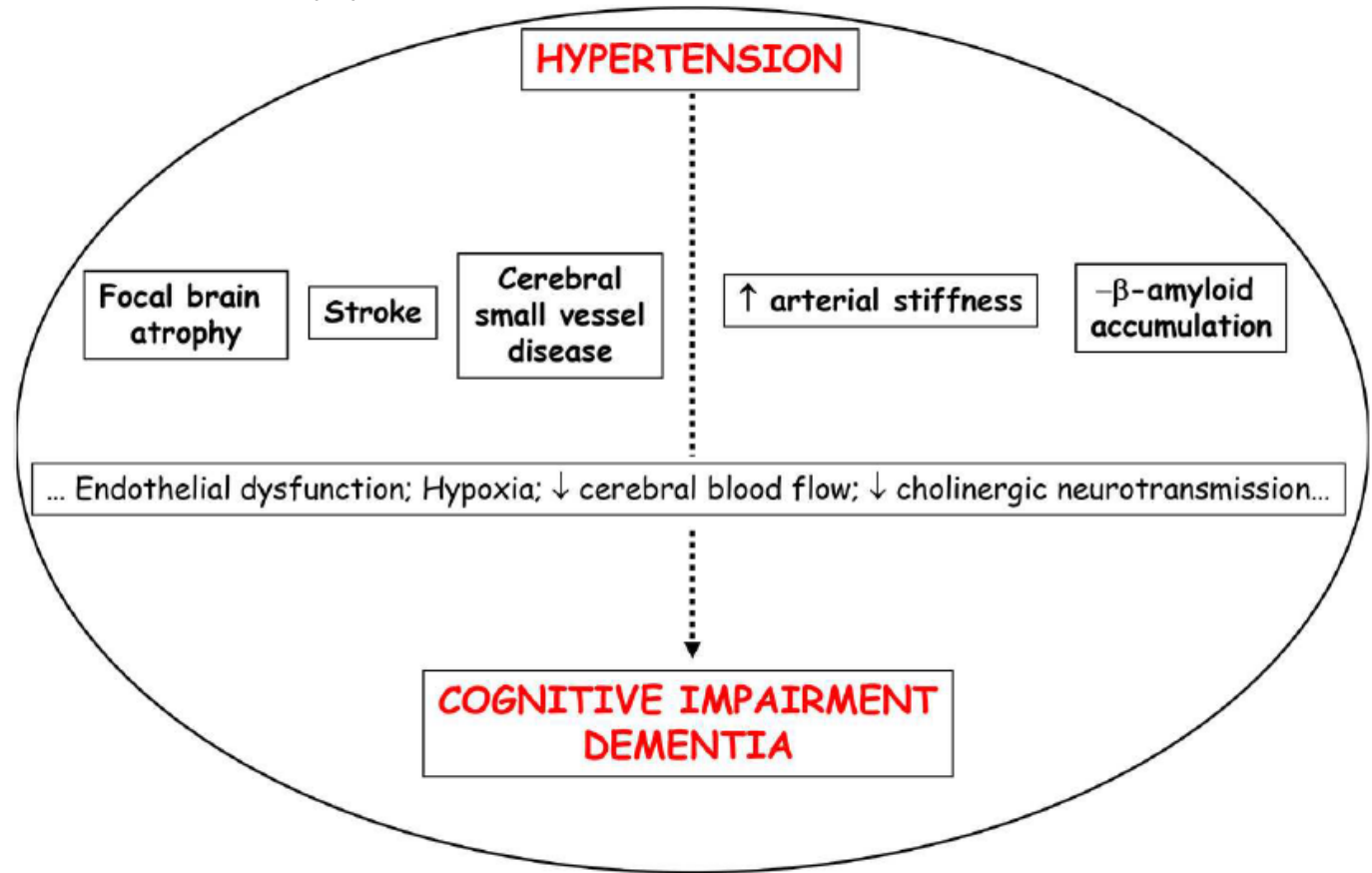
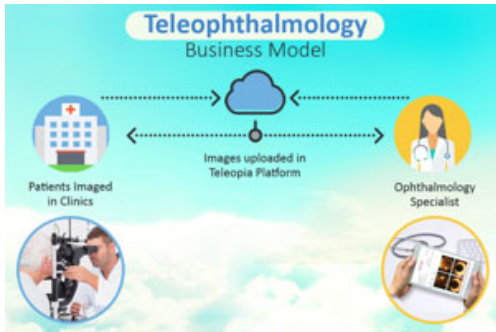


FIGURE 1 | Possible mechanisms that can explain the association between hypertension and cognitive impairment/dementia.



Conclusions from topic #1 & #2



is here to stay



potential patient-centered glaucoma assessment



research to discover vision and eye biomarkers for memory decline and dementia

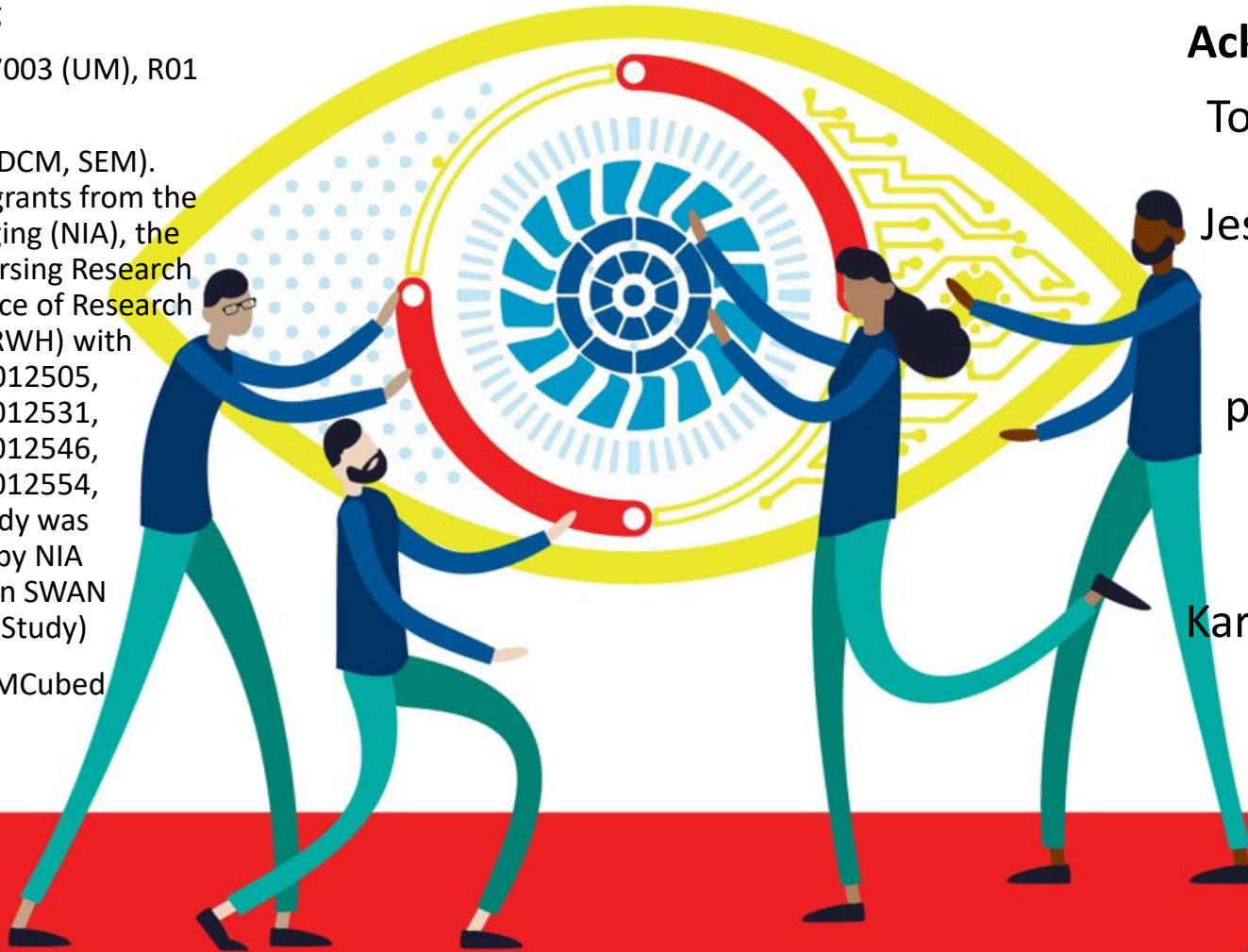
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Topic 2: SWAN project with Sarah Wood, Michelle Hood, Joshua Ehrlich, Carrie Karvonen-Gutierrez, Brenda Gillespie, David Musch



Thank you



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Submit Your Questions Through

