

Vision impairment and access to eye care

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Objectives

- Discuss leveraging national surveys to examine eyecare use
- Understand intersectional disparities for people with VI
- Discuss opportunities for improving access

JAMA Ophthalmology | Original Investigation

Trends in Eye Care Use and Eyeglasses Affordability

The US National Health Interview Survey, 2008-2016

Varshini Varadaraj, MD; Kevin D. Frick, PhD; Jinan B. Saaddine, MD;
David S. Friedman, MD; Bonnielin K. Swenor, PhD



N=21,781 to 36,697 per year
2008-2016
Adults 18+
National Sample



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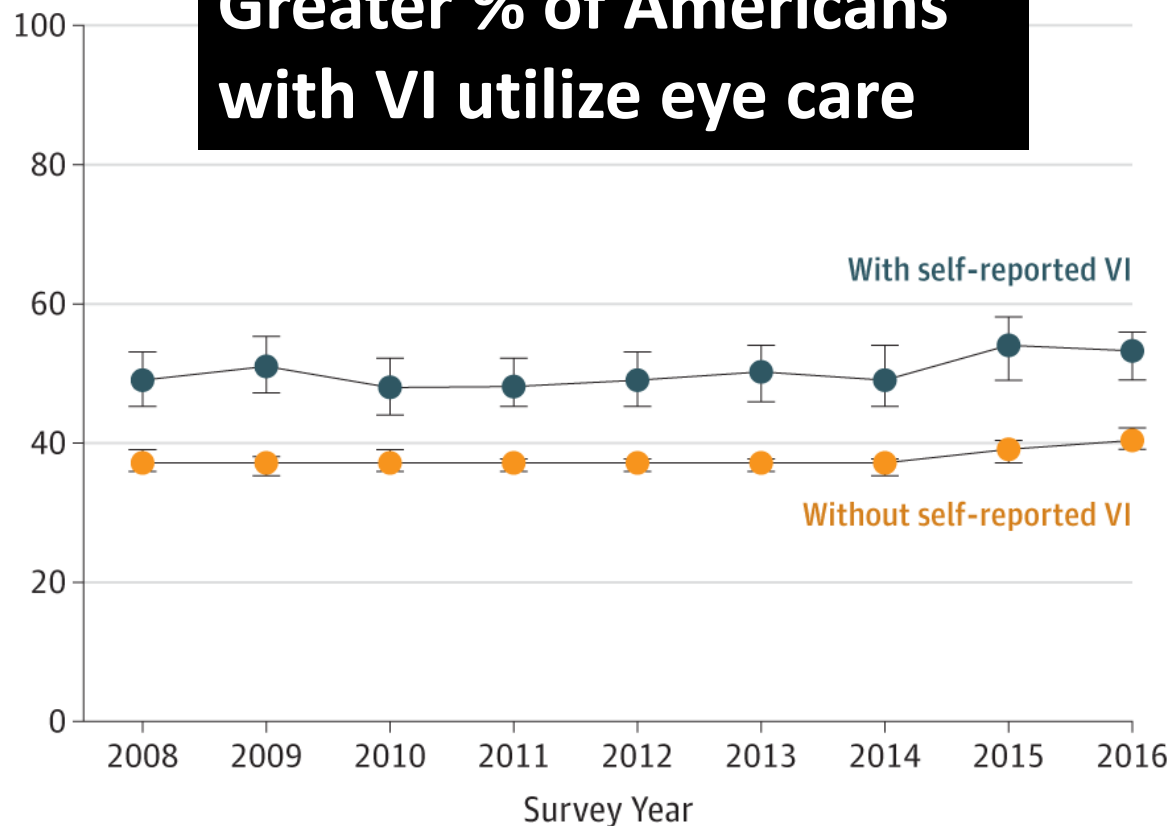
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A Use of eye care

Greater % of Americans with VI utilize eye care

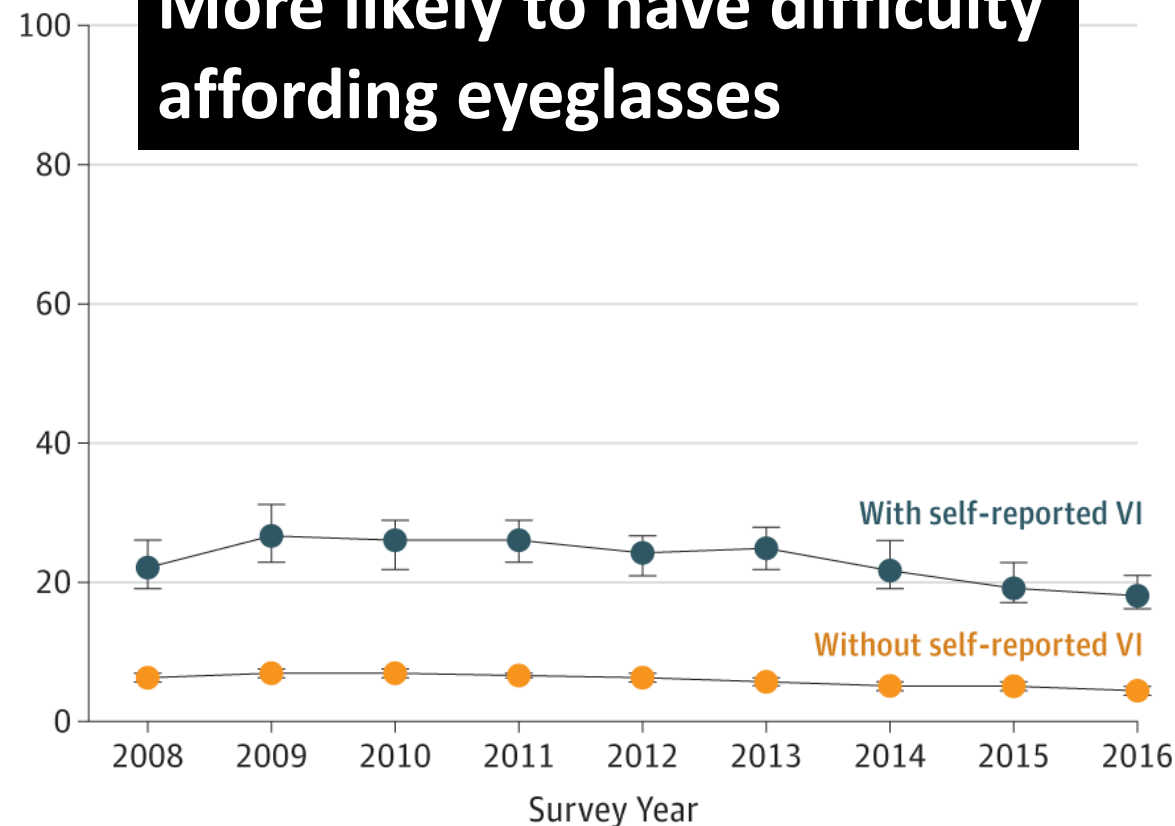
US Population That Used Eye Care, %



B Difficulty affording

More likely to have difficulty affording eyeglasses

US Population Reporting Difficulty Affording Eyeglasses, %



Intersectional disparities exist



	Eyecare Visit, OR	Difficulty Affording glasses, OR
VI vs. no VI	1.54	3.86
Female vs. Male	1.42	1.68
Black vs. White	0.87	0.86
Asian vs. White	0.82	0.68
Hispanic vs. White	0.81	0.96

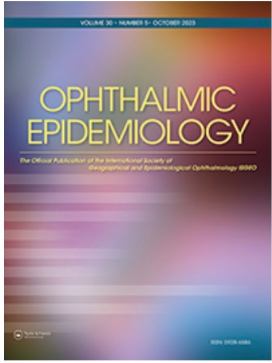
Adjusted for year, VI, age, sex, race/ethnicity, education, poverty-income ratio, general health, and vision insurance.

P<0.001 for all



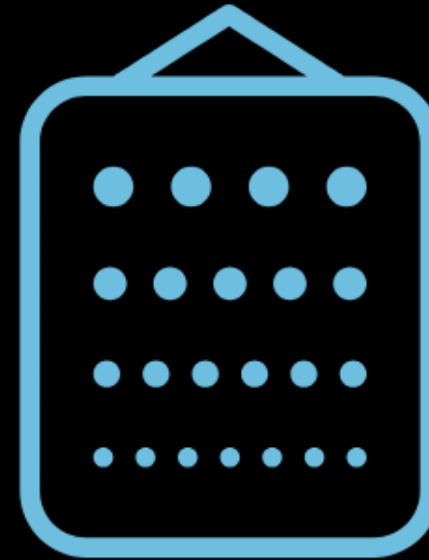
- Marginalized populations face difficulties with using and/or affording eyecare
- Focus healthcare priorities on expanding availability and accessibility
- Making them more affordable to the most vulnerable





Disparities in Eye Care Utilization by Self-Reported Vision Difficulty and Diabetes Status in the United States

Jessica Brinson, Priyanka Kumar, Jiangxia Wang, Varshini Varadaraj, Bonnielin K. Swenor & Adrienne W. Scott



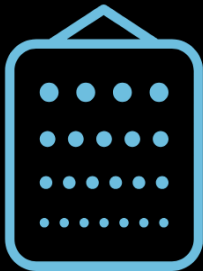
N=284,599
Years 2010-2018
Adults 18+
National Sample



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Most eyecare use among adults with diabetes and VI



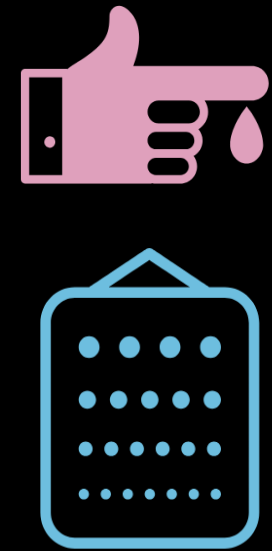
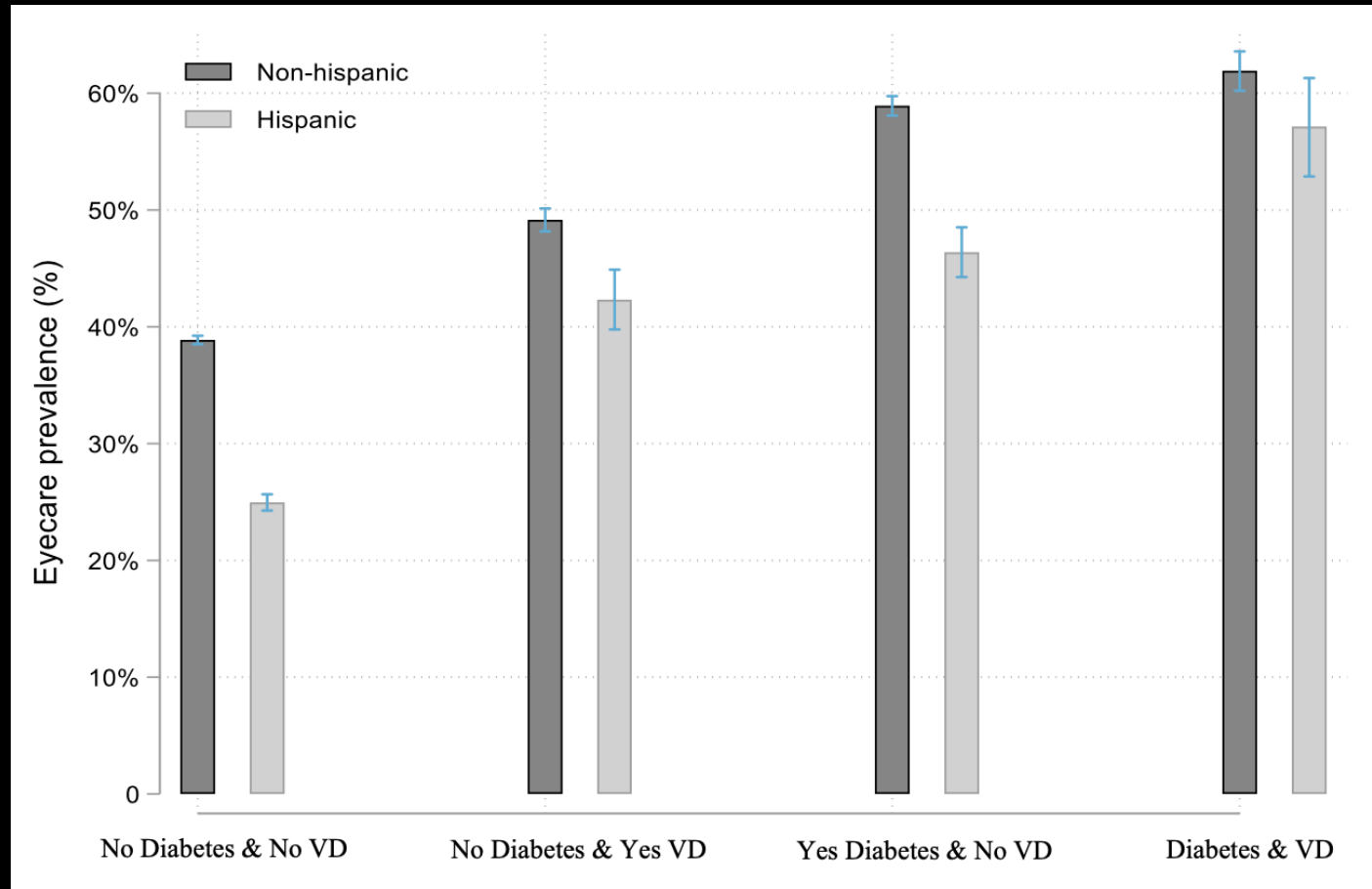
	Eyecare Use, OR
No diabetes & no VI	Ref
Diabetes & no VI	1.92
VI & No diabetes	1.57
Diabetes & VI	2.49

Adjusted for age,
ethnicity, education, PIR,
insurance, year##region,
diabetes##region, and
diabetes##race

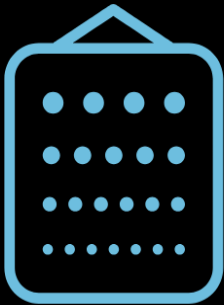
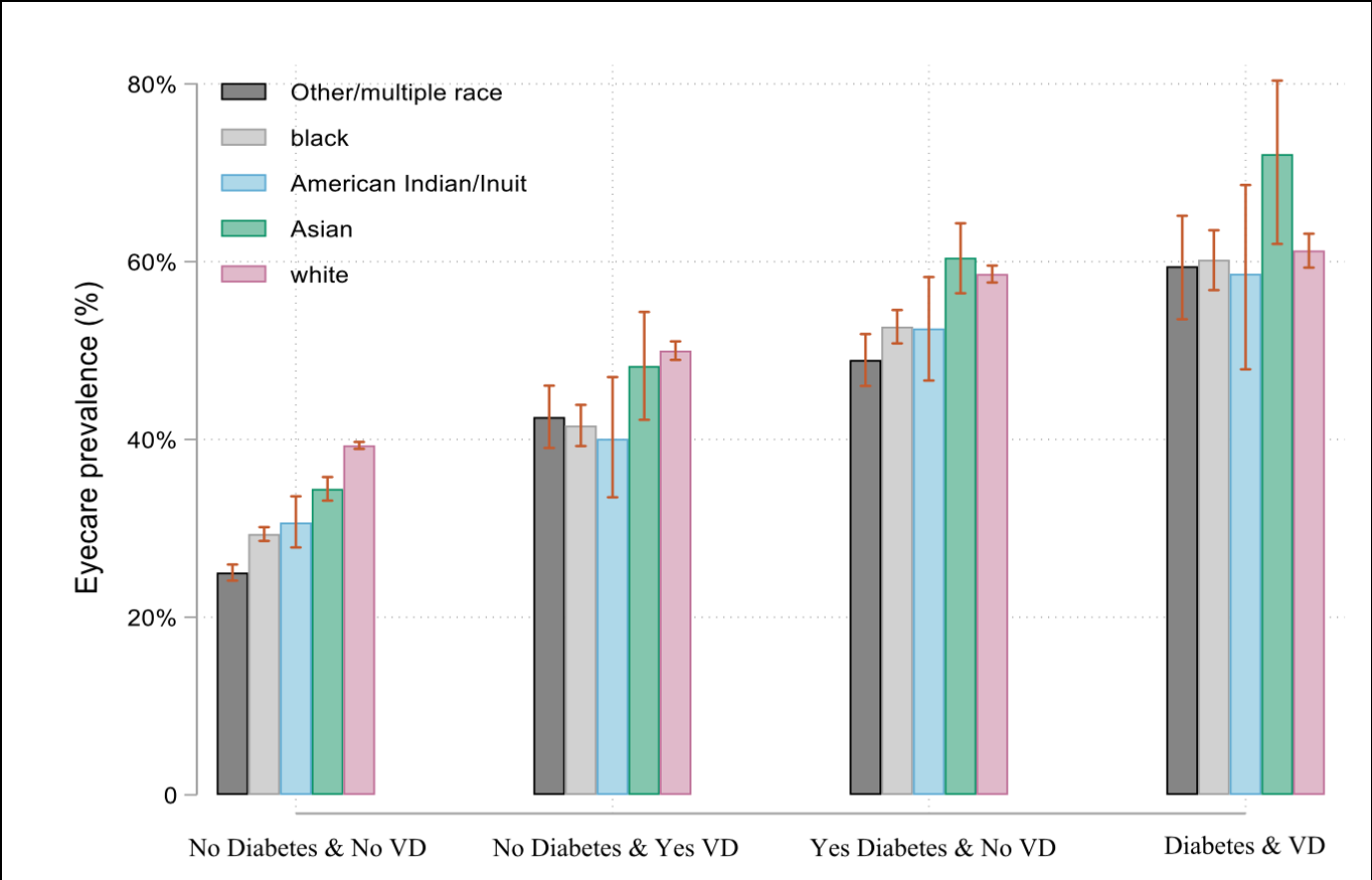
P<0.001 for all

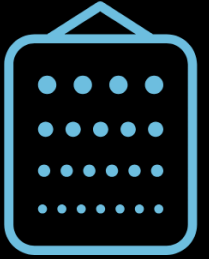


49% of non-Hispanic adults with only VI used eyecare vs.
42% of Hispanic adults with only VI



42% of Black & Other race with only VI used eyecare vs. 50% of White adults with VI





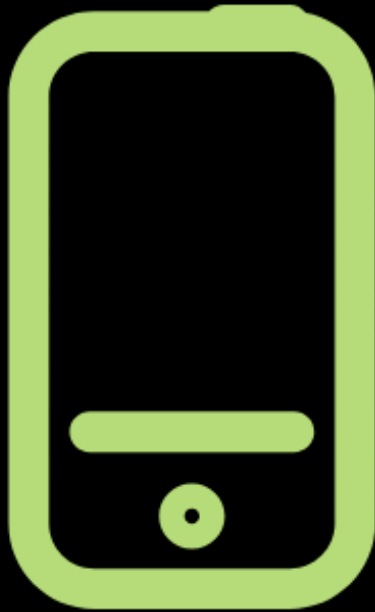
- Adults with diabetes have higher eyecare use than adults without
- Differences by race and ethnicity
- Need to continue to train eye care professionals
- Facilitate access to eye care resources and health literacy
- Understand disparities in eyecare use based on social determinants of health



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Digital Technology Use Among Older Adults With Vision Impairment

Jonathan Thomas, BS; Louay Almidani, MD, MSc; Bonnielin K. Swenor, PhD, MPH; Varshini Varadaraj, MD, MPH



2833 Older Adults 65+
Year 2021
National Sample



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Older adults with VI have lower digital technology ownership and knowledge

Technology Use	OR
Cellphone	0.58
Computer	0.61
Tablet	0.68
Send emails/texts	0.58
Goes online besides email/text	0.64



Adjusted for age, race, gender, education, living arrangements, and comorbidities.

P<0.01 for all



- Expansion of telemedicine to reduce in-person barriers
- Older adults with VI need to be equipped with the proper technology and skillset
- Identify those who may lack digital technology access
- Develop strategies to improve telemedicine accessibility

JAMA Ophthalmology | **Original Investigation**

Comparison of Access to Eye Care Appointments Between Patients With Medicaid and Those With Private Health Care Insurance

Yoon H. Lee, BS; Andrew X. Chen, BS; Varshini Varadaraj, MBBS, MPH; Gloria H. Hong, BA; Yimin Chen, BS; David S. Friedman, MD, PhD;
Joshua D. Stein, MD, MS; Nicholas Kourgialis, MA; Joshua R. Ehrlich, MD, MPH

330 eyecare professionals
Maryland and Michigan
Year 2017



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Eye appointments offered more often to Private insurance holders

	Medicaid	Private
Adults	62%	79%
Children	45%	63%

P<0.01 for both



Medicaid holders 60% less likely to get an eye appointment

OR

BCBS

Ref

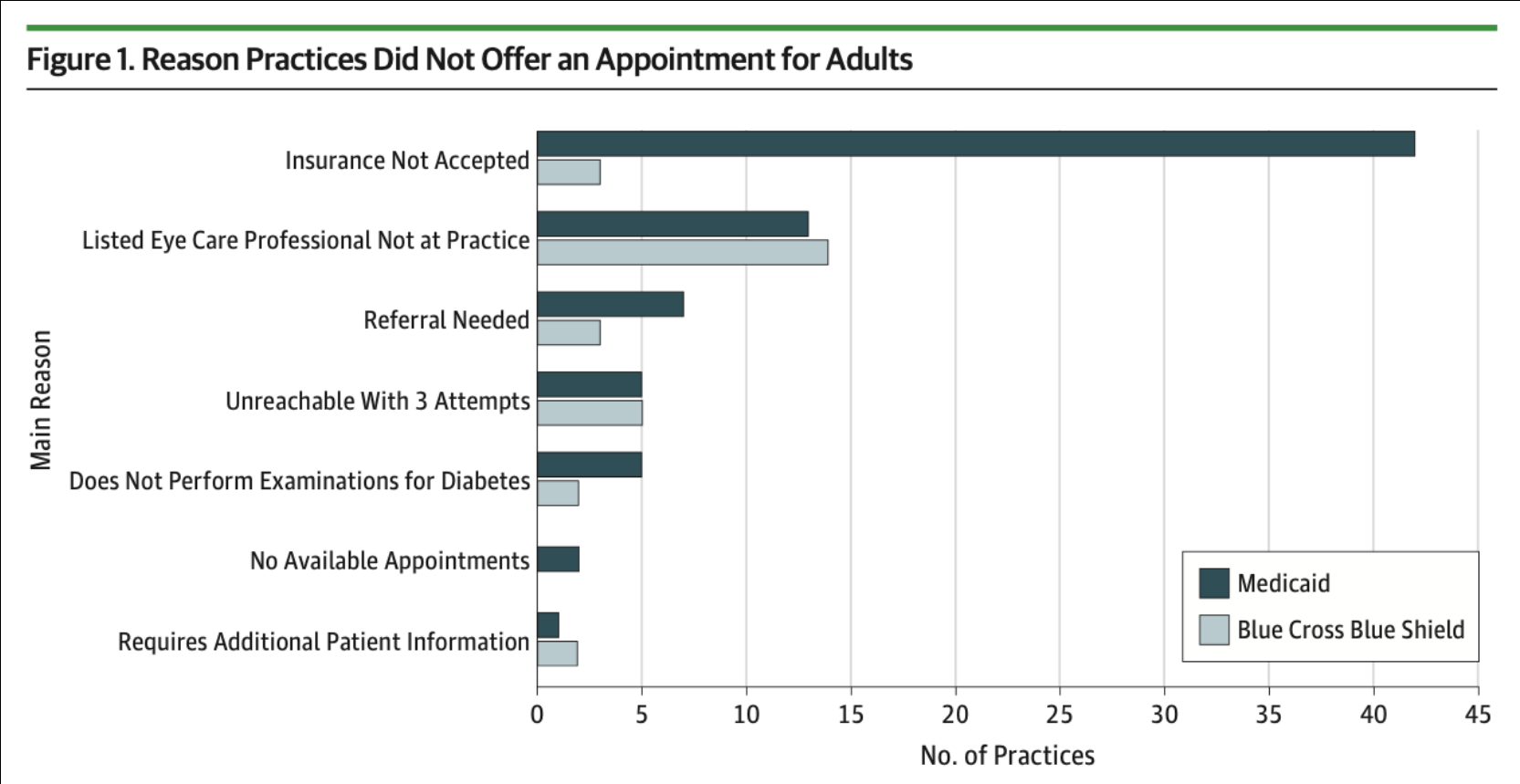
Medicaid 0.41

$P < .001$

Adjusted for professional type (ophthalmologist vs optometrist), sex of professional, state, neighborhood type, county-level household income and proportion of minority race/ethnicity.



Medicaid often not accepted at eyecare offices and more likely to need a referral



Lee YH et al. Comparison of Access to Eye Care Appointments Between Patients with Medicaid and Those with Private Health Care Insurance. *JAMA Oph* (2018)



- Difficulty obtaining appointments may explain lower rates of use of recommended eye care services among those with Medicaid.
- Policy change to incentivize eye care professionals to care for patients with Medicaid could help to improve access.
- Accessible and centralized resource with information about insurance plans that eye care professionals accept may help.



There's a need for Innovative Solutions



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**Autorefractive-Based
Prescription and Mailed Delivery
of Eyeglasses**

PRATEEK GAJWANI, MS*
VARSHINI VARADARAJ, MBBS, MPH*
WILLIAM PLUM, BS
DI ZHAO, PhD
EGWUONWU JOHNSON, BS
NICCOLO DOSTO, BS
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DAVID S. FRIEDMAN, MD, PhD†
LUCY I. MUDIE, MBBS, MPH†



Sample from a community-based program aimed at streamlining
screening approaches for glaucoma in Baltimore

N=55

Year 2016

Adults 40+

Community-based



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85% were extremely satisfied and 92% were extremely or moderately satisfied with the mailed eyeglasses

Patient Satisfaction	Extremely Satisfied	Moderately Satisfied	Neutral	Moderately Dissatisfied	Extremely Dissatisfied
Overall satisfaction with glasses	33 (84.6)	3 (7.7)	2 (5.1)	1 (2.6)	0
Satisfaction with quality and variety of frames	34 (87.2)	2 (5.1)	2 (5.1)	1 (2.6)	0
Satisfaction with frame fit	35 (89.7)	2 (5.1)	2 (5.1)	0	0
	Strongly Agreed	Somewhat Agreed	Neutral	Somewhat Disagreed	Strongly Disagreed
Preferred this method of spectacle delivery to traditional store pick-up	33 (84.6)	2 (5.1)	3 (7.7)	1 (2.6)	0
Believed vision was improved with glasses	35 (89.7)	2 (5.1)	1 (2.6)	1 (2.6)	0
Total number of patients, 39. Data are number (%).					

Evaluation of Tablet-Based Tests of Visual Acuity and Contrast Sensitivity in Older Adults

Varshini Varadaraj ^a, Lama Assi^a, Prateek Gajwani^a, Madison Wahl^a, Jenina David^a, Bonnielin K. Swenor ^a, and Joshua R. Ehrlich ^{b,c}



N=82

Year 2020

Adults 55+

Clinic-based sample

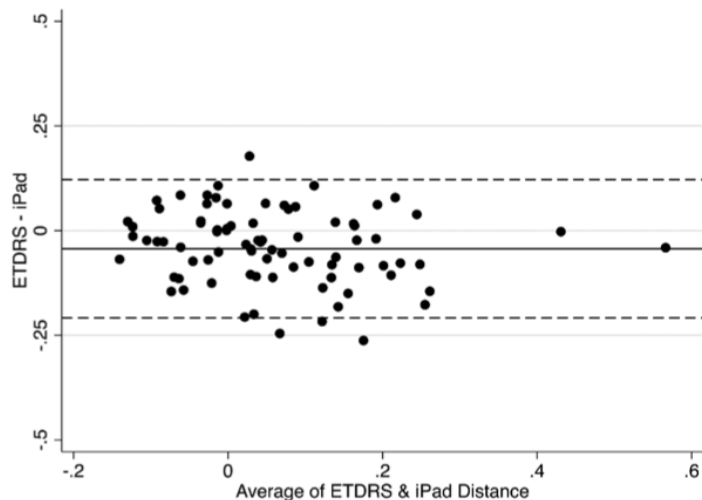


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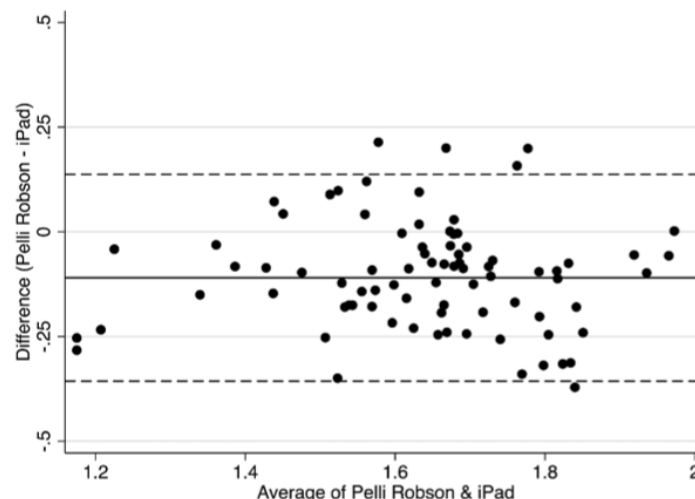
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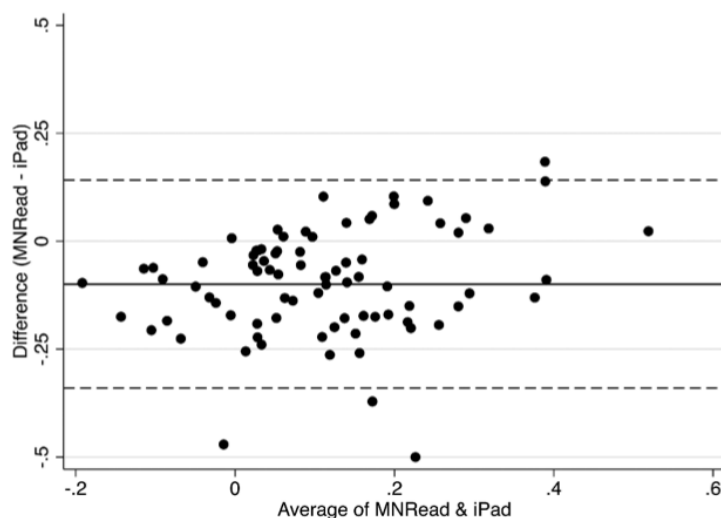
a. Bland Altman Plot for Distance Visual Acuity



b. Bland Altman Plot for Contrast Sensitivity



c. Bland Altman Plot for Near acuity



- Strong Correlation and good agreement between standard and tablet-based tests
- Differences between methods similar across degree of visual function and ambient light conditions



- Recent advances in technology, and
- Ubiquity of smart devices provide opportunities for vision testing
- Accessible, portable, and easy-to-use platforms with multiple tests
- Platform for predictable and convenient testing in a field-based setting



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Investigation of the Accuracy of a Low-Cost, Portable Autorefractor to Provide Well-Tolerated Eyeglass Prescriptions

A Randomized Crossover Trial

Sanil Joseph, MHA, MSc,¹ Varshini Varadaraj, MD, MPH,² Shivang R. Dave, PhD,³ Eduardo Lage, PhD,^{3,4,5}
Daryl Lim, PhD,³ Kanza Aziz, MD,² Sarah Dudgeon, MPH,⁶ Thulasiraj D. Ravilla, MBA,¹
David S. Friedman, MD, PhD⁷

N=400

Year 2019

Adults 18+

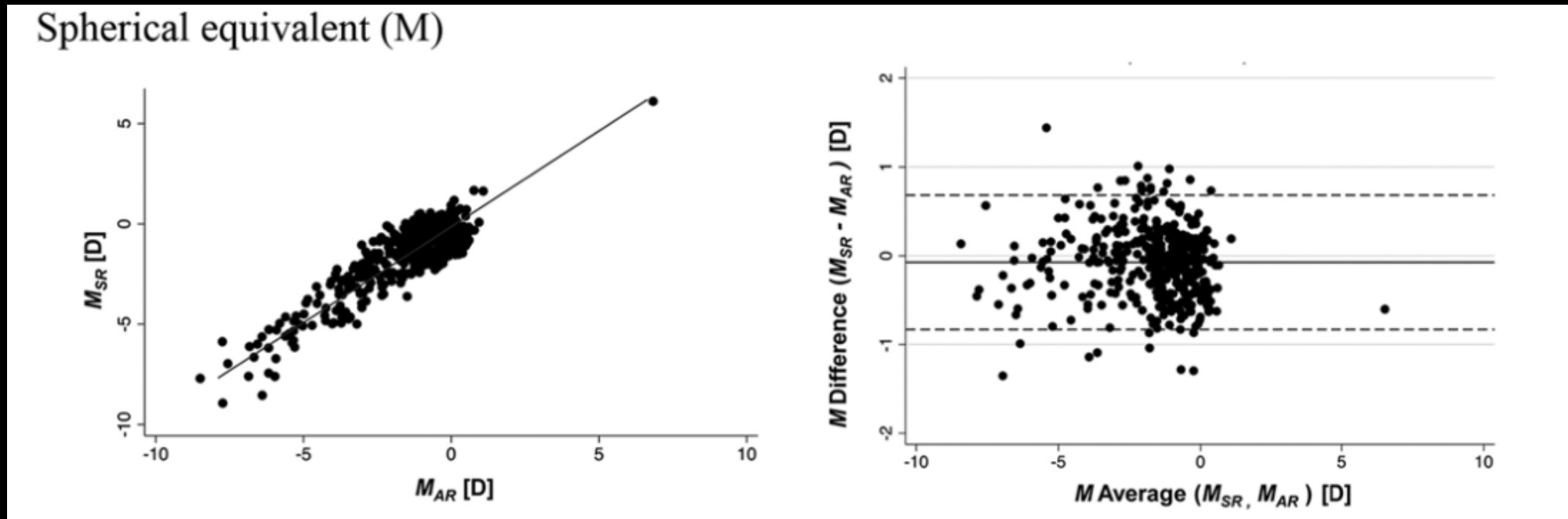
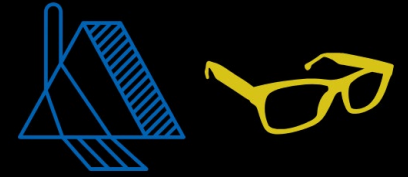
Clinic-based sample



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- Strong correlation and good agreement between the standard and auto-refractions measures
- Patients had similar preference for eyeglasses based either

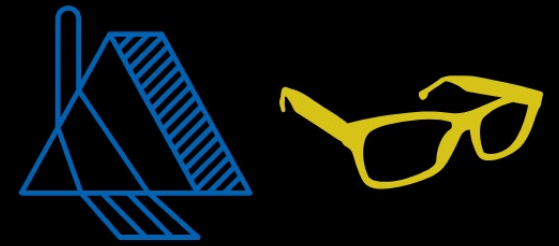


Josep S et al. Investigation of the accuracy of a low-cost, portable autorefractor to provide well-tolerated eyeglass prescriptions: a randomized crossover trial. *Ophthalmology* (2021)



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- Shortage of refractionists and equipment in rural settings
- Autorefractors can be operated by nonclinical personnel
- Potential to address refractive correction needs in field settings

Josep S et al. Investigation of the accuracy of a low-cost, portable autorefractor to provide well-tolerated eyeglass prescriptions: a randomized crossover trial. *Ophthalmology* (2021)



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Key Takeaways

- Disparities exist for access to care
- Connection to social determinants of health
- Improving digital accessibility and utilization
- Developing sustainable community-based programs for high-risk populations
- Utilizing portable vision testing measures
- Addressing policy and funding gaps





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