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TeleOphthalmology & Diabetic Retinopathy: Where Do We Stand Today?

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Disclosure: CEO of EyePACS, Inc.

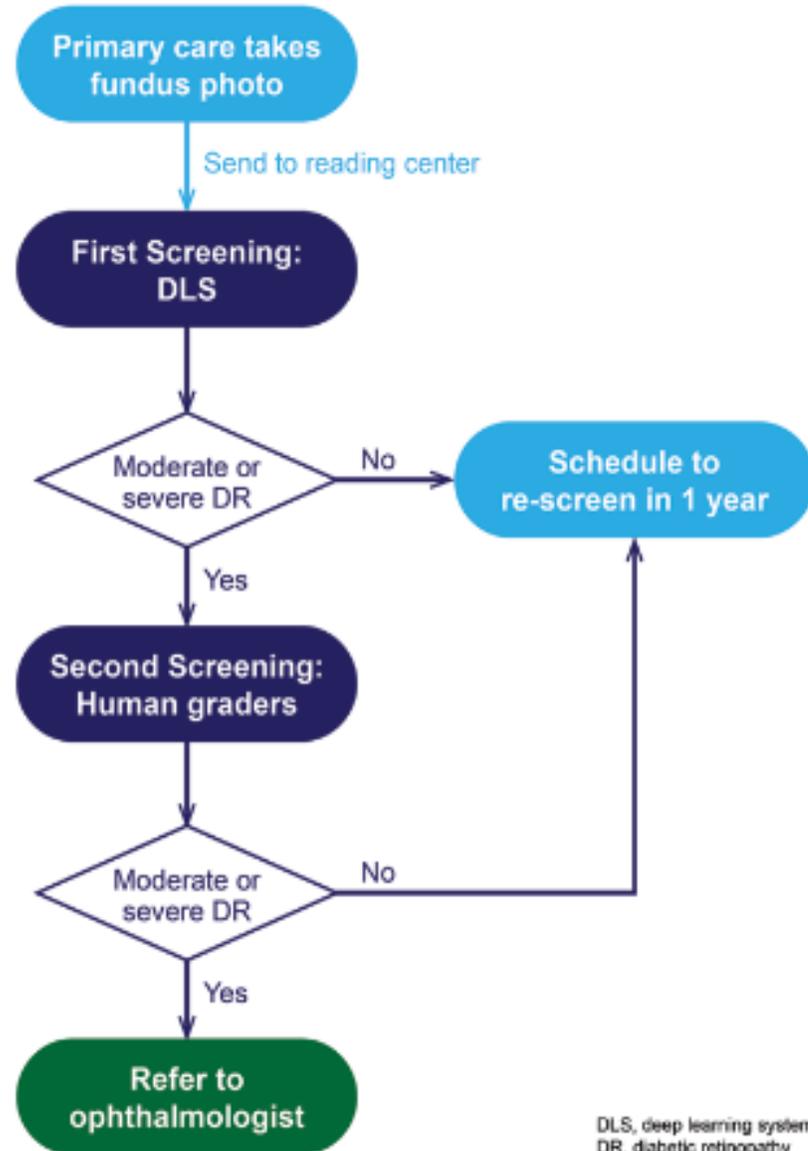
Why Perform Retinopathy Screening In Primary Care/Diabetes Care Clinics?

- **Quality Measures:** Improves Rate of Retinal Exams for Diabetic Patients
- **Referral Effectiveness:** Detects Sight-Threatening Conditions Before It's Too Late
- **Self-Management:** Improves Patient Education About Diabetic Blindness Prevention and About Glycemic Control



*Primary Care Clinician Training,
Seattle, Washington*

Eye Care Perspective



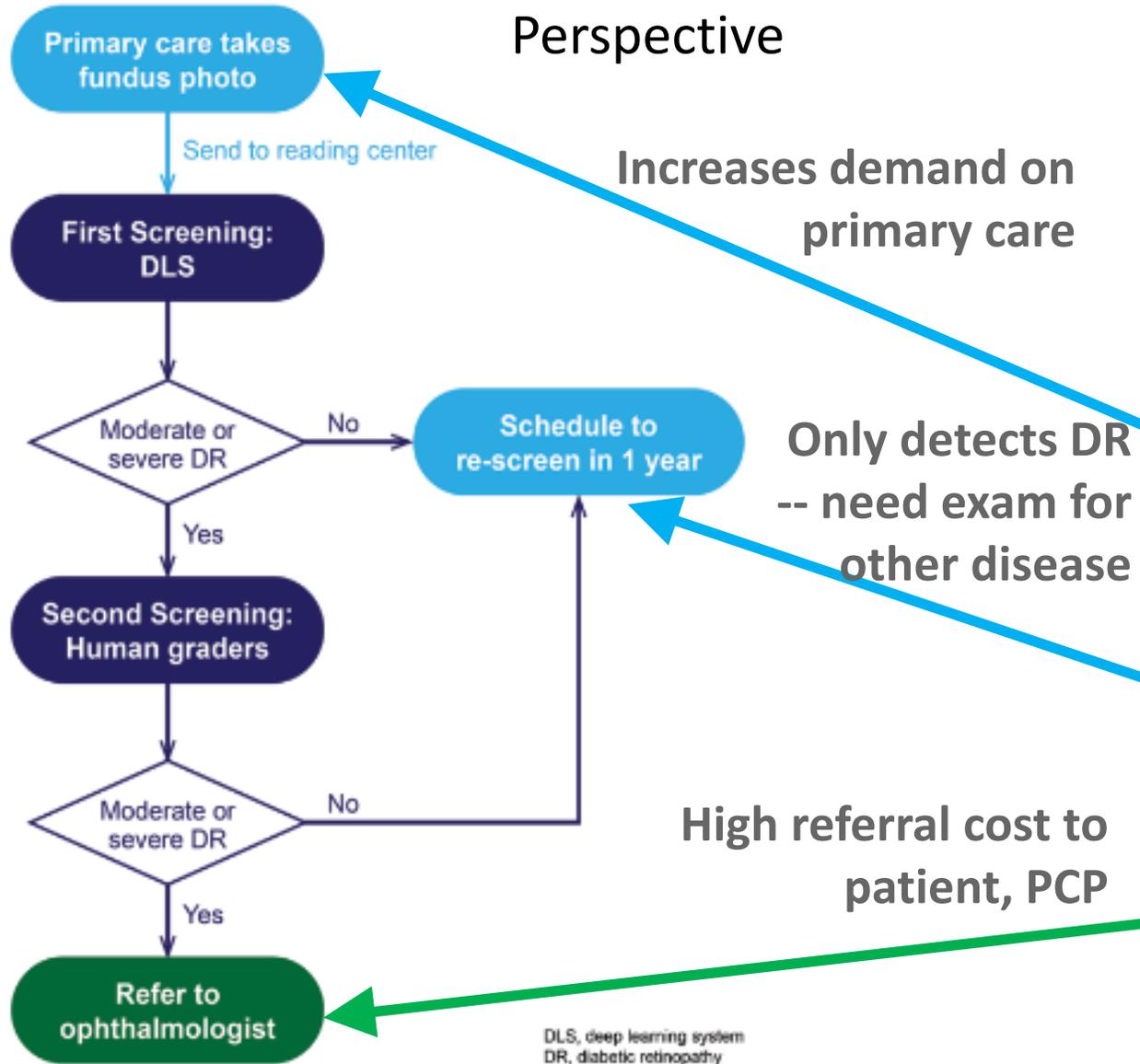
DLS, deep learning system
DR, diabetic retinopathy

Rohit Varma, 2018

The Promise Of AI For Diabetic Retinopathy Screening:

- Reduces demand on eye care providers
- Increases accuracy
- Reduces cost

Primary Care Perspective

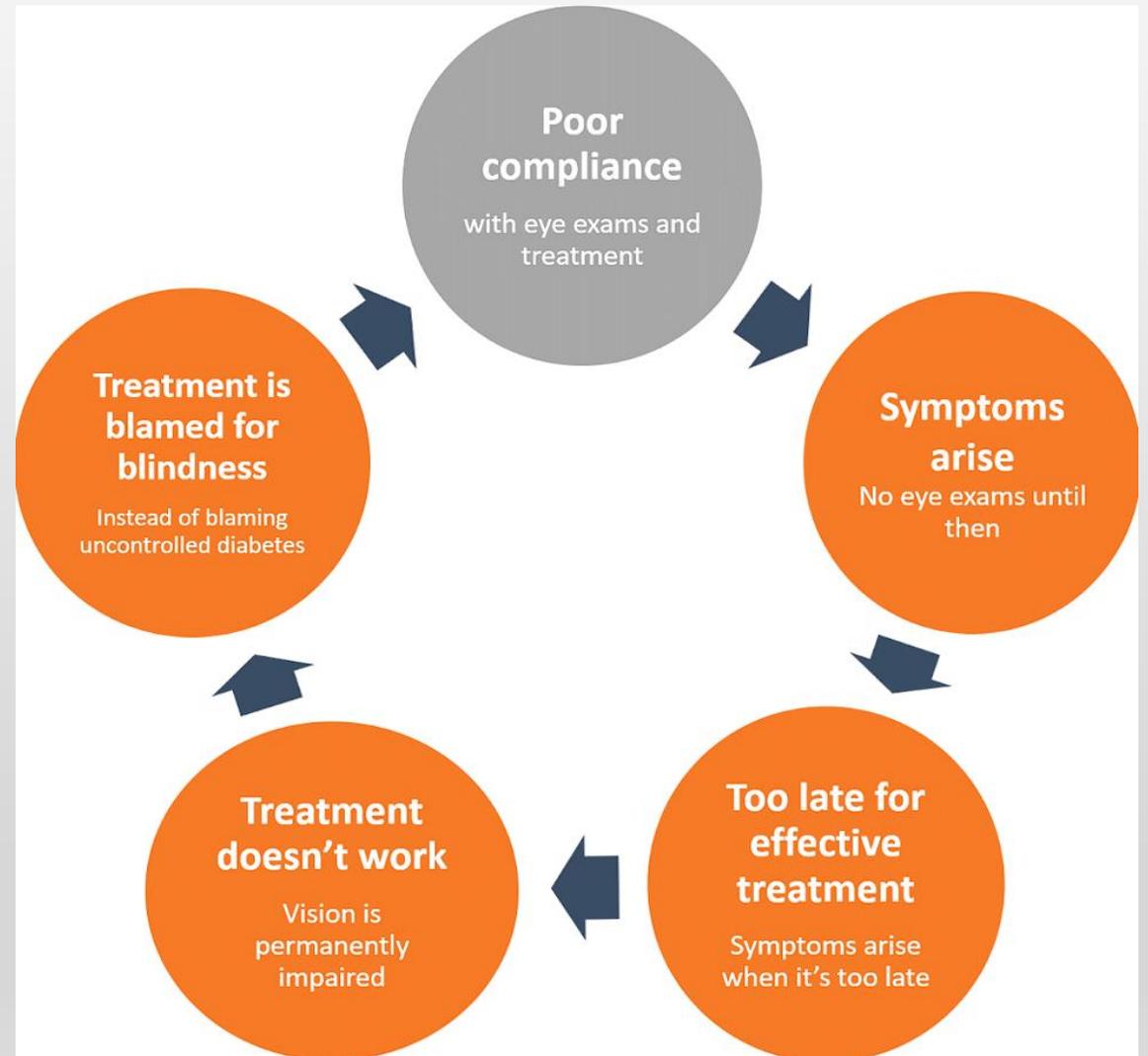


The Promise of AI For Diabetic Retinopathy Screening:

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The Problem:

- Patients with diabetes don't get regular eye exams
 - Too many other appointments
 - Social, economic, logistical barriers
 - Behavioral barriers
- Patients go to eye care provider when they start to have symptoms
- By that time it's often too late
- Treatment is often ineffective, and patients lose sight
- Patients often blame vision loss on



Closing The Loop: Screening Is Not Enough

Report on Referral Outcomes 2008

Study: 288 patients from 4 clinics referred through EyePACS in 2008 for specialist care of sight-threatening retinopathy

By the end of December 2009:

- 85% received notification of referral – median 46 days after EyePACS screening
- 70% received appointment – Average 65 days
- 48% of appointments were kept (96 out of 184)

▪ **22.5% of referred patients received treatment or entered monitoring with specialist.**

- 10 patients were treated for retinopathy (10 out of 288)



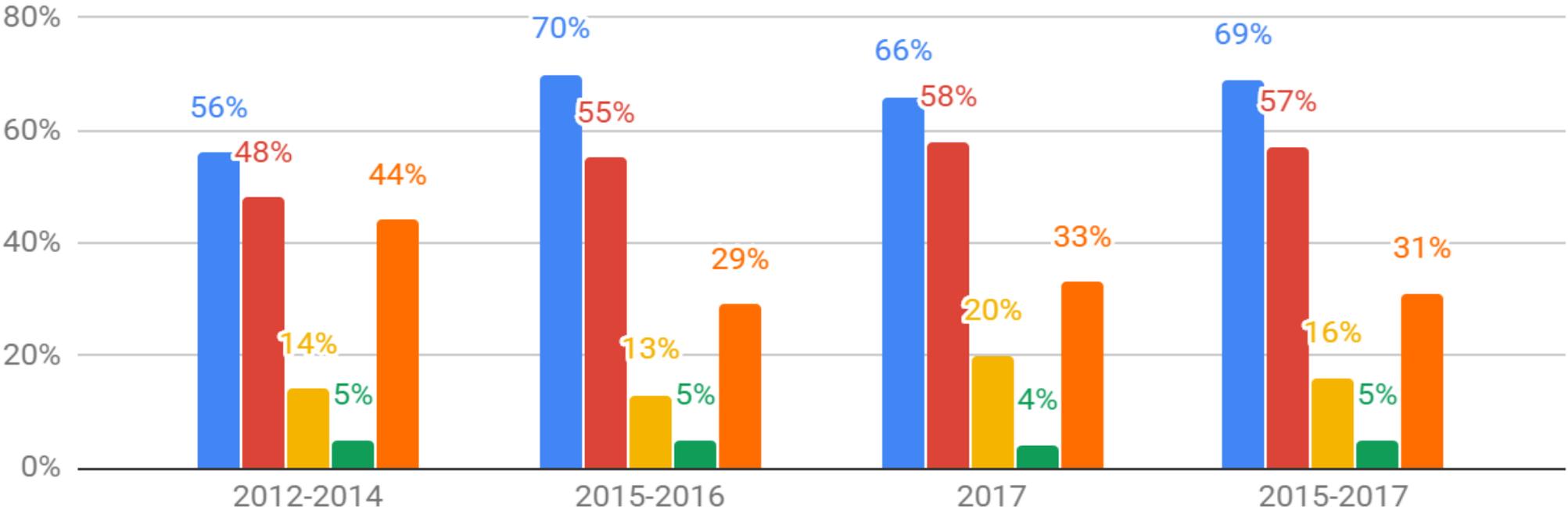
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Evidence That Retinopathy Screening Programs Might Not Prevent Blindness

- 55% noncompliance with laser treatment in Beijing due to lack of awareness
 - *Hua et al, Can J Ophthalmol, 2013*
- “Digital retinal imaging dramatically improves screening rates, but does not improve visit compliance for treatment”
 - *Newman et al, Family Medicine, 2012*
- Low compliance with screening results in poor vitrectomy outcomes
 - *Itoh et al, Jpn J Ophthalmol, 2012*
- “Attendance for diabetic eye screening was inversely associated with HbA1c..”
 - *Scanlon et al, Diabetic Medicine, 2013*
- “29.9% of patients adhered to recommendations to have an eye examination within indicated time frames, even though cost and accessibility were minimized as barriers”
 - *Keenum et al, JAMA Ophthalmology, 2016*

Proportion of Patients with VTDR Keeping First OPHTH APPT

- Any FIRST OPHTH. APPT
- FIRST OPHTH APPT Within 1 year of DRS
- Within 2X recommended interval (all)
- Within Recommended interval
- Did not keep FIRST OPHTH APPT



Bresnick G, Cuadros JA, Khan M, et al. Adherence to ophthalmology referral, treatment and follow-up after diabetic retinopathy screening in the primary care setting. *BMJ Open Diabetes Res Care*. 2020;8(1):e001154. doi:10.1136/bmjdr-2019-001154

Complex Behavioral Problem

- Barriers

- Money (treatment cost, lost wages)
- Logistics (appointment system, transportation, child care)
- Comorbidities (CVD, mobility, depression)
- Social Determinants of Health (abuse, health literacy, neighborhood, support system)
- Fear – risk aversion



- Drivers

- Fear – risk aversion
- Family and friends
- Engagement and trust in providers and staff
- Motivational interviewing
- Reminders, making it easy, persistence
- Symptoms

Dr. Abraham Verghese





Key Take-Aways:

- Use validated, effective interventions to prevent blindness, not just to meet quality measures.
- New technology won't help to prevent blindness without a change to the workflow and clinic processes
- Best scenario for blindness prevention in primary care is with appropriate interventions in the middle to guide and engage patients
- Screening interventions are as much triage and patient engagement as they are diagnostic tests