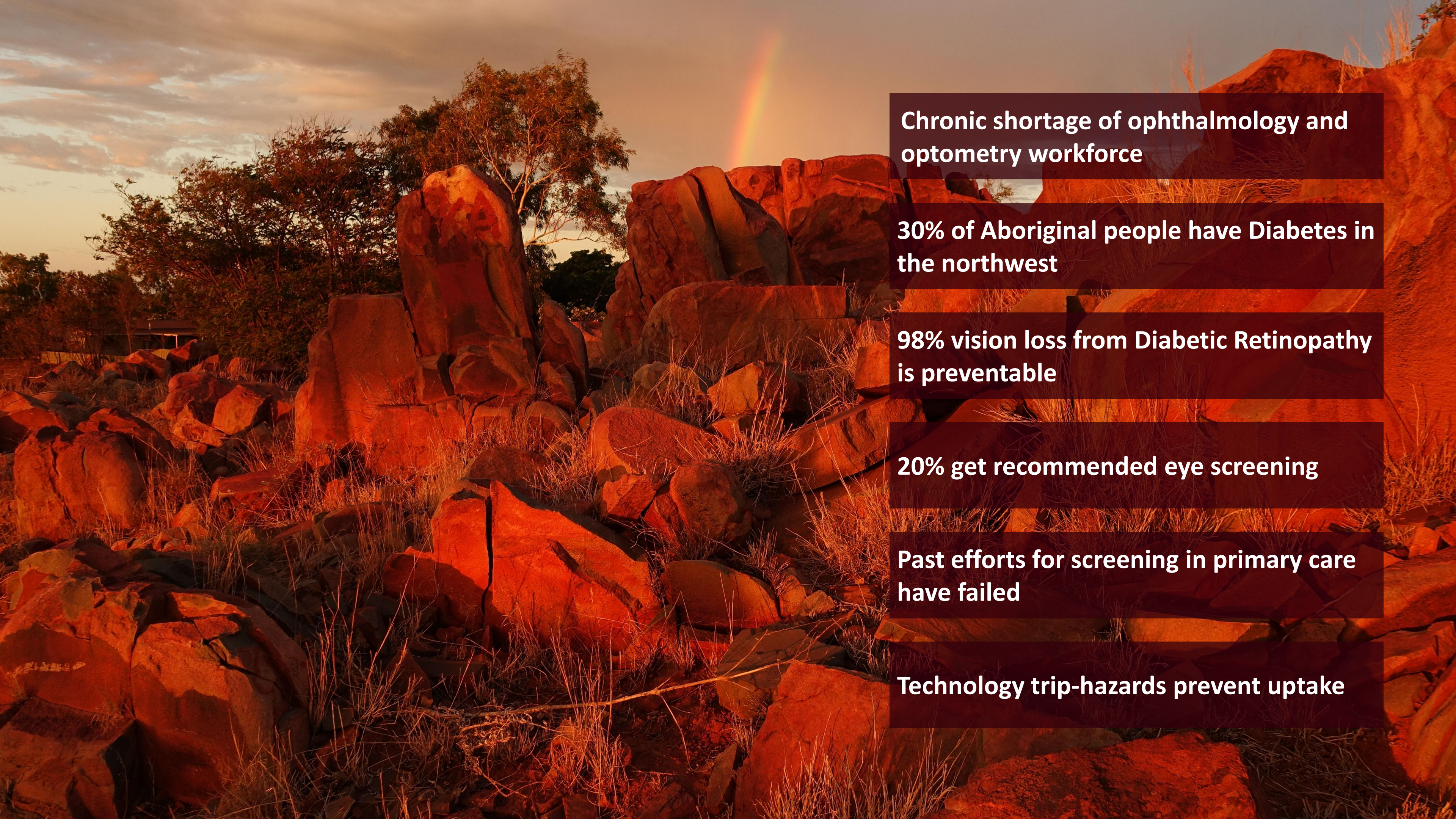




Implementation of AI for eye screening in Australian primary care







Chronic shortage of ophthalmology and optometry workforce

30% of Aboriginal people have Diabetes in the northwest

98% vision loss from Diabetic Retinopathy is preventable

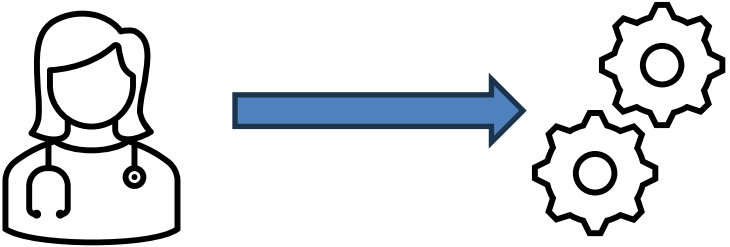
20% get recommended eye screening

Past efforts for screening in primary care have failed

Technology trip-hazards prevent uptake

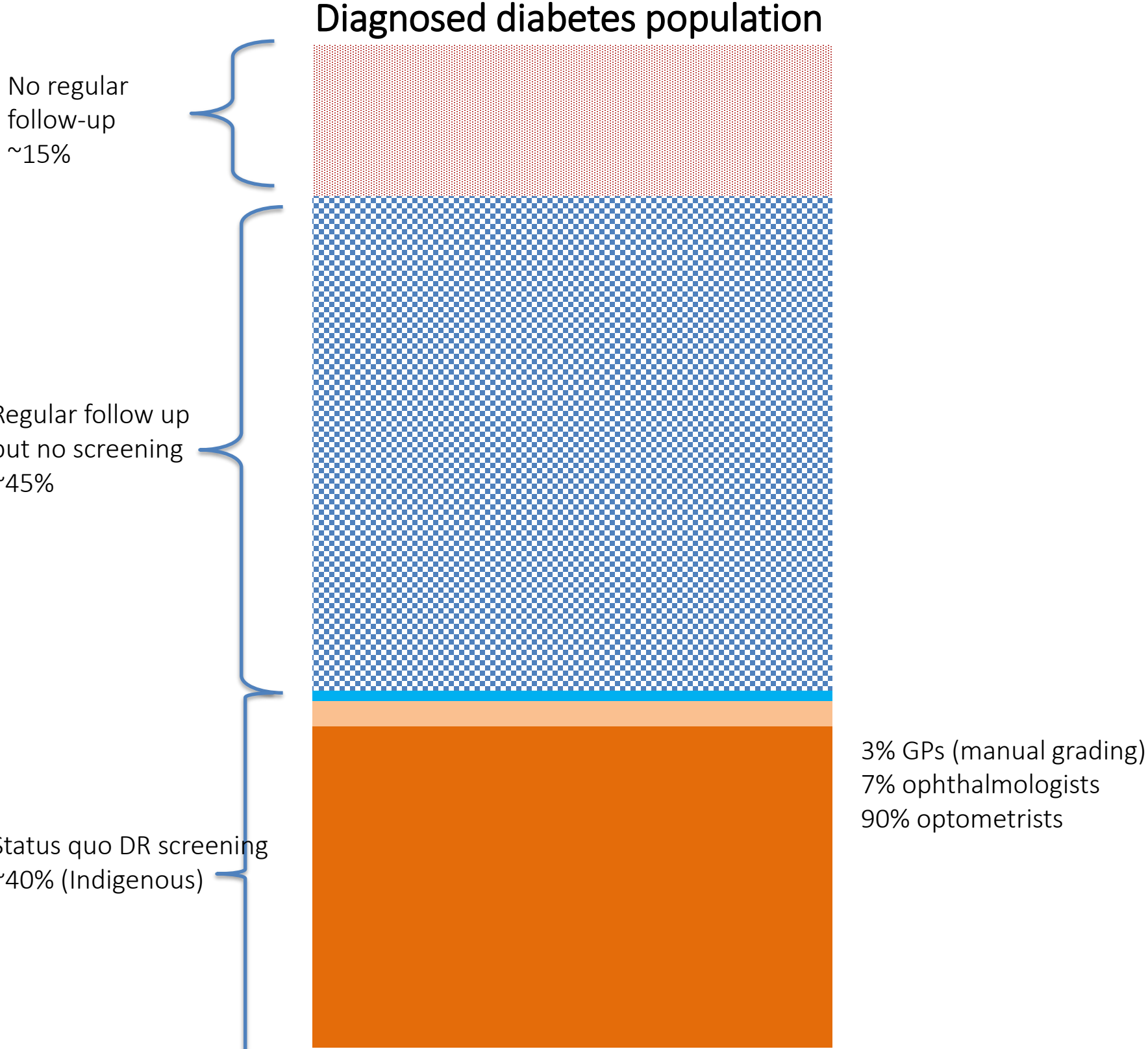
Diabetic Retinopathy Screening Uptake is Low

With AI-enabled grading, possible to expand access but reimbursement remains a barrier



To improve screening rates, we need to improve access to screening at GPs

1.5 million Australians living with diabetes¹, but only 1300 MBS claims in 2024²



¹<https://map.ndss.com.au/>

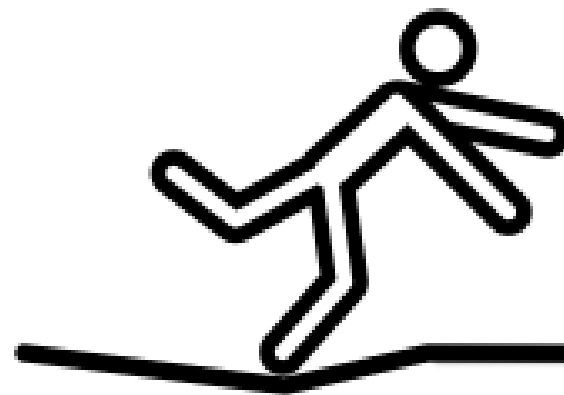
²<https://medicarestatistics.humanservices.gov.au/> for MBS items 12325 and 12326



Take the photo



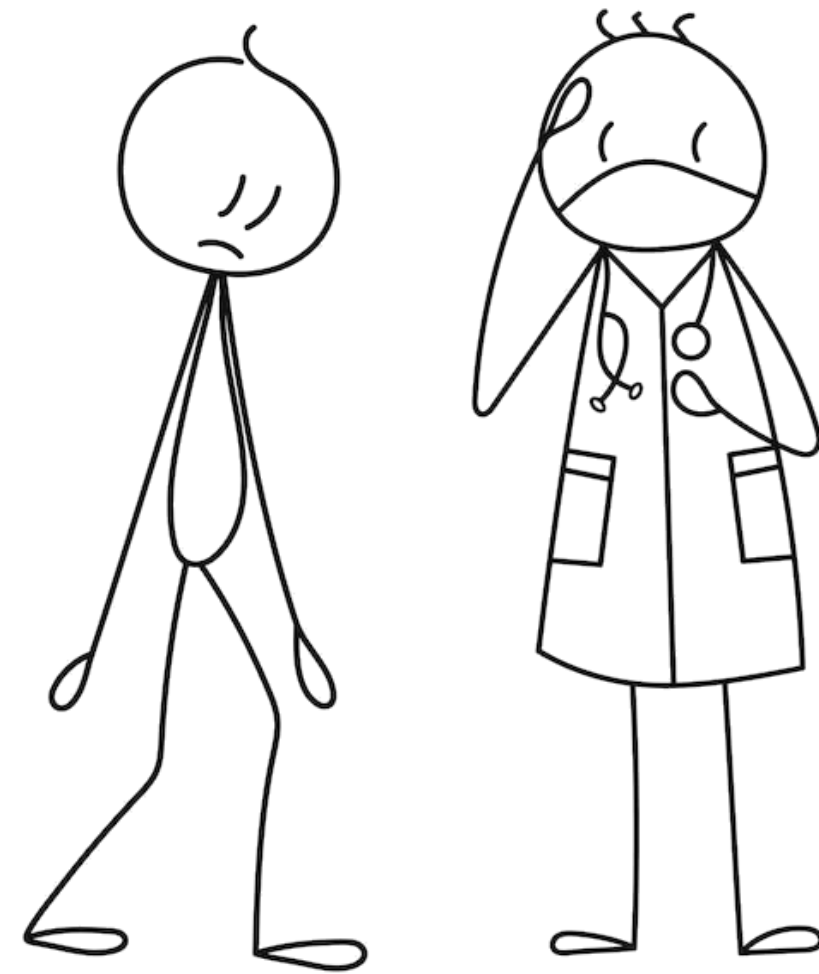
Photo assessed



Follow up care



???

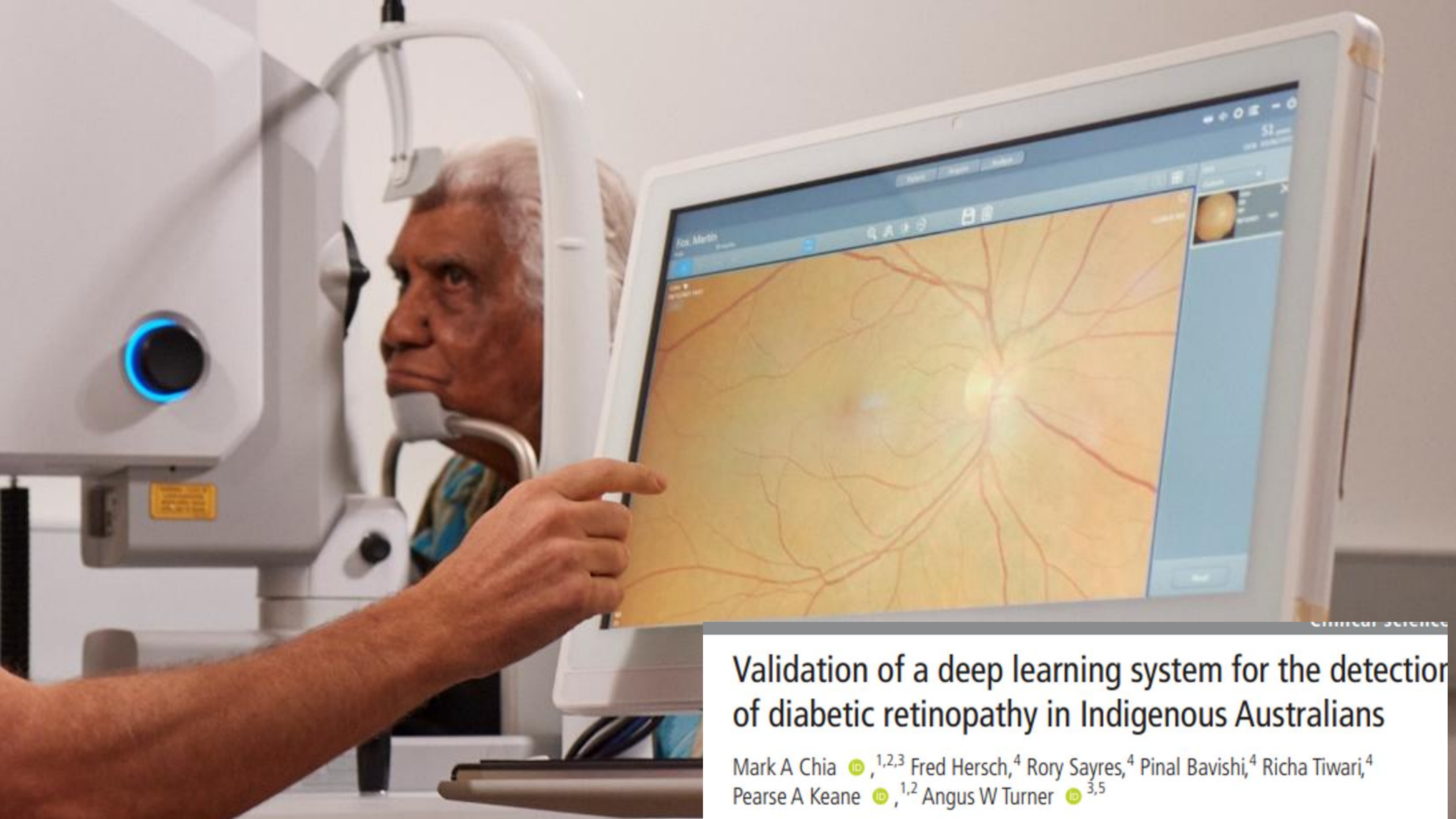




Not all populations and settings are the same..

Subgroup	Sensitivity (%; 95% CI)	Specificity (%; 95% CI)	AUC (%; 95% CI)
<i>Diabetes type</i>			
Type 1	100.0 [39.8–100.0]	90.9 [81.3–96.6]	0.96 [0.92–0.99]
Type 2	96.4 [81.7–99.9]	85.3 [76.9–91.5]	0.91 [0.86–0.96]
<i>Clinic</i>			
Endocrinology	100.0 [71.5–100.0]	91.5 [85.6–95.5]	0.96 [0.93–0.98]
Aboriginal medical service	95.2 [76.1–99.9]	70.0 [4.86–81.4]	0.83 [0.73–0.92]
<i>Camera model</i>			
Canon	100.0 [59.0–100.0]	90.7 [82.5–95.9]	0.95 [0.92–0.98]
DRS	100.0 [63.1–100.0]	91.4 [82.3–96.8]	0.96 [0.92–0.99]
Topcon Maestro	94.1 [71.3–99.9]	53.3 [26.6–78.7]	0.74 [0.59–0.88]

Table 4. Sub-group analysis (n = 203).



Validation of a deep learning system for the detection of diabetic retinopathy in Indigenous Australians

Mark A Chia ,^{1,2,3} Fred Hersch,⁴ Rory Sayres,⁴ Pinal Bavishi,⁴ Richa Tiwari,⁴ Pearse A Keane ,^{1,2} Angus W Turner ^{3,5}

PROOF OF CONCEPT

- Google AI was clear winner (n=317)
 - 100% sensitivity
 - 97.5% gradable
- Positive patient and stakeholder evaluation towards the use of AI
- 17 times more people screened

The screenshot displays the ARDA interface with the following components:

- Google Logo** at the top left.
- ARDA: Automated Retinal Disease Assessment** title.
- CHOOSE IMAGE** button.
- Text: "Drag another image to analyze or".
- FILE NAME (SIZE)**: Uploaded retina image jpg (2.11M).
- DIAGNOSIS ID**: drw-2062.
- MODERATE DIABETIC RETINOPATHY REFERRABLE**: A horizontal bar chart showing a score of approximately 0.75, with a label "Moderate Severe or Proliferative" above the bar.
- DIABETIC MACULAR OEDEMA GRADE**: A horizontal bar chart showing a score of approximately 0.85, with a label "Referrable DME" above the bar.
- DIABETIC RETINOPATHY GRADE**: A bar chart showing a score of 1.00 for the "Moderate" category.

The central image is a fundus photograph of a retina, showing the optic disc and retinal vessels. The image is framed by a blue circle.

A new retinal camera

**Remote nurse or health worker
takes the photo opportunistically
when seeing patient**

**AI provides on the spot diagnosis
and health assessment**

**Immediate consult with specialist or
GP as required via telehealth**



Implementation of A New, Mobile Diabetic Retinopathy Screening Model Incorporating Artificial Intelligence in Remote Western Australia

Qiang Li¹  | Jocelyn J. Drinkwater^{1,2} | Kerry Woods¹ | Emma Douglas¹ | Alex Ramirez¹ | Angus W. Turner^{1,2}

¹Lions Eye Institute, Lions Outback Vision, Nedlands, Western Australia, Australia | ²Centre for Ophthalmology and Visual Science, The University of Western Australia, Crawley, Australia

Correspondence: Angus W. Turner (angus.turner@uwa.edu.au)

Received: 30 October 2024 | **Revised:** 18 February 2025 | **Accepted:** 12 March 2025

Funding: This activity was supported by the Western Australian Future Health Research and Innovation Fund (grant ID DoH202310626/Charitable Foundation, and the Fred Hollows Foundation.

Keywords: deep learning system | diabetes mellitus | diabetic retinopathy | remote | screening

ABSTRACT

Objective: Diabetic retinopathy (DR) screening rates are poor in remote Western Australia where communities rely








diabetology



Article

A Real-World Comparison of Three Deep Learning Systems for Diabetic Retinopathy in Remote Australia

Jocelyn J. Drinkwater^{1,2}, Qiang Li² , Kerry Woods², Emma Douglas² , Mark Chia^{3,4}, Yukun Zhou^{3,4}, Steve Bartnik², Yachana Shah² , Vaibhav Shah² , Pearse A. Keane^{3,4}  and Angus W. Turner^{1,2,*}

¹ Centre for Ophthalmology and Visual Science, The University of Western Australia, 2 Verdun St, Nedlands, WA 6009, Australia; jocelyn.drinkwater@uwa.edu.au

² Lions Outback Vision, Lions Eye Institute, 2 Verdun St, Nedlands, WA 6009, Australia; emma.douglas@lei.org.au (E.D.)

³ Moorfields Eye Hospital NHS Foundation Trust, 11-43 Bath St, London EC1V 9EL, UK; yukun.zhou.19@ucl.ac.uk (Y.Z.); p.keane@ucl.ac.uk (P.A.K.)

⁴ Institute of Ophthalmology, University College London, 9-11 Bath St, London EC1V 9LE, UK

* Correspondence: angus.turner@uwa.edu.au

Abstract

Background/objective: Deep learning systems (DLSs) may improve access to screening for diabetic retinopathy (DR), a leading cause of vision loss. Therefore, the aim was to

Partners on the ground



Funders

the
Challenge

Reimagining regional and remote health care



The McCusker
Charitable Foundation



The Fred Hollows
Foundation

Technology partners (in kind)



Research partners





GP perspectives

Responses (n=129) suggest that in medical practice:

95%

see value in performing
DR screening

71%

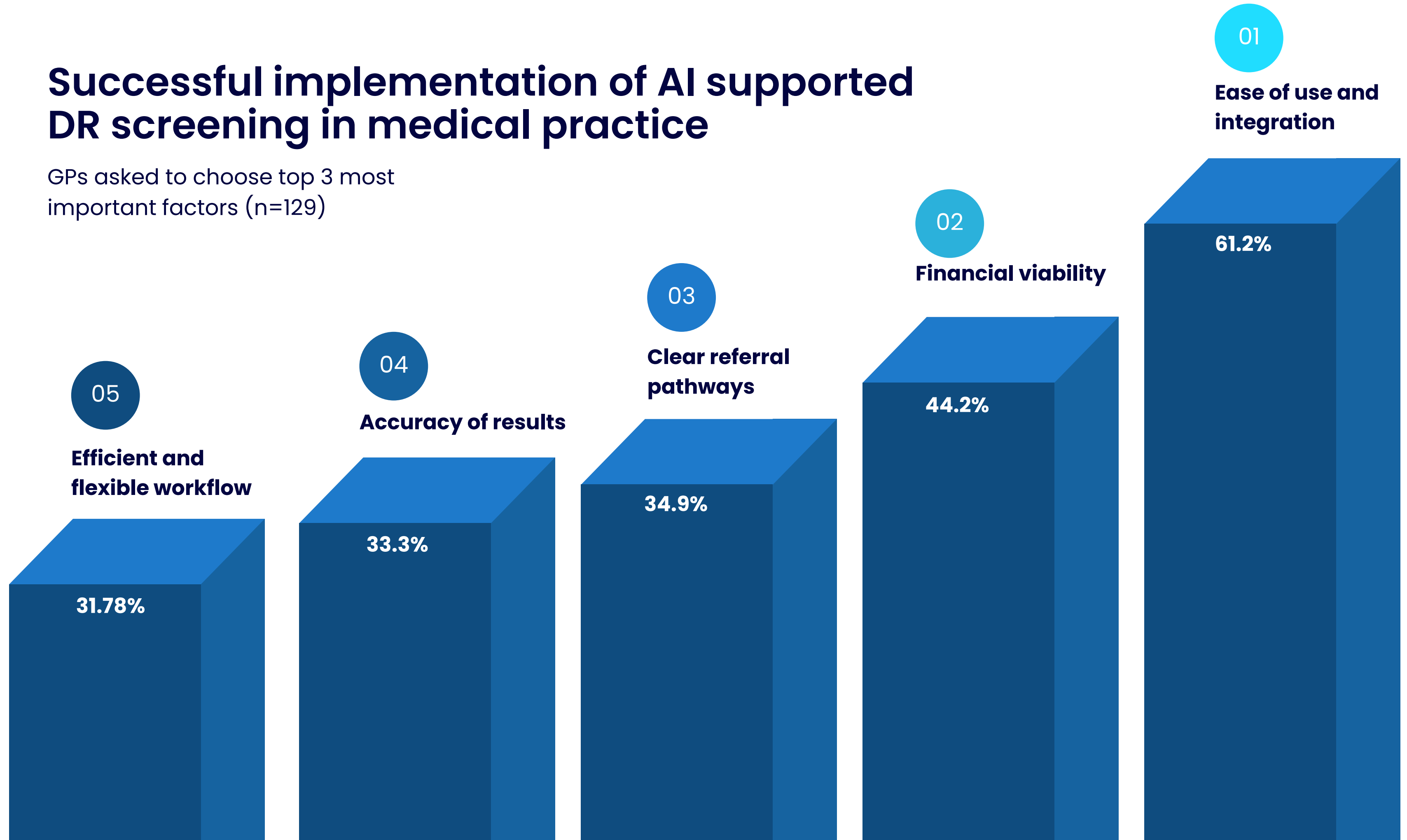
believe AI supported DR
screening is feasible

73%

are confident in
explaining a diagnosis
made by AI to a patient

Successful implementation of AI supported DR screening in medical practice

GPs asked to choose top 3 most important factors (n=129)





[ABOUT NINOX VISION](#)

[KEY IMPACTS](#)

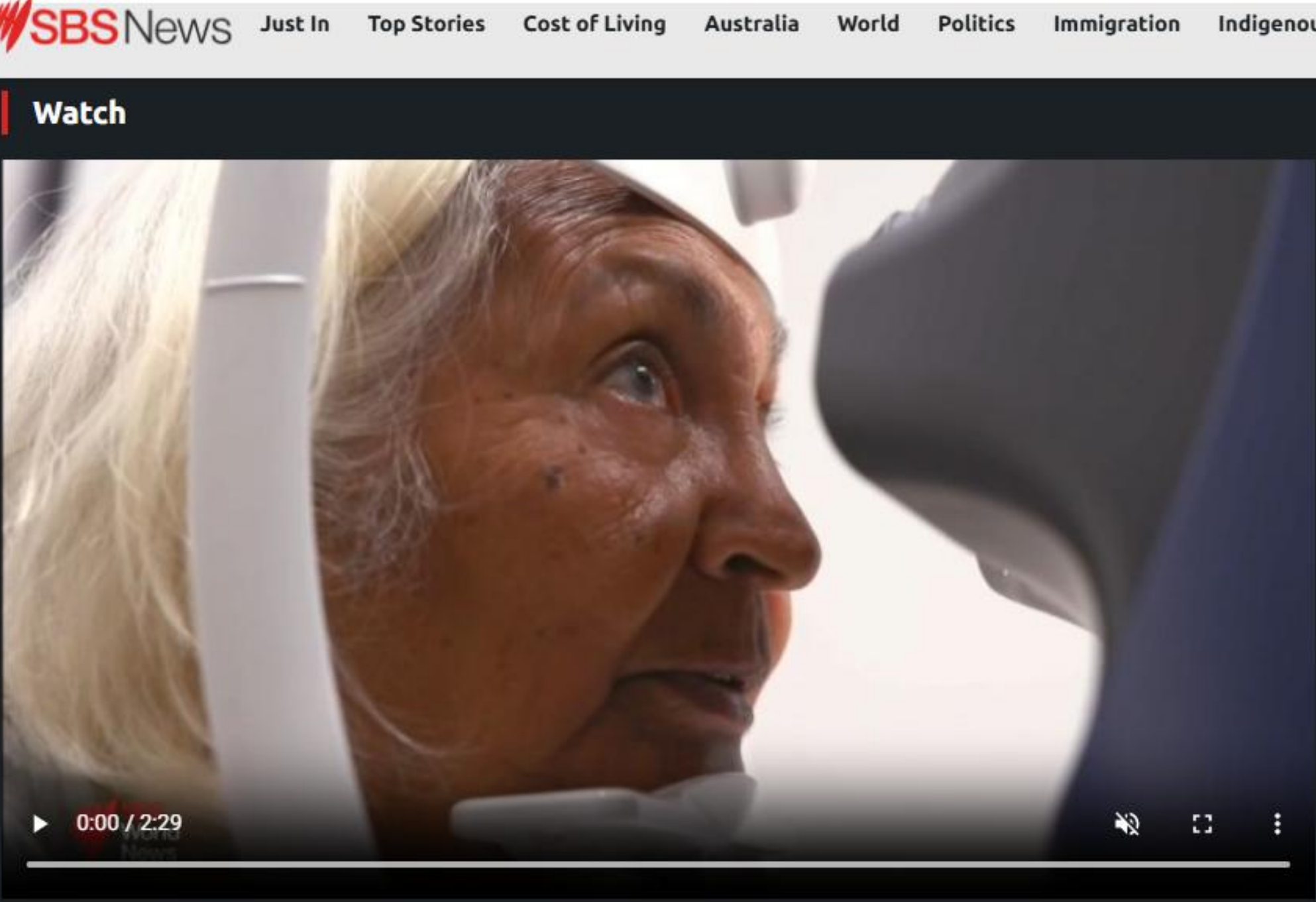
[CONTACT](#)

Revolutionising Diabetic Retinopathy Screening in Australia

[LEARN MORE](#)

The BRAMS Experience - first 2 months

- 15 Oct- 15 Dec, 2025
- \$7300 MBS billing dollars from 70 scans
- Item numbers 12325 , 75857 (BB incentive), 10987
- Compared with 14 scans only in whole of 2024.



The screenshot shows the SBS News website interface. At the top, there is a navigation bar with the SBS News logo and links for 'Just In', 'Top Stories', 'Cost of Living', 'Australia', 'World', 'Politics', 'Immigration', and 'Indigenous'. Below the navigation bar is a 'Watch' section. The main content is a video player showing a close-up of an elderly woman's eye being scanned by a device. The video player has a progress bar at the bottom left showing '0:00 / 2:29' and control icons for play, volume, and full screen. Below the video player is a caption: 'New AI technology in remote WA helps early detection of diabetes related eye disease'. To the right of the caption are social media sharing icons for Facebook, X, and Email, along with a 'Share' label.

SBS News Just In Top Stories Cost of Living Australia World Politics Immigration Indigenous

Watch

0:00 / 2:29

New AI technology in remote WA helps early detection of diabetes related eye disease

Share f X Email

Next steps...

- 5 Trial sites – including urban, regional, remote
- Health Economic Implementation Paper
- TGA approval / authorised prescriber bridging
- Consumer Attitudes Qualitative Research
- AI diagnosis - adherence to follow up outcomes


Clinical & Experimental Ophthalmology

WILEY

Clinical & Experimental Ophthalmology 

REVIEW **OPEN ACCESS**

Health Economic Considerations for the Implementation of Artificial Intelligence-Enabled Diabetic Retinopathy Screening: A Review

James Leigh^{1,2,3}  | Jocelyn Drinkwater^{2,3} | Angus Turner^{2,3} | Elizabeth-Ann Schroeder¹ 

¹Nuffield Department of Primary Care Health Sciences, University of Oxford, UK | ²Lions Eye Institute, Lions Outback Vision, Nedlands, Western Australia, Australia | ³Centre for Ophthalmology and Visual Science, The University of Western Australia, Crawley, Australia

angus@ninoxvision.org or 0422 279 179

