

Teleoptometry Eye Care Delivery in a Remote Aboriginal Community: Protocol, Implementation and Lessons Learned

2021 National Aboriginal and Torres Strait Islander Eye Health Conference The Gap & Beyond

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Acknowledgement of Country

I acknowledge and respect the traditional custodians whose ancestral lands I am meeting upon here today, the Kurna people.

We also acknowledge the Anangu Pitjantjatjara Yankunytjatjara people for which this work was carried out

We also pay respects to the cultural authority of Aboriginal and Torres Strait Islander peoples visiting from other areas of Australia that have joined us online today, and pay our respects to Elders past, present and emerging.

About me

Born in Cuba till about 5

Lived in South Africa till I was about 12

Moved to Australia and completed high school in Mount Gambier

Studied Optometry at Flinders University – 2015

Began a PhD in 2019 – Wardliparingga Aboriginal Health Equity (SAHMRI) and Flinders Ophthalmology Department

- Professor Jamie Craig
- Professor Alex Brown

Outreach optometrist to 9 Aboriginal communities across South Australia

Flinders optometry lecturer/clinical placement and research supervisor for Masters students



Flinders
UNIVERSITY



SAHMRI
South Australian Health &
Medical Research Institute

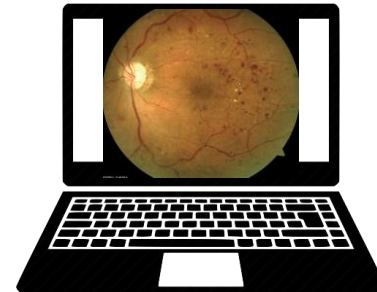


Need

The COVID-19 pandemic impacted on non-essential face-to-face services to remote Aboriginal communities, including optometry and ophthalmology visits

It was unclear when regular eye care services would resume

Health care delivery models required adaptation while maintaining quality to avoid potentially widening health disparities



Response

In April 2020, a process of developing a protocol and implementation plan took place for delivering eye care services via telehealth

This was in partnership with the local health service and Eye Health Nurse, and the visiting optometrist with support from fund holders and optometry students



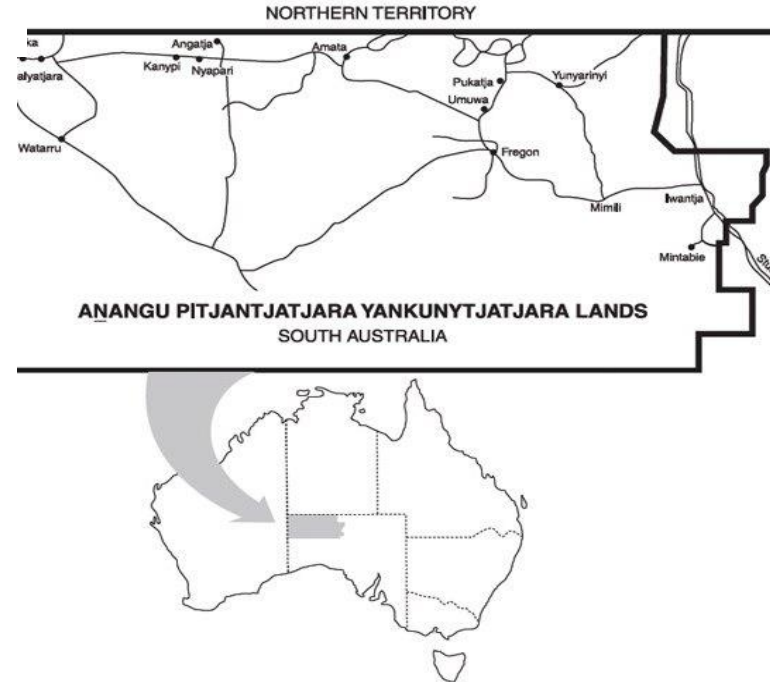
Region Context



Nearest ophthalmology/optometry service is approximately 400-600 kilometres away

Optometry/ophthalmology eye visits generally occur twice per year with 1-2 additional optometry-only visits

Eye Health Nurse provides ongoing eye care throughout the year (i.e. retinal photography/trachoma screening and coordination)



Background

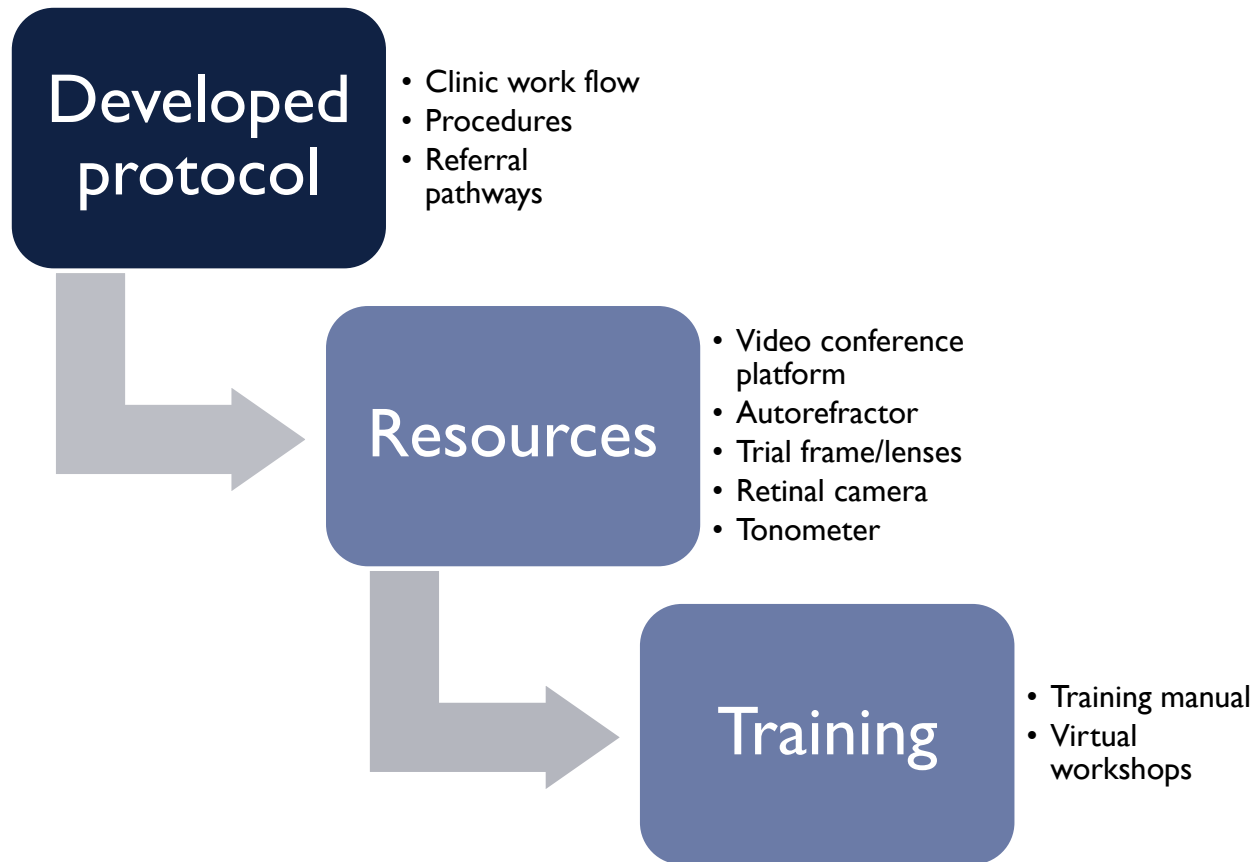
Most of the existing telehealth eye programs are disease specific (i.e. glaucoma)

Currently there is minimal research into implementing and evaluating teleoptometry into primary eye care setting

However, the benefits are well established:

1. Decreasing travel distance
2. Increasing patient convenience
3. Avoiding delays in care
4. Cost effective to both the patient and healthcare system

Design Phase



Design Phase

Protocol developed to include clinic workflow, procedures and triaging

- The model was adapted from the pre-existing retinal screening program that is nurse-led whereby images are captured and sent to an ophthalmologist for grading (also telehealth)
- Videoconference platform identified, set-up and tested (*Healthdirect, Covi*
Telehealth)

Equipment sought

1. Autorefractor sought from the US as a partnership with Plenoptika
2. Trial frame and lenses

Design Phase

Healthcare worker (in this case an ophthalmic nurse) training took place prior to the commencement of consultations

Additional training was needed for through virtual workshops as these aren't routine clinical eye tests

1. Measuring near vision
2. Using trial frames and lenses (pseudo-subjective refraction)
3. Portable autorefractor use
4. Refresher on assessing pupils and eye movements (additional tests)

A training manual was also devised to assist with future training and capacity building to other staff

Implementation Phase

The final model flow included:

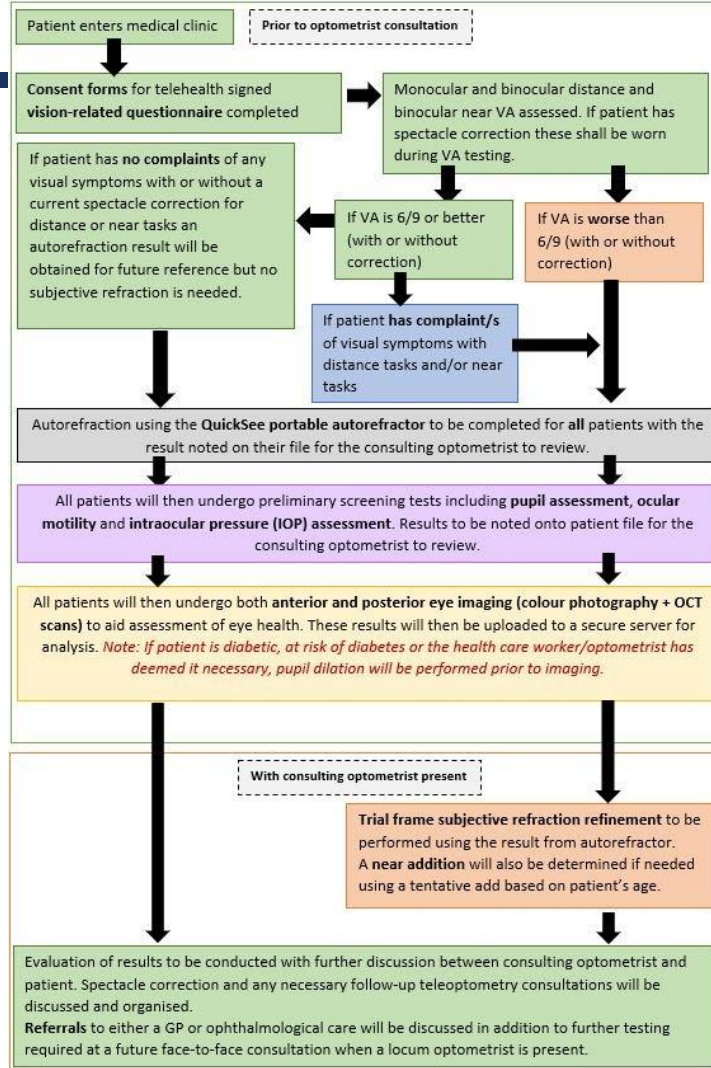
1. A series of questions and tests occurred between the ophthalmic nurse and patient prior to the consultation with the optometrist
2. The optometrist joins a video-conference with the patient and nurse
3. The optometrist seeks additional tests (if needed), clarifies the history, discusses the findings and devises a suitable management plan

The local healthcare worker remains present throughout to assist with patient communication and document actionable items such as referrals

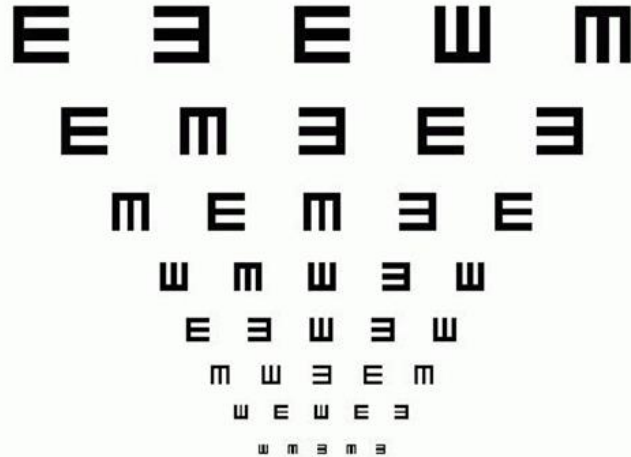
Testing performed

1. Distance and near visual acuity (habitual and best-corrected)
2. Autorefraction (Quicksee portable autorefractor)
3. Preliminary testing (pupils, eye movements)
4. Intraocular pressures (iCare)
5. Retinal photography

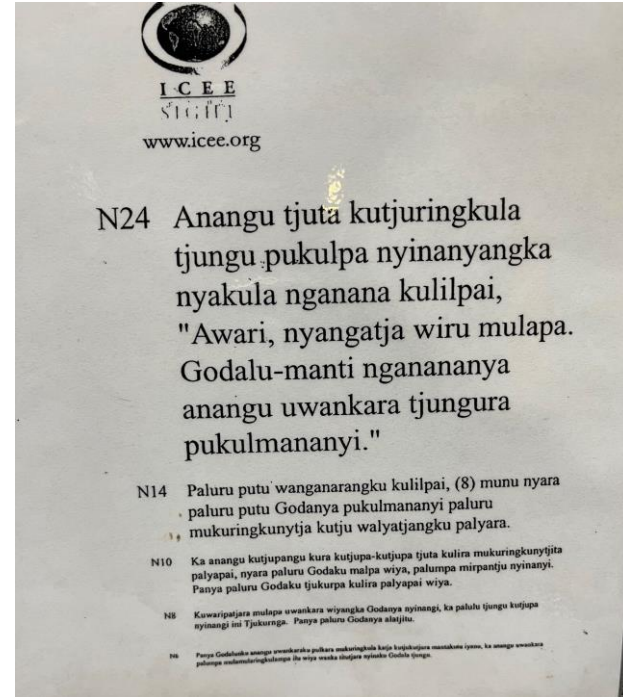
Full clinic flow



Equipment and technology used



Distance vision chart



Near vision chart

Equipment and technology used



Trial frame



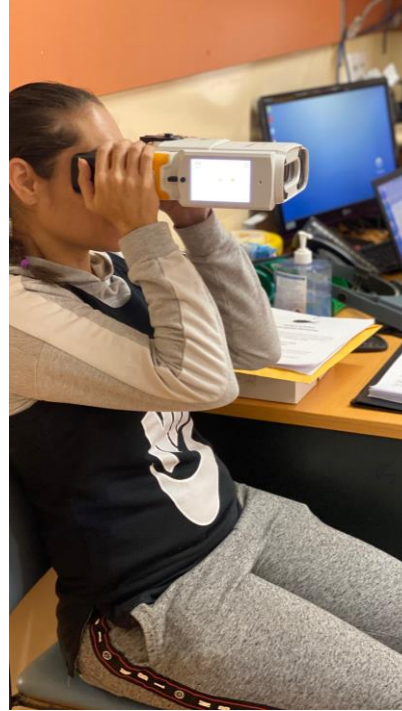
Trial lenses

Equipment and technology used



A PlenOptika QuickSee Autorefractor

- Spherical limit of ± 10 D
- Astigmatic limit of ± 6 D
- On average, the autorefractor results are accurate within approximately ± 0.50 D of spherical power and ± 0.10 D of cylindrical power. (12)
- Binocular measurements available in approximately 1-2 minutes including the time taken to explain the test.



Equipment and technology used



iCare tonometer



Canon CR-2
Fundus camera

45 degree field of
view



Case Study

Presentation

25-year-old, Female

Presenting because of poor vision in both her eyes and for retinopathy screening

Lost her current glasses

Nurse Examination

Presenting Distance Visual Acuity: RE 6/12 LE 6/12

Presenting Near Visual Acuity: N4

Autorefractor: R -1.00 L -1.00 old prescription: R -0.75 L -0.75 (in 2017)

Best-corrected vision with autorefractor results in trial frame: RE 6/5 LE 6/5

Pupils: PERRLA, no RAPD

Motility: Full and Smooth

Retinal Photos Taken

Case Study

Optometrist Interpretation

Presenting vision consistent with autorefraction results and previous prescribed glasses

No diabetic retinopathy detected on photos

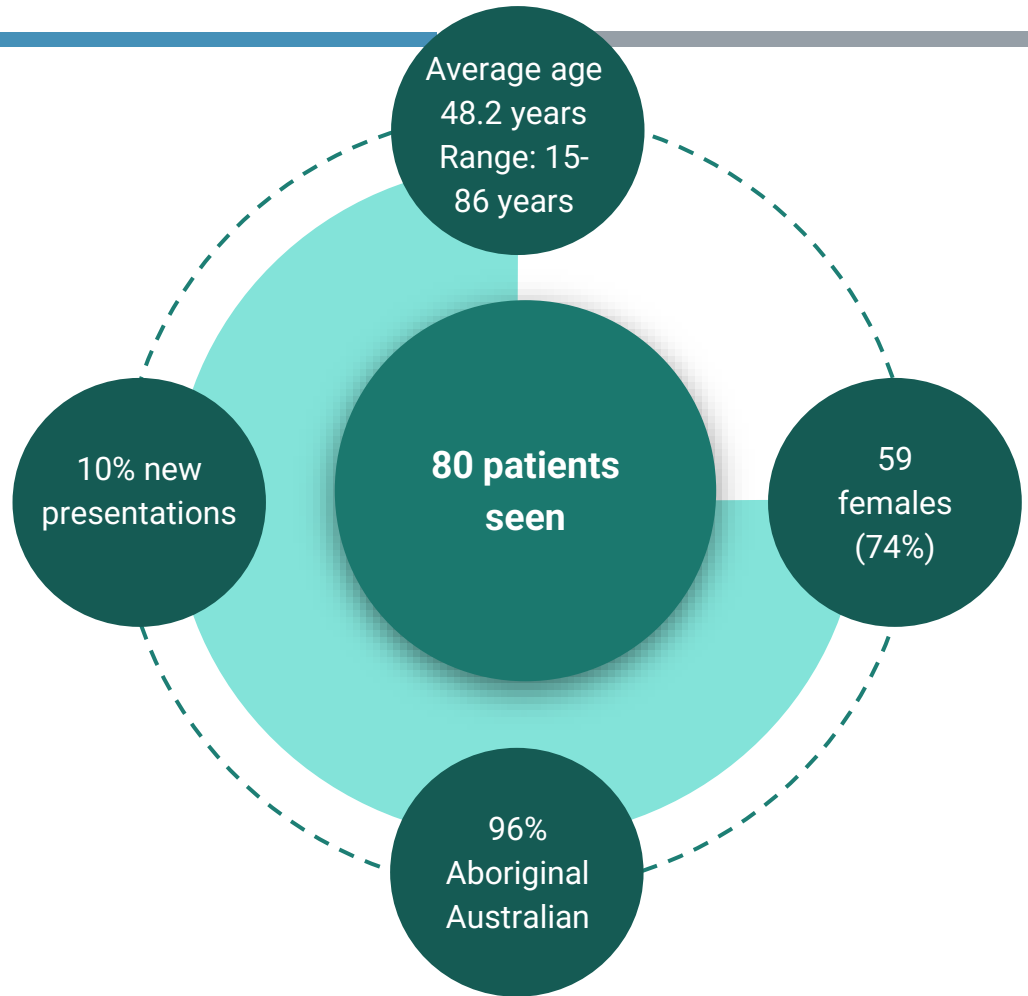
Order glasses through the existing spectacle subsidy scheme

Review in one year

Preliminary Results

Demographics

Testing occurred over 6 weeks between
15 June 20 and 29 July 20
12-15 patients per week
Flexibility of service (on call system)

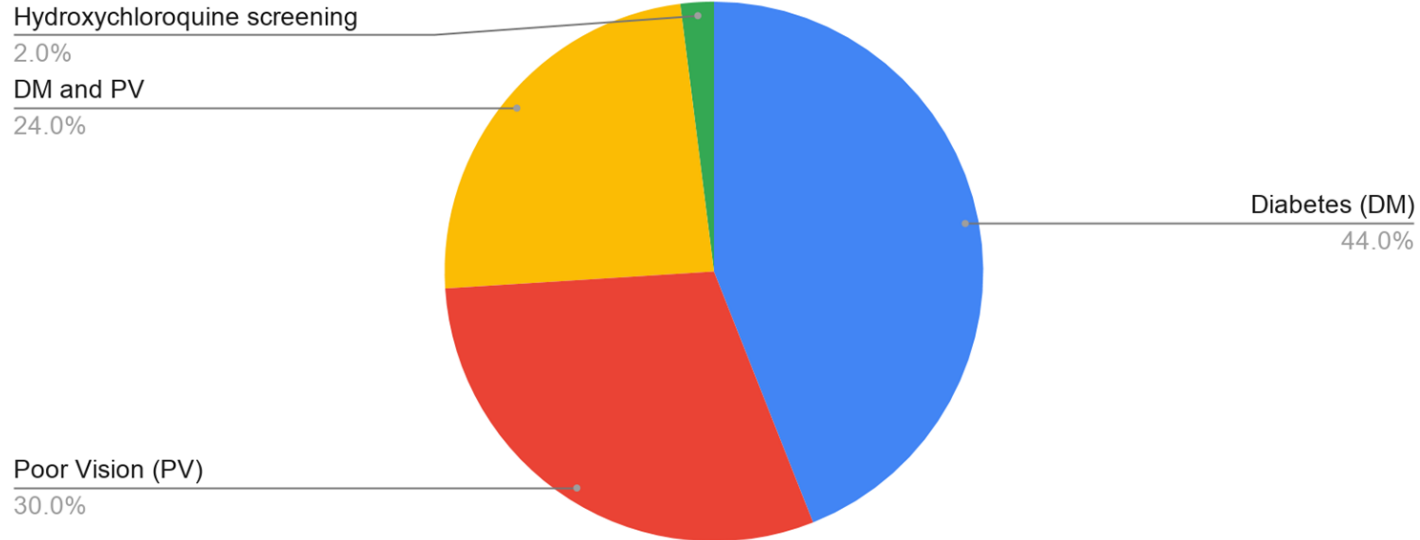


Preliminary Results

Reasons for patient presentation

- Two most common presentations were **diabetes** (44%) and **poor vision** (30%)

Reasons for patient presentation



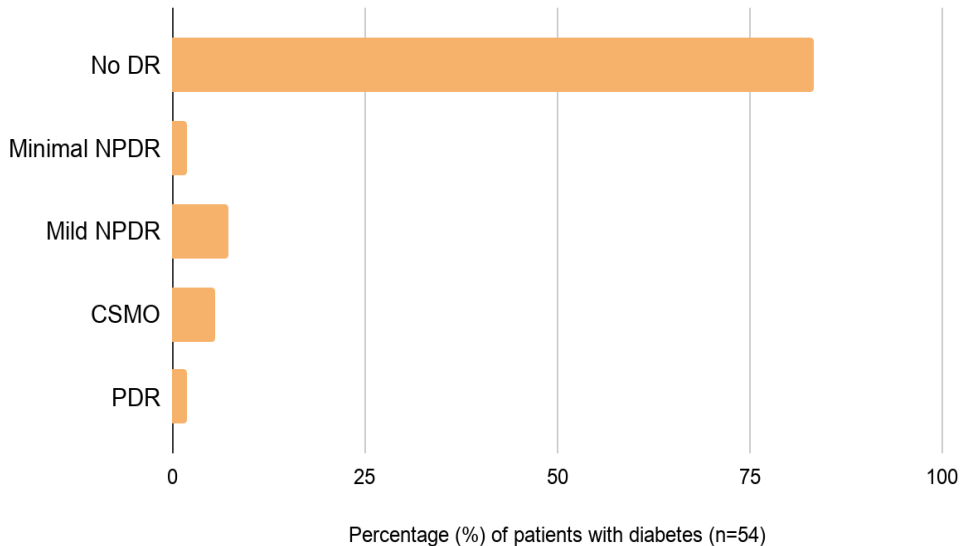
Preliminary Results

Diabetic retinopathy (DR) grading

Out of 54 patients with diabetes

- 83.3% had **no diabetic retinopathy (DR)**
- 1.9% had **minimal** nonproliferative diabetic retinopathy (NPDR)
- 7.4% had **mild** NPDR
- 5.5% had **clinically significant macular oedema (CSMO)**
- 1.9% had **proliferative** diabetic retinopathy (PDR)

Prevalence of diabetic retinopathy (DR)



Preliminary Results

Refraction - impact and outcomes

- Number of eyes eligible for autorefracton was 114
- Successful autorefractor results obtained in 80% of eyes (91 of 114)
- The autorefracton result was the same as the final prescription in 70% (56 of 80)

Accuracy of autorefractor result compared to final prescription

Greater than or equal to $\pm 1.00D$

5.0%

Within $\pm 0.75D$

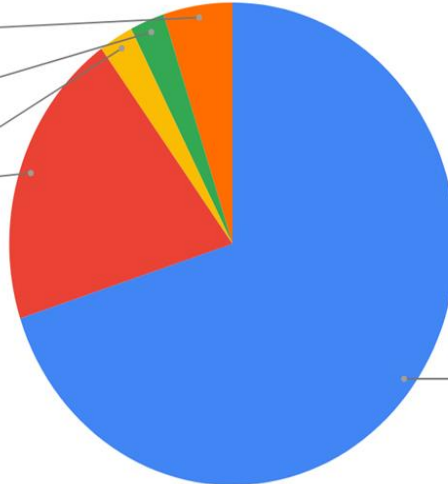
2.5%

Within $\pm 0.50D$

2.5%

Within $\pm 0.25D$

20.0%



Autorefractor result same as final prescription

70.0%

Preliminary Results

Refraction - impact and outcomes

Autorefractraction failed in 23 eyes due to:

- Machine error in 7 eyes (30%)
 - Cataract in 3 eyes (13%)
 - Equipment adaptation in 3 eyes (13%)
 - Combined corneal scar and cataract in 2 eyes (8.7%)
 - Patient dexterity in 2 eyes (8.7%)
 - Vascular occlusion in 2 eyes (8.7%)
 - Ptosis in 2 eyes (8.7%)
 - Heterotropia
-
- One patient declined the autorefractor





Dispensing outcomes

New prescription spectacles were dispensed in 53% (42 of 80) of patients,

‘Ready-made’ single vision spectacles were required in 59% (47 of 80).

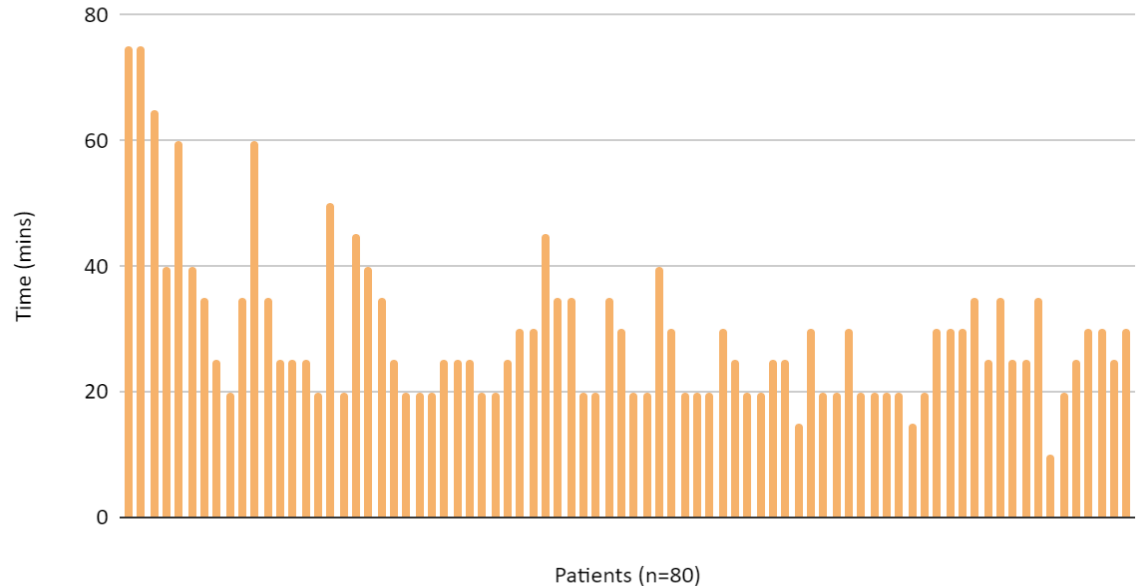
- Both new prescription spectacles and ‘ready-made’s were required in 26% (21 of 80)

92.3% of patients with a presenting vision of 6/12 or worse in one or both eyes obtained a final best corrected distance visual acuity of 6/9 or better

Duration of Consults

- Average duration of telehealth consultation was 29.5 minutes (range 10 to 75)
- Reflects similar length of time to face-to-face consultation

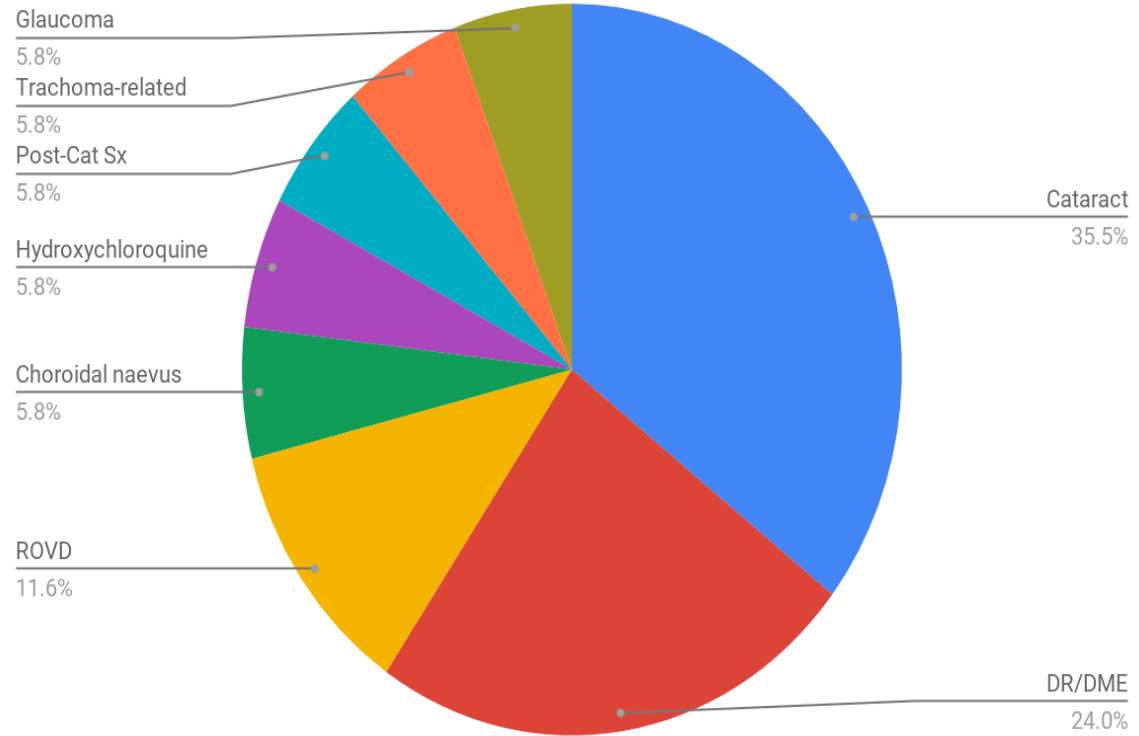
Duration of telehealth consultations



Preliminary Results - Referrals

17.5% (14 of 80) of patients required referral to ophthalmology

- 14% (2 of 14) referrals were classified as **urgent**



Success of the teleoptometry service delivery model



- Achieved live video-conferencing comparable to face-to-face consultations with similar time efficiency
- Technology enabled collection of accurate and reliable data
- Satisfactory outcomes - screen, monitor, treat, referral
- Set-up for ongoing evaluations and model improvement

Limitations

- Small sample size
- No measure for patient satisfaction – future work
- Accuracy of diagnosis unable to be determined until follow-up from optometrist – especially with cataract
- Longer study duration to assess sustainability of the program
- Funding sustainability undetermined?
- Refraction outcome misclassification - autorefraction compared to trial frame refraction by optometrist?

Future Adaptations

- Train other healthcare workers to work closely with the visiting optometrists
- Introducing a single system to streamline communication between optometrists and ophthalmologists
- Results dependent on skill and experience of health care worker
- Working relationship and collaboration is fundamental
- Introduce new equipment such as OCT may increase accuracy of referrals



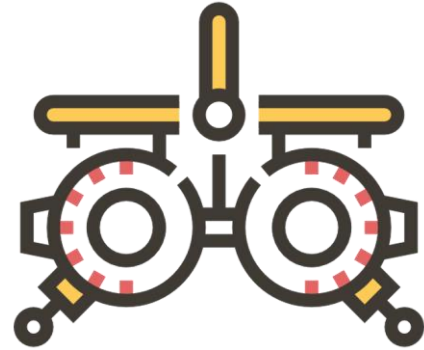
Future Adaptations



- Continue to develop and improve program
- Supplement traditional optometry/ophthalmology visits
 - ✓ Increased monitoring, more timely
 - ✓ Decreased travel for patient
- Hopefully greater proportion of population will engage with the service
- Implement program into other similar communities
- Hope for changes to MBS to include applicable items for sustainable funding

Conclusions

- The initiative was able to provide a broad scope hybrid tele optometry services in order to deliver a much needed eye healthcare during the COVID-19 restrictions
- Innovatively utilised technology and telehealth to provide a means of evaluating refractive error and providing spectacles.
- Detected and monitored pathology
- The program shows promising signs for tele-optometry implementation into the future, particularly in remote areas, although further research and evaluations are needed



Thank you for listening 😊

I thank the **patients** and the **communities** which we have worked in.

Thank you to **Cathy Starr** for co-delivering this service.

Thank you for **Flinders Optometry students** (Bonnie, Rui, Kate, Nathan, Laura) for developing the protocol and collating the findings.

Thanks to **Rural Doctors Workforce Agency** for funding the telehealth service delivery and equipment



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