

# TB ECHO

Evaluating the Eyes During COVID-19

April 6, 2020



# AEs associated with TB Meds

- Ophthalmic toxicity: EMB, LZD, ETA, INH, RFB
- EMB: optic neuropathy

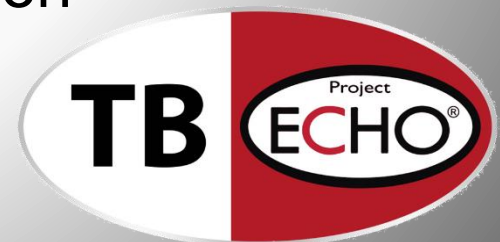
Changes in visual acuity > red-green color > visual fields

Ave. time to visual impairment:  $4.7 \pm 2$  mos (range 1-8)

May be permanent

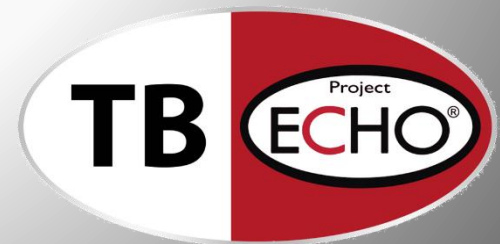
Ave. time to resolution:  $3.3 \pm 3.9$  months

- LZD, INH, ETA: optic neuropathy
- RFB – uveitits – esp in doses >300 mg/d
  - Erythematous, painful eyes; blurring vision



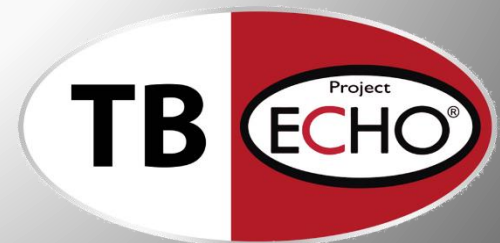
# Evaluation

- Get baseline VA and color discrimination
- EMB/LZD: Screen monthly for visual acuity and color discrimination
- Diabetes control
- Educate patients about changes in VA, color discrimination, changes in visual fields, erythema, eye, pain
- If above visual changes occur, STOP Medications!

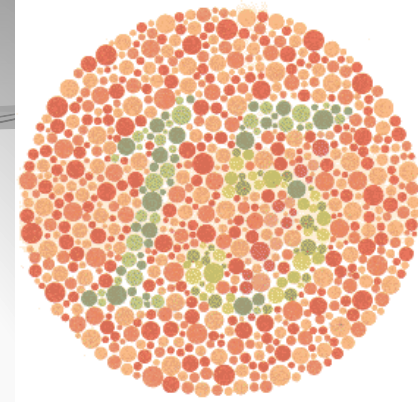


# Eye Screening & Shelter in Place

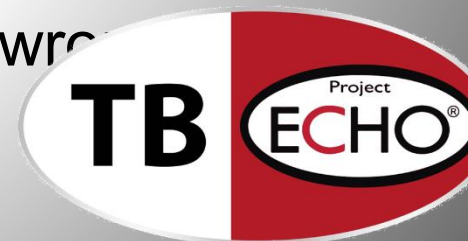
- Remote eye screening options? Tips from ECHO-land?
- I did a quick review of options that are out there
- There are many apps available...most not right for our needs
- Validation is lacking



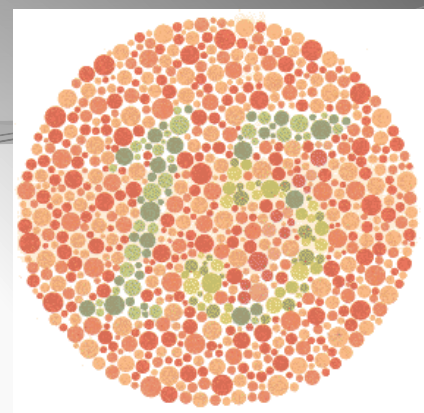
# Color Discrimination Ishihara



- Dr. Shinobu Ishihara developed 1917
- Many online tests and apps have deficiencies
  - Enchroma <https://enchroma.com/pages/test>
  - Colorblindness App
- Work fine if you don't have problems with color discrimination, but if you do,
  - State that you have a problem without additional info
  - Don't identify the specific plates that you got wrong
  - Crash

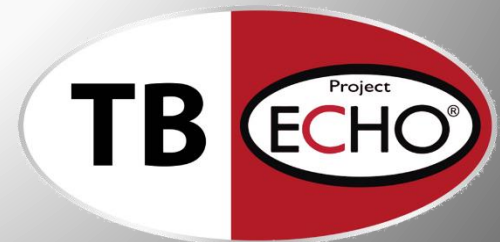
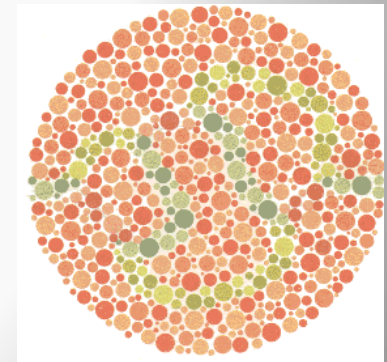
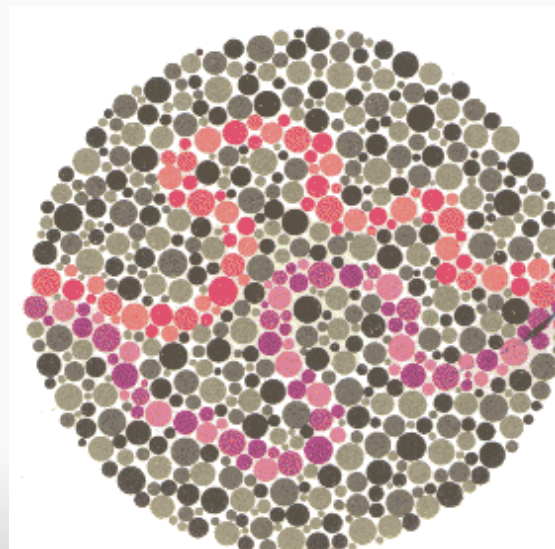
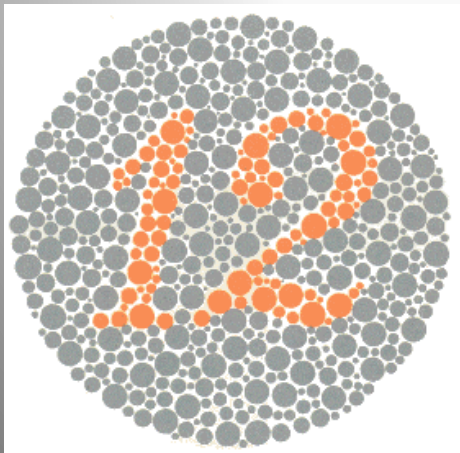


# Color Discrimination Evaluation Options



- Email the patient a pdf with the color plates and have the patient go through them with you
- One source:

[https://www.challenge.tb.org/publications/tools/country/Ishihara\\_Tests.pdf](https://www.challenge.tb.org/publications/tools/country/Ishihara_Tests.pdf)

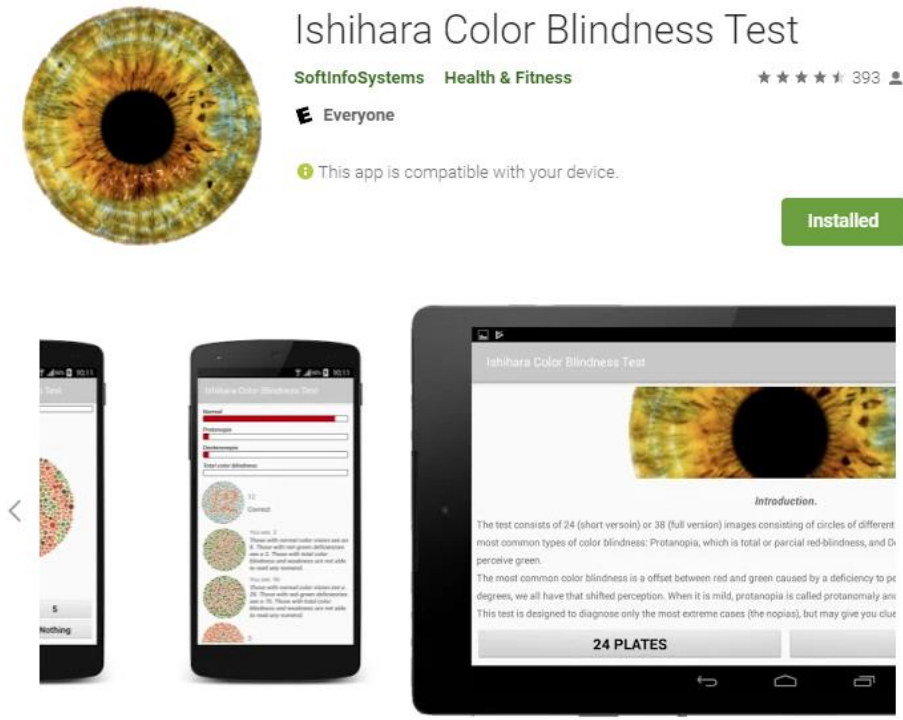




# Ishihara Colorblindness App

## Evaluation Options

- [https://play.google.com/store/apps/details?id=com.softinfosysru.ishiharacolorblindnesstest&hl=en\\_US](https://play.google.com/store/apps/details?id=com.softinfosysru.ishiharacolorblindnesstest&hl=en_US)



The image displays the Google Play Store listing for the 'Ishihara Color Blindness Test' app. At the top left is a circular Ishihara test plate. The app title 'Ishihara Color Blindness Test' is prominently displayed, followed by the developer 'SoftInfoSystems' and the category 'Health & Fitness'. It shows a 4-star rating from 393 reviews and is marked as 'Everyone'. A green 'Installed' button is visible. Below the main image, three smaller screenshots show the app's interface on a smartphone and a tablet. The smartphone screens show a test plate and a results screen with a progress bar and instructions. The tablet screen shows the app's introduction text and a test plate. At the bottom, a paragraph explains the Ishihara test.

Ishihara Color Blindness Test

SoftInfoSystems Health & Fitness

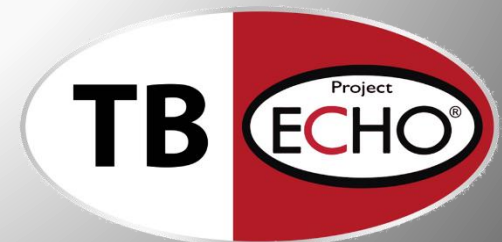
★★★★★ 393

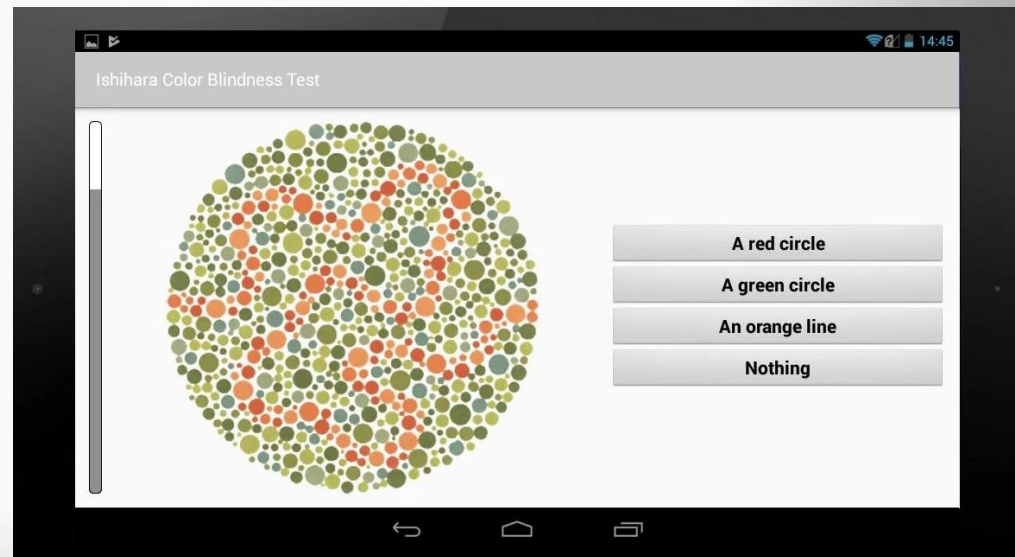
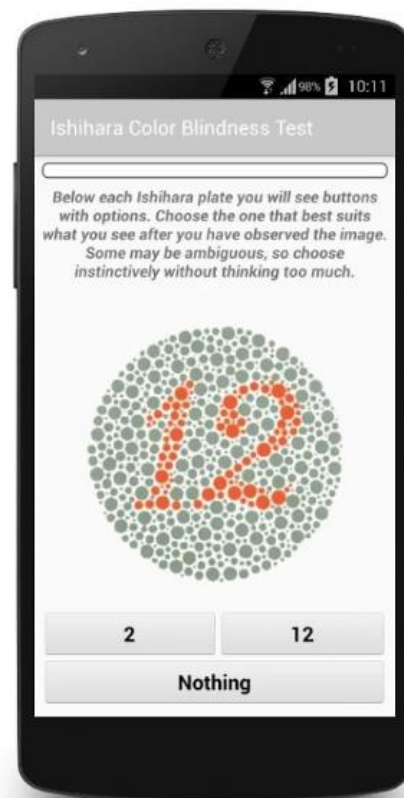
Everyone

This app is compatible with your device.

Installed

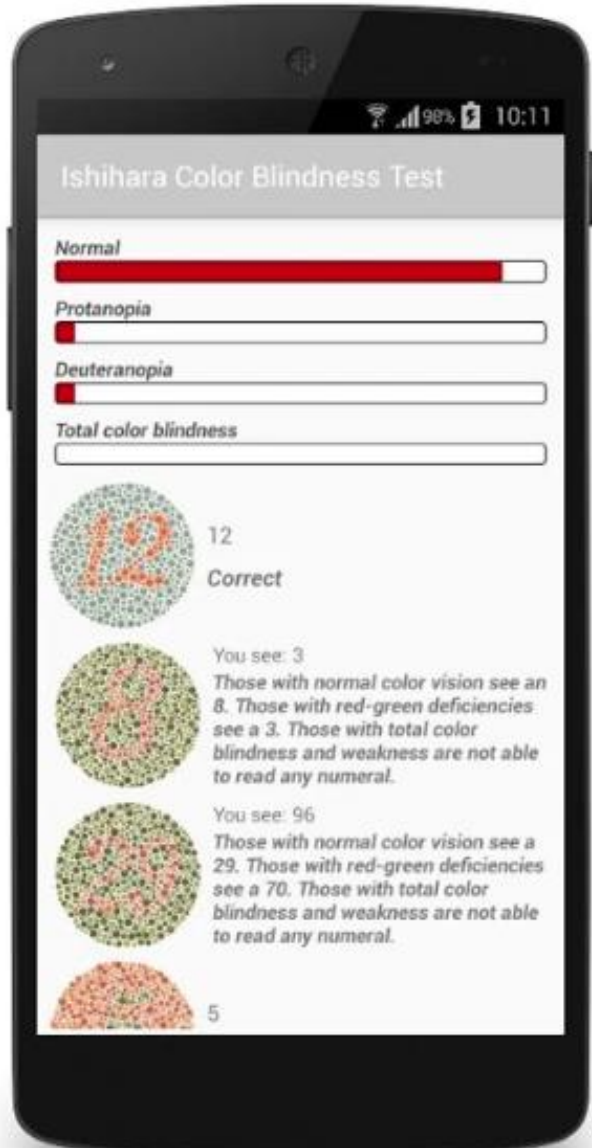
The Ishihara test is a color perception test for red-green color deficiencies, the first in a class of successful color vision tests called pseudo-isochromatic plates. It was named after its designer, Dr. Shinobu Ishihara, a professor at the University of Tokyo, who first published his tests in 1917.





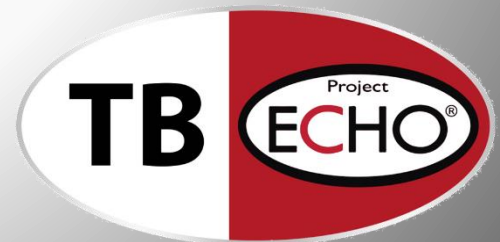
Protanopia - inability to distinguish red light

Deuteranopia – inability to distinguish green light (most common)



# Visual Acuity

- Over 100 Apps available between Android and iPhone platforms
- Limitations/Issues
  - Many tell you that your eyesight is impaired and direct you to a website for eye exams
  - Adapting a visual chart to varying screen sizes does not ensure that the size, font, or required distance is accurate compared to paper chart
  - Lack of validation

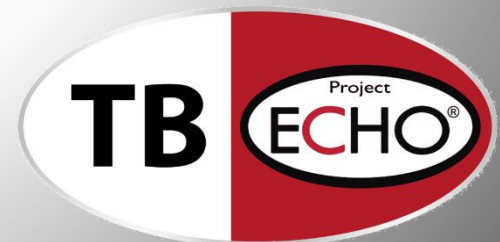


# Visual Acuity

Snellen chart for adults

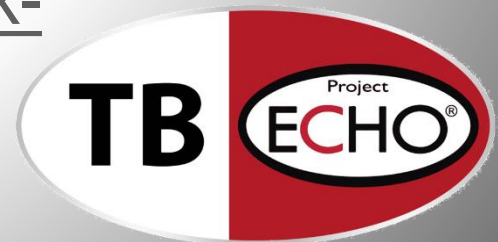


- I could not find an appropriate mobile-based app that could be used without assistance
- Paper Snellen Chart?



# Visual Acuity: Peek Acuity App

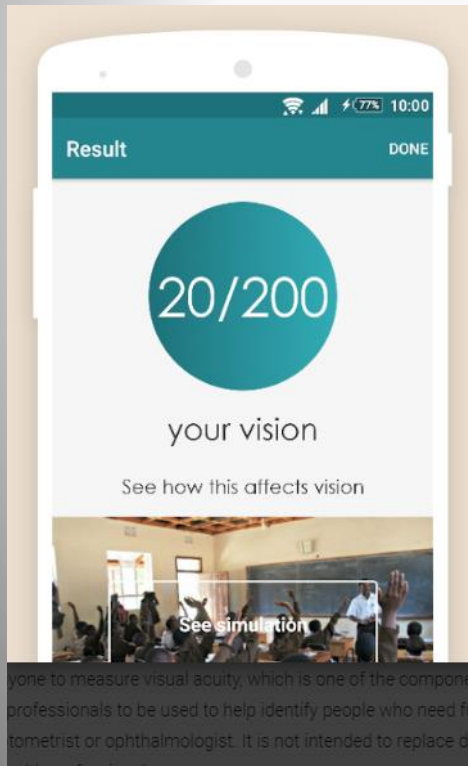
- Described in 2015 (Bastawrous *JAMA Ophthalmology*)  
Kenya: Compared to using at patients' homes to in clinic assessment: <1 line of vision difference.
- Free!
- Scores in standard units of Snellen - including metric (6/6) and imperial (20/20) - and LogMAR (0.0)
- Requires patient + one person
- [https://www.peekvision.org/en\\_GB/peek-solutions/peek-acuity/](https://www.peekvision.org/en_GB/peek-solutions/peek-acuity/)



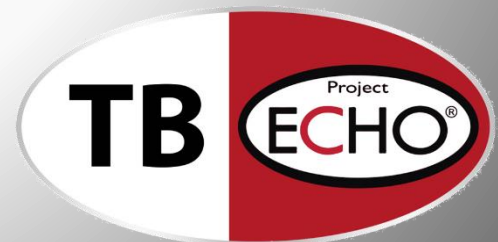
# Visual Acuity: Peek Acuity App

Instructional Video Available:

<https://www.youtube.com/watch?v=Xw3qMLjdpfM>



- Person holding phone stands 2 meters from patient
  - Provide with pre-cut string?



# Comments or Questions?

