

Visual Acuity Testing for Telemedicine

AAPOS Webinar

Evan Silverstein, MD

03/24/2020

Handout provided

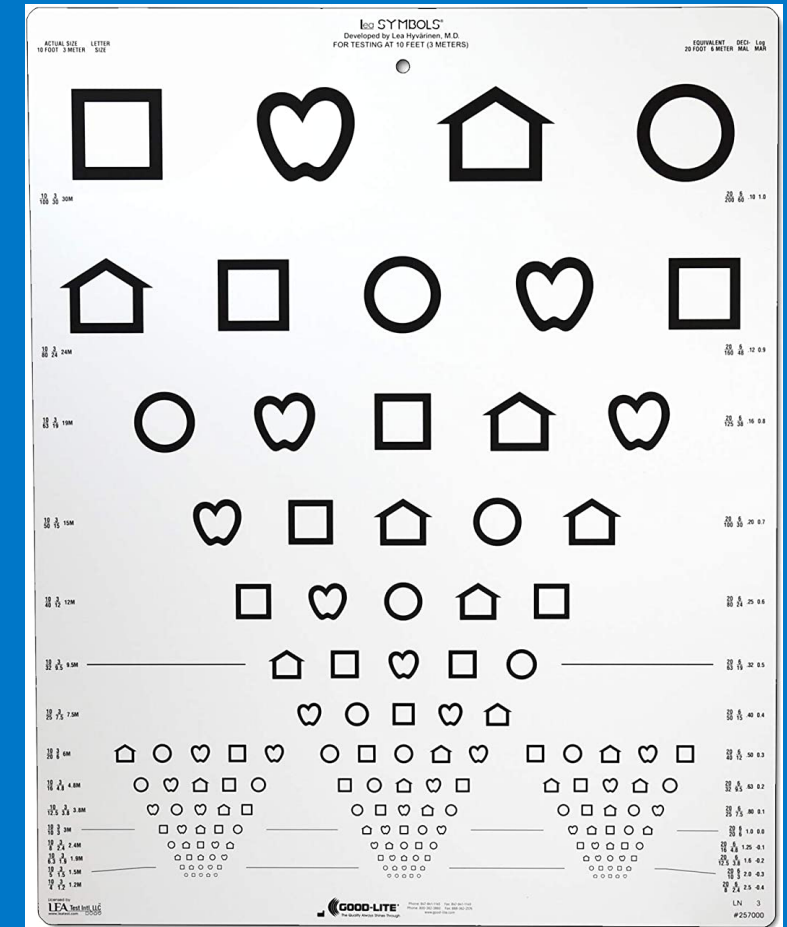
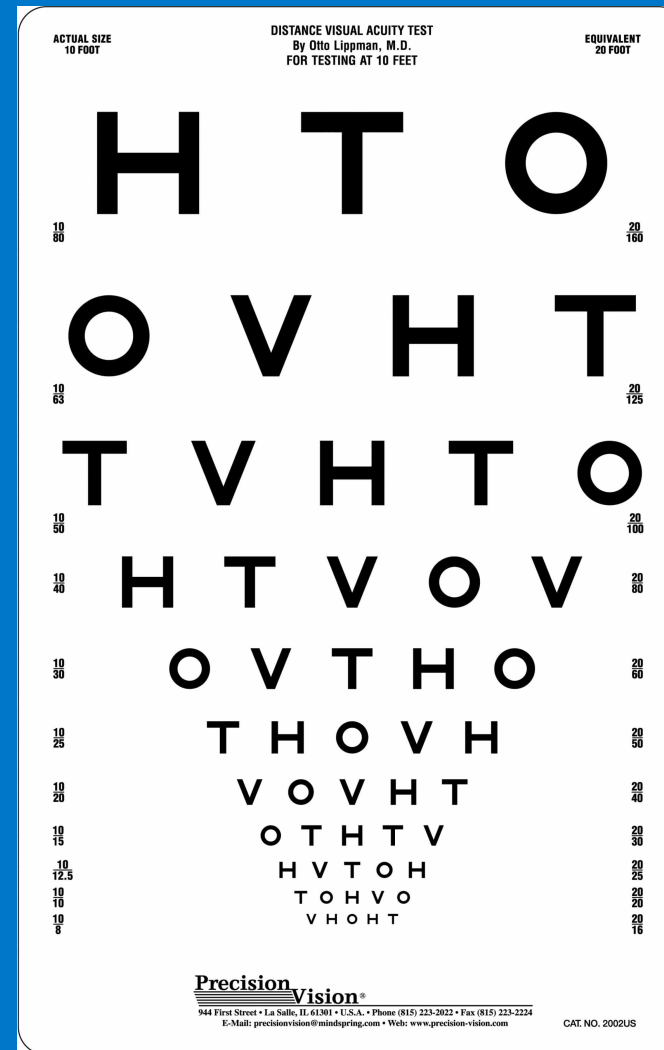
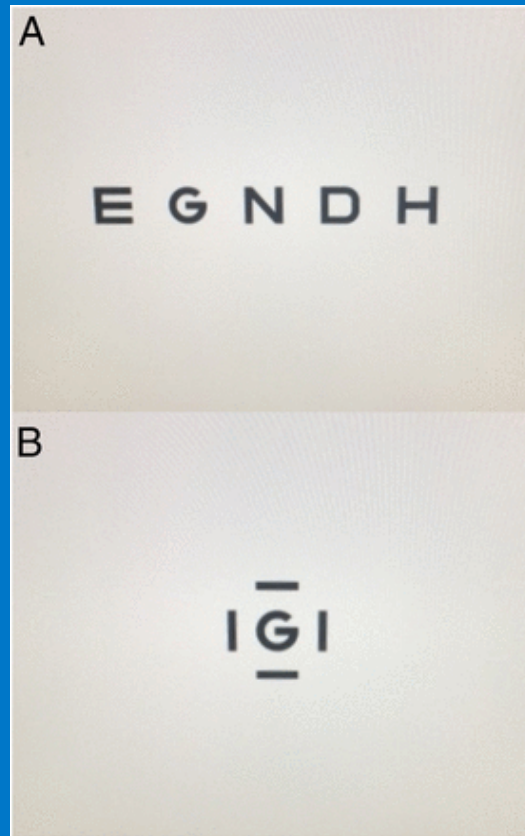
Financial Disclosures

See Vision, LLC – owner
Hill-Rom - consultant



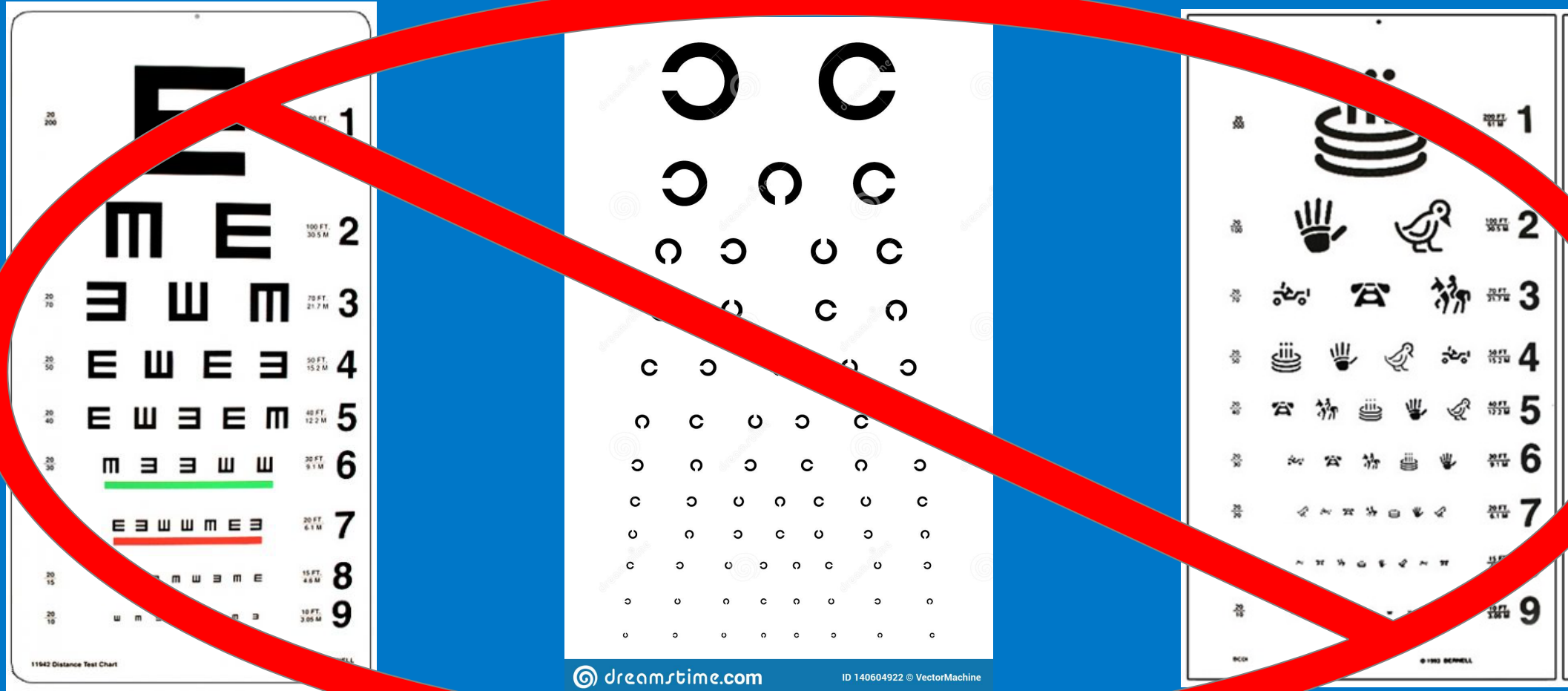
Visual acuity in the office

Visual acuity in the pediatrician's office



Donahue SP, Baker CN; Committee on Practice and Ambulatory Medicine, American Academy of Pediatrics; Procedures for the Evaluation of the Visual System by Pediatricians. *Pediatrics*. 2016;137(1):10.1542/peds.2015-3597. doi:10.1542/peds.2015-3597

Visual acuity in the pediatrician's office



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Pediatric Ophthalmology Clinic at Eye Associates Northwest



Visual Acuity at Home

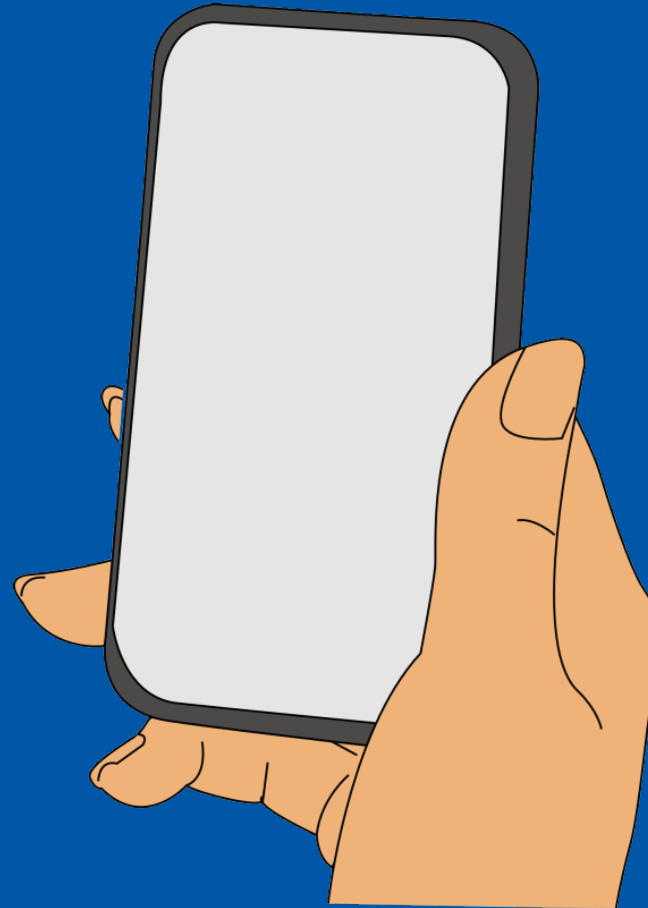
Visual Acuity at Home



Visual Acuity at Home



Methods for testing visual acuity



Paper acuity

Younger Children - HOTV

Bob Arnold, MD; ABCD Vision

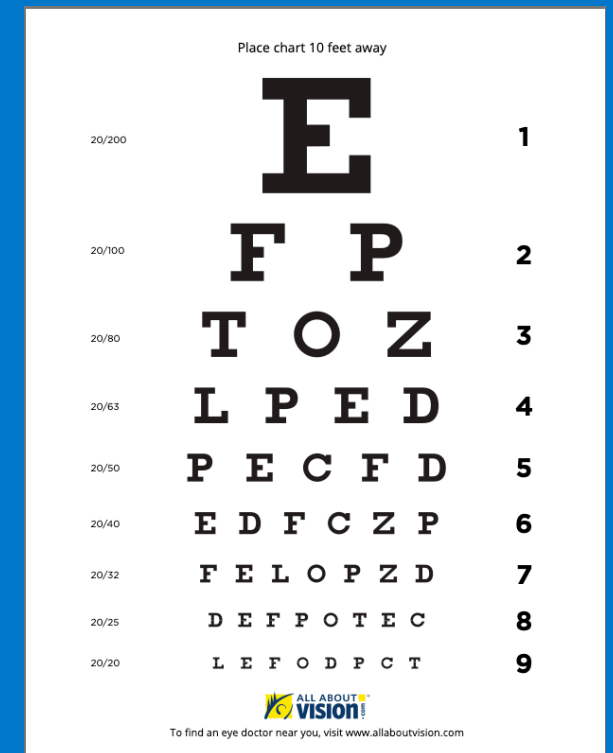


Tsao Wu M, Armitage MD, Trujillo C, et al. Portable acuity screening for any school: validation of patched HOTV with amblyopic patients and Bangerter normals. *BMC Ophthalmol.* 2017;17(1):232.

Older Children – Snellen/ETDRS

AAO:

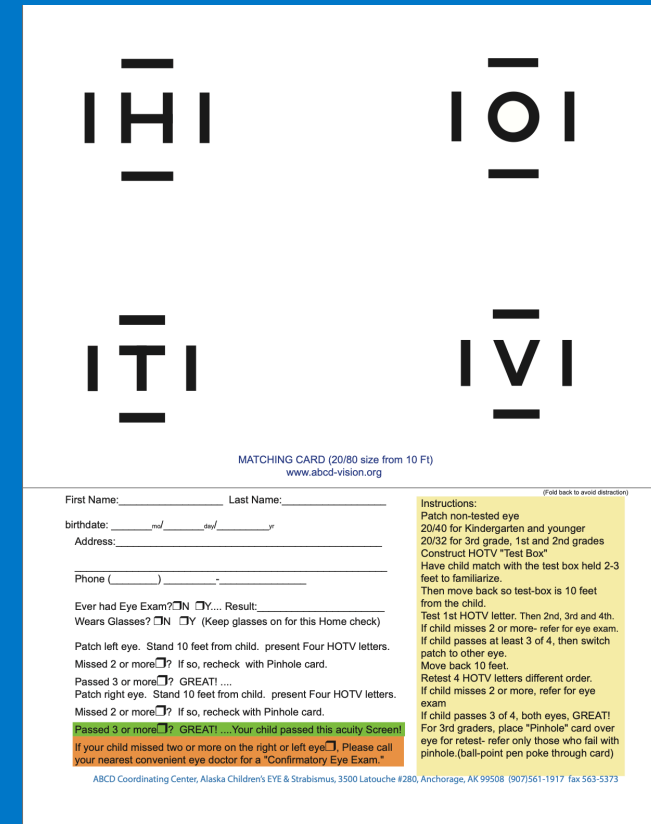
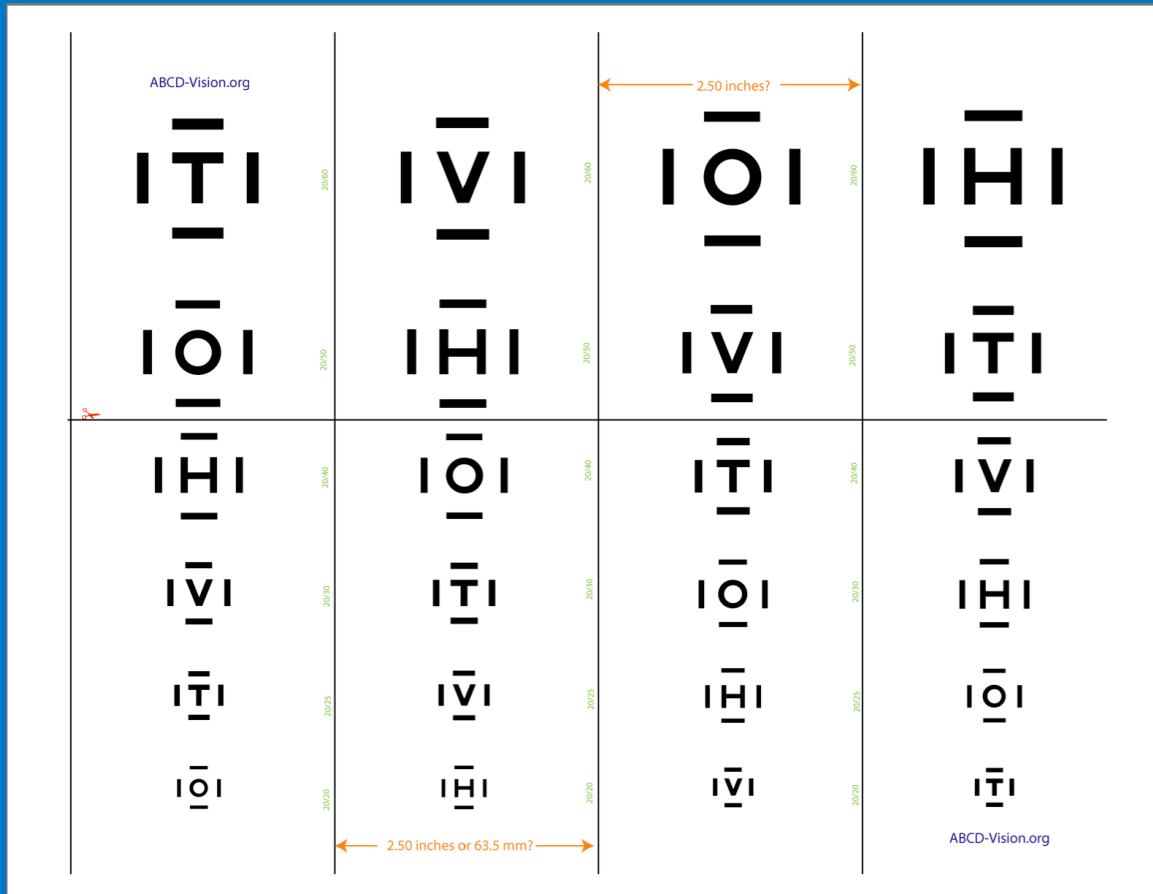
AllAboutVision



Paper acuity – HOTV – Bob Arnold, MD

<http://www.abcd-vision.org/Images/Home-Acuity-monitor.pdf>

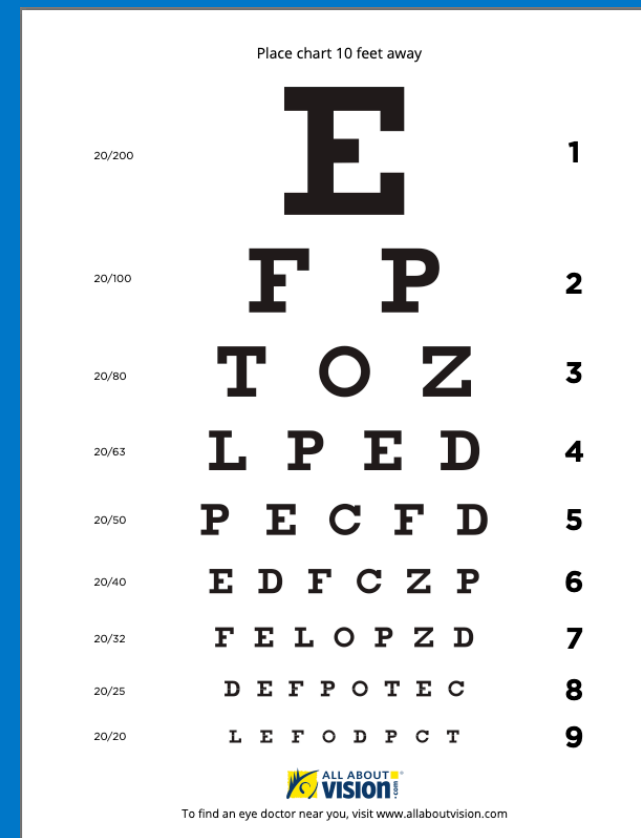
<http://www.abcd-vision.org/Images/ABCD-Home-match-HOTV.pdf>



Paper acuity -- Older Children

AAO: <https://bit.ly/3dj57X2>

AllAboutVision: <https://www.allaboutvision.com/eye-test/snellen-chart.pdf>



Standardization

1. Set up
10 feet (120 inches)



Standardization

1. Set up
10 feet (120 inches)
- 11 sheet of printer paper
(11 x 11 = 121 inches)



Standardization

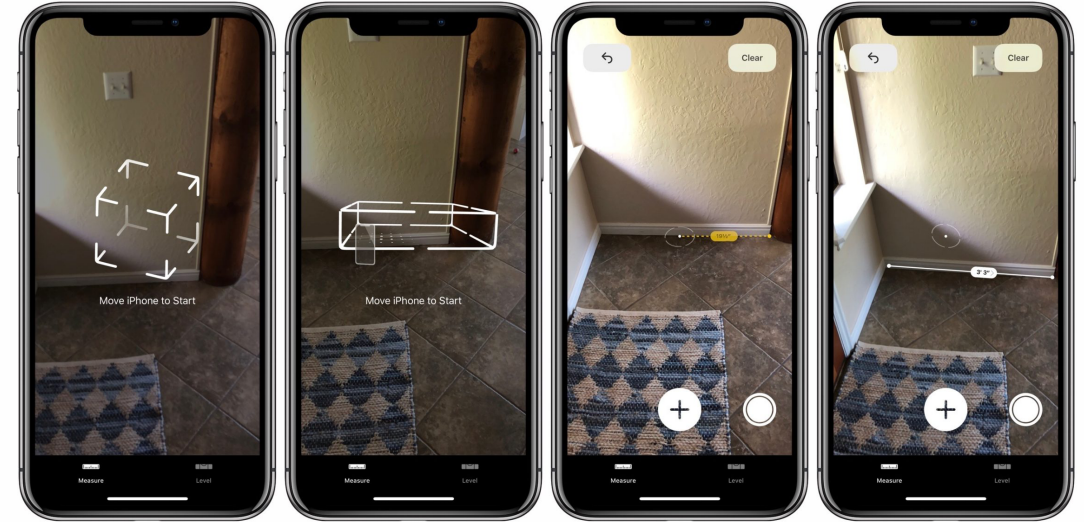
1. Set up
10 feet (120 inches)

Measure app – iOS



- iPhone SE and iPhone 6s or later
- iPad (5th Generation or later) and iPad Pro
- iPod touch (7th generation)

Google Measure - Android



Standardization

1. Set up
10 feet (120 inches)
2. Testing
occlusion

Standardization

- 1. Set up
10 feet (120 inches)
- 2. Testing
occlusion
- 3. Reporting

Handout provided

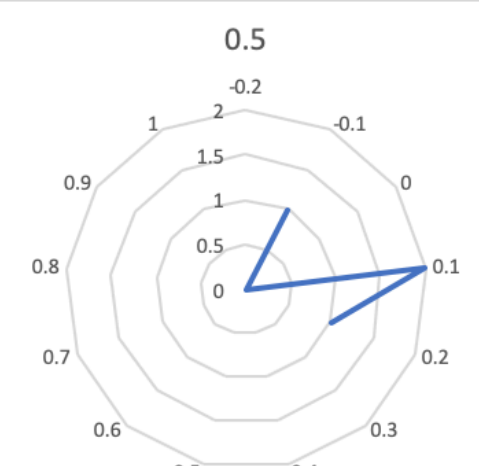
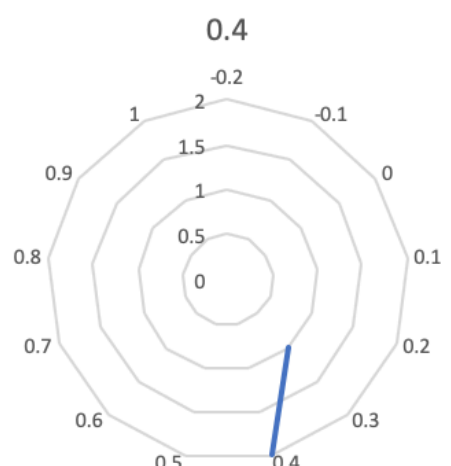
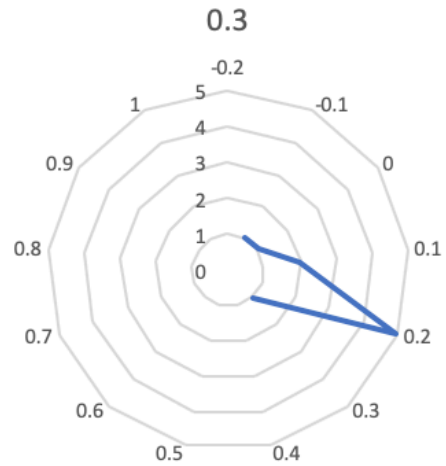
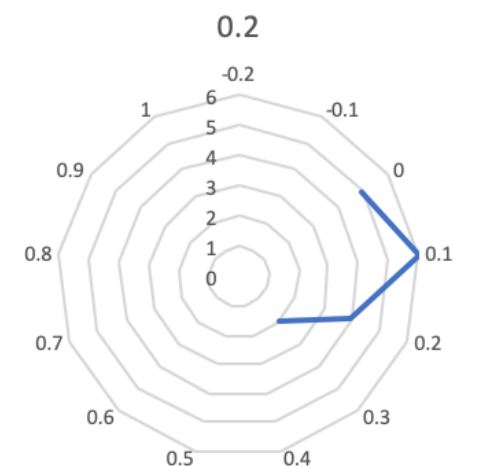
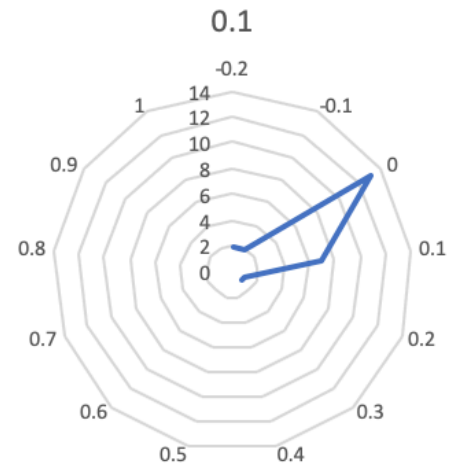
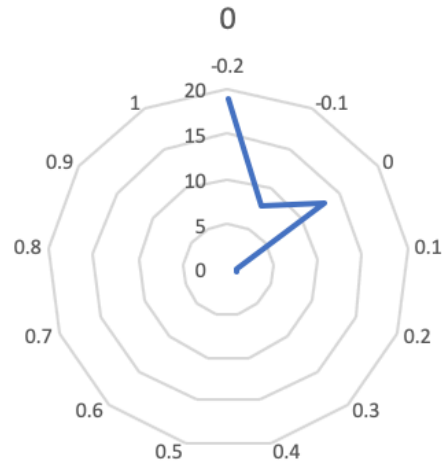
Method used:	
HOTV <input type="checkbox"/>	Snellen <input type="checkbox"/>
Glasses on?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Vision:	Reliability:
Right eye: 20 / <input type="checkbox"/>	1 2 3 4 5
	Low Medium High
Left eye: 20 / <input type="checkbox"/>	1 2 3 4 5

Electronic acuity

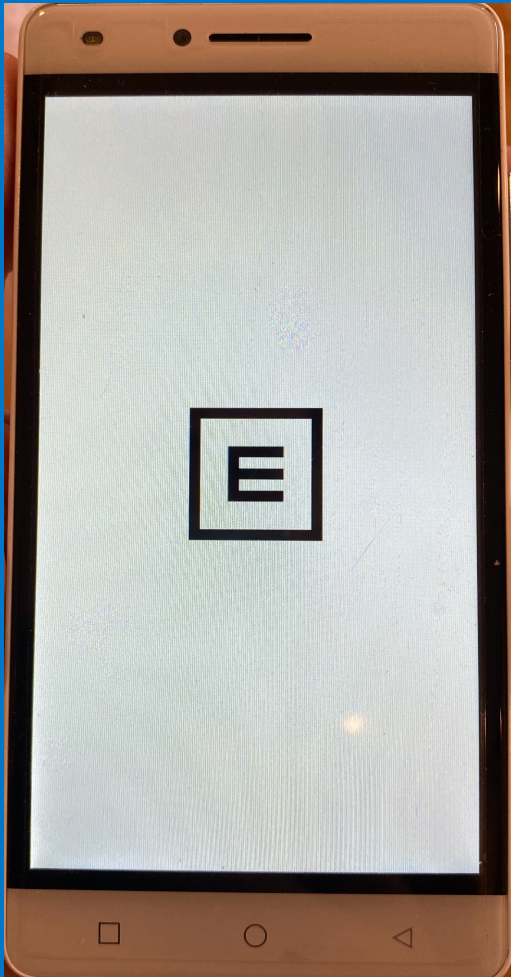
Product	VA Method	Testing Distance	Devices	Validated	Available
GoCheckKids	HOTV Snellen Crowd-Match	5 feet	iOS (Apple) Android (soon?)	Method ✓ FDA class I device	Possibly soon



Trivedi RH, Wilson ME, Peterseim MM, Cole KB, Teed RG. A pilot study evaluating the use of EyeSpy video game software to perform vision screening in school-aged children. *J AAPOS*. 2010;14(4):311–316. doi:10.1016/j.jaapos.2010.03.008



Product	VA Method	Testing Distance	Devices	Validated	Available
Peek Acuity	Tumbling E Boxed	2 meters	Android	✓	Yes - Free



Zhao L, Stinnett SS, Prakalapakorn SG. Visual Acuity Assessment and Vision Screening Using a Novel Smartphone Application. *J Pediatr*. 2019;213:203–210.e1. doi:10.1016/j.jpeds.2019.06.021

de Venecia B, Bradfield Y, Trane RM, Bareiro A, Scalamogna M. Validation of Peek Acuity application in pediatric screening programs in Paraguay. *Int J Ophthalmol*. 2018;11(8):1384–1389. Published 2018 Aug 18. doi:10.18240/ijo.2018.08.21

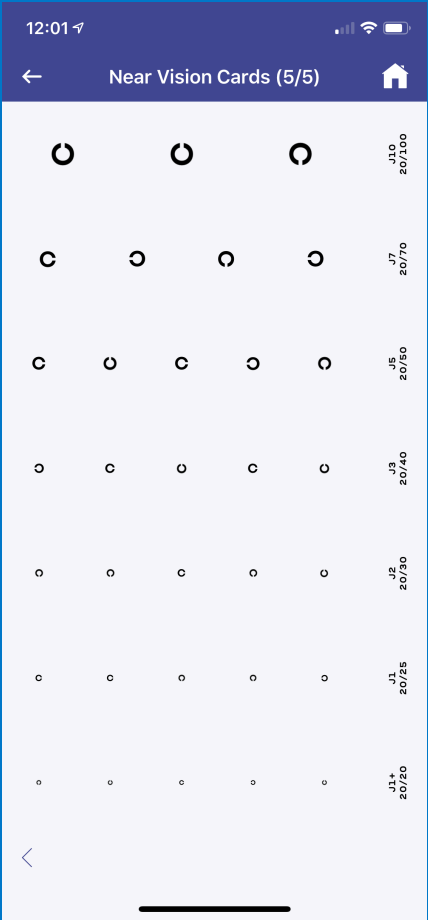
Bastawrous A, Rono HK, Livingstone IA, et al. Development and Validation of a Smartphone-Based Visual Acuity Test (Peek Acuity) for Clinical Practice and Community-Based Fieldwork [published correction appears in JAMA Ophthalmol. 2015 Sep;133(9):1096]. *JAMA Ophthalmol*. 2015;133(8):930–937. doi:10.1001/jamaophthalmol.2015.1468

Product	VA Method	Testing Distance	Devices	Validated	Available
Jaeb Visual Acuity Screener©	HOTV ETDRS Crowd	5 feet	Windows	✓	Yes - Free

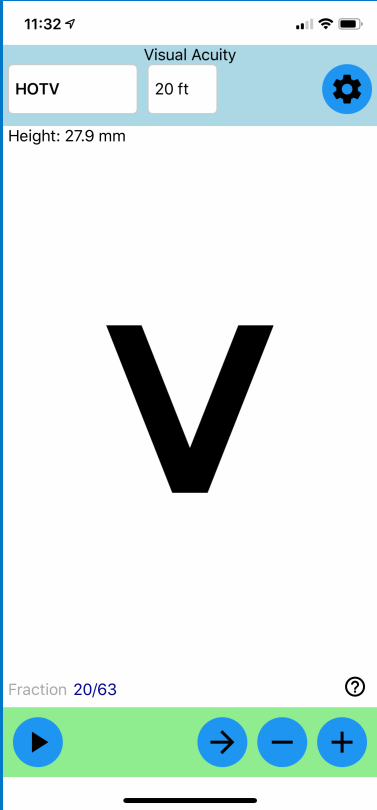


Yamada T, Hatt SR, Leske DA, et al. A new computer-based pediatric vision-screening test. *J AAPOS*. 2015;19(2):157–162. doi:10.1016/j.jaapos.2015.01.011

Product	VA Method	Testing Distance	Devices	Validated	Available
Eye HandBook	Modified Jaeger Number X-O Tumbling E Landolt C	14 inches	iOS Android	X	Yes – Free (ads)



Product	VA Method	Testing Distance	Devices	Validated	Available
“Visual Acuity Charts” - iOS Snellen Chart - Android	Single optotype Snellen Tumbling E Landolt C ETDRS HOTV LEA Numbers	2-6 meters	iOS Android	X	Yes - Free



Product	VA Method	Testing Distance	Devices	Validated	Available
GoCheckKids	HOTV Snellen Crowd-Match	5 feet	iOS (Apple) Android (soon?)	Method ✓ FDA class I device	Possibly soon
Peek Acuity	Tumbling E Boxed	2 meters	Android	✓	Yes - Free
Jaeb Visual Acuity Screener©	HOTV ETDRS Crowd	5 feet	Windows	✓	Yes - Free
Eye HandBook	Modified Jaeger Number X-O Tumbling E Landolt C	14 inches	iOS Android	X	Yes - Free
“Visual Acuity Charts” - iOS Snellen Chart - Android	Single optotype Snellen Tumbling E Landolt C ETDRS HOTV LEA Numbers	2-6 meters	iOS Android	X	Yes - Free

Handout

Home Visual Acuity Testing

During the COVID-19 pandemic, we will be performing telehealth visits. An important part of an eye examination is measuring vision—how well your child can see on an eyechart.

Prior to your telehealth appointment, please check and record your child's vision in their right eye and their left eye. If they have glasses, please ensure they are wearing them during the test.

Method used:

HOTV ☐

Snellen ☐

Glasses on?

Yes ☐

No ☐

Vision:

Right eye: 20 /

1 2 3 4 5
Low Medium High

Left eye: 20 /

1 2 3 4 5

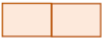
Reliability:

Please follow these directions:

- 1) Print a full sized visual acuity chart:
- Children < 6 (or if they do not know their letters):
<http://www.abcd-vision.org/Images/Home-Acuity-monitor.pdf>
Confirm that the distance between lines is 2.5 inches (guide on sheet)
 - Fold chart so letters are on outside, and secure with a paper clip
 - Print matching guide for younger children
<http://www.abcd-vision.org/Images/ABCD-Home-match-HOTV.pdf>
 - Children > 6 (or children that know their letters)
<https://www.allaboutvision.com/eye-test/snellen-chart.pdf>



- 2) Set up testing area
- HOTV chart:
- Give your child the matching guide (if needed) and practice the test
 - Find a room that is at least 15 feet long
 - Place chair for child at the end of the room
 - Measure 10 feet from the back of the chair
- Tape measure
- "Measure" app on iOS or Android
- Lay 11 printer pages (8.5" x 11") end to end
- Snellen chart:
- Tape chart on a wall
 - Measure 10 feet from the wall (methods as above)



- 3) check your child's vision
- if you have a patch, patch your child's left eye
 - if your child wears glasses, put them on
- HOTV: (child can point to the matching letter or state the letter out loud)
- Stand 10 feet away and randomly spin the chart and point to the first letter under the black line (20/40). If they can identify this letter, move to the next smallest letter. If they cannot read it, go up a line. Find the size of letters your child can read at least 3/4. Record this number. (20/___) Record how reliable you think the vision test was.
- video guide: <https://vimeo.com/398735742>
- Snellen:
- Have your child stand 10 feet away from the eyechart on the wall
 - Ask your child to read the lowest line of letters they can.
 - identify the lowest line of letters your child can read at least half the letters. Record this number (20/___). Record how reliable you think the vision test was.

Patch the right eye and repeat the test.

General tips:

- No cheating!
- Make sure your child's eye is patched or completely covered and they are not peeking.
 - Do not give your child any hints.
- Practice first
- Especially for the HOTV test, stand close to your child and practice. Make sure they understand the "game".

Thank you
evan.silverstein@vcuhealth.org