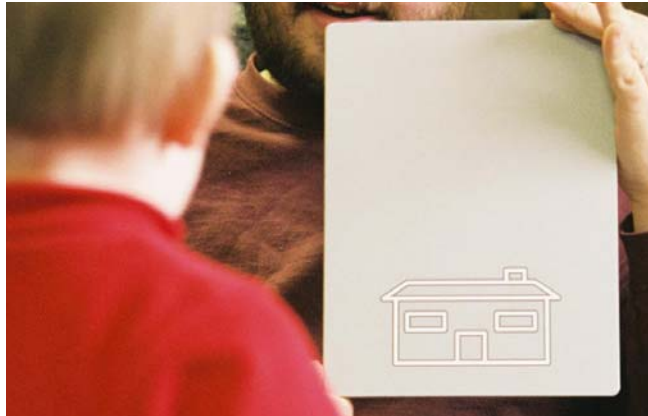


New Cardiff Acuity Test Set™



As the examiner shuffles through the cards, the movement of the child's eyes up or down is noted.

The Cardiff Acuity Test™ is designed specifically for acuity measurement in children aged 1 to 3 years. The test is also helpful with other age groups with intellectual impairment, dementia, head injury or stroke.

TEST PRINCIPLES

The test employs the principle of vanishing optotype, in other words the figure (fish, car etc.) blends with the gray background shades at the acuity threshold. Thus resolution, detection and recognition acuity thresholds are all brought together.

The target figures are pictures, all of the same overall size, drawn in decreasing widths of white and black lines. The acuity is determined by the narrowest white band for which the target is visible to the child.

The vanishing optotypes are combined with the principle of 'Preferential Looking' to provide a pediatric test method that provides excellent accuracy of diagnosis. When a card is presented the child will choose to look towards the top or bottom of the card if they have sufficient acuity to recognize the target figure. This works because the child naturally prefers to look at a target figure rather than the blank end of the stimulus. Further, 'Preferential Looking' works when the examiner does not know whether the top or the bottom of the cards contains the target figure. If the child does not show a preference for either the top or bottom of the card, the acuity threshold has been exceeded.

TEST ADMINISTRATION

The Cardiff Acuity Test includes three cards at each acuity level. The Richmond P/N 4740R Standard card set includes 12 levels (36 cards) and covers acuity levels from 20/160 to 20/12.5 (6/48 to 6/3.75). Richmond P/N 4741R Low Vision set also includes 12 levels (36 cards) but covers acuity levels from 20/320 to 20/25 (6/96 to 6/7.5) .

A working distance of 40 inches (one meter) is recommended. At this distance eye movement position judgements are reliable and a range of 20/320 to 20/12.5 (6/48 to 6/3.8) can be measured. A closer working distance of 20 inches (50 cm) can be used as an alternative to test lower acuity levels or allow closer interaction with the child.

The Cardiff Test employs an up-down positioning of the target figures rather than the right-left separation (as is used in the Teller Acuity Cards™ II) so that the eye movements are easier to discriminate in cases of congenital nystagmus. Further, the Cardiff Test can be used in cases of suspected malingering as the patient's eye movements are involuntary.

Test administration with the Cardiff Acuity Test is relatively quick and easy to learn. On average, an experienced examiner can conduct a complete test in 3-5 minutes.

Age (months)	Binocular Acuity		Monocular Acuity	
	(Snellen Equivalent)		(Snellen Equivalent)	
	Feet (20/)	Meters (6/)	Feet (20/)	Meters (6/)
12-17.9	160-40	48-12	160-50	48-15
18-23.9	80-25	24-7.5	100-25	30-7.5
24-29.9	50-25	15-7.5	63-25	19-7.5
30-36	40-20	12-6.	40-20	12-6.

Cardiff Acuity Test norms for typically developing children



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New Cardiff Acuity Test Set™ (continued)

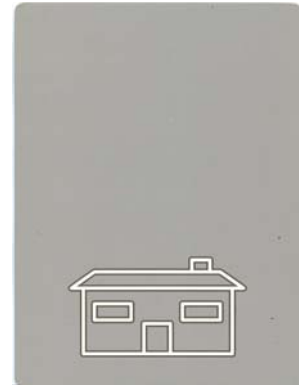
COMPETITIVE COMPARISON

Other test products used in this age range include:

Teller Acuity Cards™ II - employs a simple grating (various widths of gray stripes) as stimuli whereas the Cardiff Acuity Test presents a more interesting figure (car, boat etc).

Lea Gratings™ (Paddles) - based on the movement of the target grating level as it appears from behind the non-stimuli paddle whereas the Cardiff Acuity Test and the Teller Acuity Cards™ II do not require movement of the target.

It must be noted that both grating type tests and the Cardiff Preferential Looking Test tends to give a higher acuity level than a letter test simply because the child is required only to resolve the target, not to identify it.



Vanishing optotype blends in with background at specific acuity

Pediatric Acuity Test	Age Range	Optotype Acuity Range	# of Cards
Teller Acuity Cards™ II	6 months to 3 years	20/16 to 20/1900	17
Cardiff Acuity Test™ - Standard	12 months to 3 years	20/12.5 to 20/160	36
Lea Gratings™	12 months to 2 years	not applicable-see note	6
Allen School Figures w/ hand	3 to 5 years	20/30 to 20/100	4
Lea Single Symbol™ Book	19-36 months	10/5 to 10/100	13

Comparison of pediatric acuity tests helps position each test in terms of age and pricing. Lea Gratings help track visual acuity development but are not intended to be used to convert to optotype acuity values.

WHAT'S NEW IN 2005?

Two versions of the Cardiff Acuity Test are now offered to meet the differing needs of Pediatric vs Low Vision patients:

P/N 4740R Standard: 12 acuity levels from 20/160 to 20/12.5
P/N 4741R Low Vision: 12 acuity levels from 20/320 to 20/25

There are three cards at each of these 12 acuity levels. Both versions also include a pair of 4608R Butterfly foamy occluding glasses.

Intended for test distances of 1 meter or 50 cm. Card measure 7 3/4 by 10 1/2 in (20 BY 27 cm) and are labeled by acuity level equivalents in decimal, meters, feet, Snellen and LogMAR for both test distances.

PRICING

4740R Cardiff Acuity Test Standard Set with 36 cards and occluding glasses

4741R Low Vision Cardiff Acuity Test Low Vision set with 36 cards and occluding glasses



Butterfly occluding glasses are included with each Cardiff Test set.

KEY REFERENCES

- Adoh, T O and Woodhouse J M (1994). "The Cardiff Acuity Test used for measuring visual acuity development in toddlers." Vision Research **34**(4): 555-560
- Jackson, A J and K J Saunders (1999). "The optometric assessment of the visually impaired infant and young child." Ophthalmic and Physiological Optics **19**(1002): S49-S62
- Woodhouse, J M Adoh T O et al. (1992). "New Acuity Test for toddlers." Ophthalmic and Physiological Optics **12**: 249-251



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