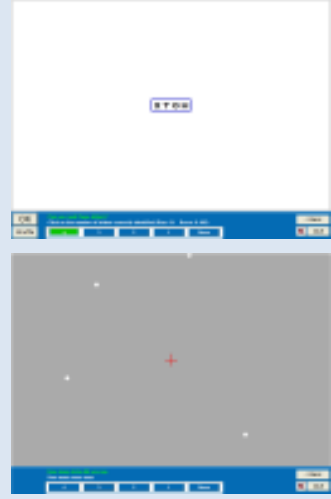


# Computerised screening for correctable visual impairment in older people

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## Abstract

Up to a third of older people have reduced vision from correctable visual problems (refractive errors or cataract). In Study 1 we evaluated a prototype computerised vision screener (CVS1) on 180 older people. The results were used to refine the test battery in a revised screener (CVS2) which was evaluated on a new sample of 200 people. All participants were aged 65+ and received a full optometric eye examination, using a masked protocol. The best sensitivity for detecting uncorrected refractive error, cataract, or AMD was obtained for a screener test combination of a fail on high contrast VA OR near VA (sensitivity 80%, specificity 68%). Using a more pragmatic criterion, the CVS2 had a sensitivity of 95% and specificity of 94% for detecting people who might be judged to require an eye examination (reduced VA or overdue). The CVS2 may help to educate older people about the need for eyecare and may be useful in detecting people whose are not aware of a drop in their VA.

## Method

- ❖ Two studies were carried out in a variety of venues including a community centre, GP clinic and optometry clinics
- ❖ All participants received vision screening and a gold standard eye examination, using a double masked protocol
- ❖ The gold standard eye examination included: high contrast and low contrast VA, orthoptic tests, visual fields, tonometry, dilated cataract grading (LOCS III), dilated fundoscopy and macular grading
- ❖ In Study 1, a prototype computerised vision screener (CVS1) was used on 180 older people. The results were used to refine the test battery (see Table 1) for Study 2
- ❖ In Study 2 the revised vision screener (CVS2) was used on a new sample of 200 older people
- ❖ Analyses included receiver-operator curves (ROC) and effect on quality of life (LVQoL)

## Objectives

Many older people have undetected reduced vision and in most cases this results from correctable problems (refractive error and cataract). We sought to investigate whether vision screening in the community might educate the public about the need for routine eyecare and provide personalised advice to persuade people with poor vision to seek optometric care.

## Results

- ❖ In the two samples:
  - cataract affected 31% - AMD in 22-29%
  - uncorrected Rx in 30-40%
  - correctable visual loss in 50-58%
- ❖ Table 2 shows examples of the sensitivity and specificity of CVS2 for detecting:
  - 2 line monocular gain in distance VA with new Rx or
  - 2 line binocular gain in near VA with new Rx or
  - significant cataract in either eye or
  - risk of rapid progression AMD in either eye
- ❖ Specificity drops to 51% for sensitivity of 80% for detecting glaucoma/glaucoma suspects
- ❖ From a pragmatic optometric perspective, CVS2 detects 95% of those who have reduced VA or are due for an exam
- ❖ Spectacle intervention group had the greatest ( $p < 0.001$ ) improvement in QoL, correlated with gain in VA (Figure 1)

Table 1: Tests included in screeners

Tests	CVS1	CVS2
Symptoms & history	Yes	Yes
High contrast VA	Yes	Yes
Low contrast VA	Yes	Yes
Near VA	Yes	Yes
Visual field	Yes	Yes
Fixation disparity	Yes	No
Stereo-acuity	Yes	No

Figure 1: LVQoL gain

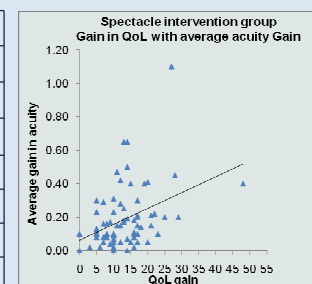


Table 2: Best test combinations achieved with screener

Test Combinations	Sensitivity (%)	Specificity (%)	PPV (%)
HCVA(0.19) or LCVA(0.39) or NVA	80.3 (72.4-86.4)	66.7 (55.6-76.1)	79 (71-85.3)
HCVA(0.29) or LCVA(0.49) or NVA or symptoms	82 (74.2-87.8)	60.3 (49.2-70.4)	76.3 (68.4-82.8)
HCVA(0.19) or LCVA(0.39)	77.9 (69.7-84.3)	69.2 (58.3-78.4)	79.8 (71.7-86.1)
HCVA(0.19) or NVA	79.5 (71.5-85.7)	67.9 (57-77.3)	79.5 (71.5-85.7)
HCVA(0.19)	77 (68.8-83.6)	73.1 (62.3-81.7)	81.7 (73.7-87.7)
LCVA(0.39)	71.3 (62.7-78.6)	76.9 (66.4-84.9)	82.9 (74.5-88.9)

## Conclusions

- ❖ Correctable visual problems can be detected with sensitivity of ~80% and specificity of ~70%
- ❖ As is well known, glaucoma detection is problematic and the implementation of vision screening does not replace the need for regular eyecare
- ❖ If vision screening reduces the prevalence of uncorrected refractive errors then it will improve quality of life
- ❖ Ethically, vision screening is only appropriate if it:
  - ✓ Never claims to replace regular eyecare
  - ✓ Educates about the need for routine eyecare
  - ✓ Detects & refers those with correctable problems