An investigation of tests and protocols used to assess colour vision in firefighters

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ABSTRACT

Background: Good colour vision (CV) is vital for safe firefighting, but approximately 8% of males have inherited CV deficits. Several attempts have been made to standardise CV assessment protocols to select firefighters with “safe” CV. Failure to apply these standards has raised safety concerns.

Objective: To investigate whether the statutory test protocol for firefighters (1996) is the most effective and practical means to assess CV in firefighting, and to establish whether the 3rd Edition City University Test (CUT) could be used to assess “safe” CV in firefighters.

Methods: A prospective cross sectional study was conducted from August 2004 to September 2005. Male recruits and serving male firefighters were asked to undertake a CUT in parallel to the statutory CV protocol. The CUT was assessed for its ability to identify individuals with CV deficits, and compared with the Ishihara test. Chi-squared coefficients and confidence intervals were calculated to test statistical significance. Receiver Operator Curves were plotted to compare the CUT and Ishihara tests.

Results: There were 403 individuals who fulfilled study selection criteria. The Nagel Anomaloscope (the “gold standard”) identified 14 individuals as having ‘unsafe’ CV. Ishihara testing selected 29 individuals with abnormal CV, but did not detect an unsafe tritan dichromat. CUT Part I identified 14 individuals with severe deficits, but made 1 false positive and 1 false negative error. CUT Part II correctly identified the 14 subjects with severe deficits.

Conclusion: CUT Part II performed better than the Ishihara in detecting “safe/unsafe” CV with respect to the standards required for operational firefighters in this cohort, and was cost effective and easy to perform. It may be possible to use the CUT in isolation or in combination with other CV tests to detect significant CV deficits, but further work is advisable because of the small size of this study.