

# Driving and vision

## Part 3 - A model for driver vision screening in UK

Continuing our series, **Mark Nevin** argues that the UK lags significantly behind other European countries in ensuring all drivers have good vision for safe driving and proposes a new model to improve the screening of drivers

**T**he system for checking drivers' vision in the UK has been in place since the 1930s, and is outdated, lacking a solid scientific basis, and is arguably not comparable to the underlying European Union standards.

We have seen in Part 1 of this series that legislation is currently being implemented in the UK, and indeed across Europe, that presents an opportunity to improve the screening of all drivers' vision to ensure that all road users benefit from all drivers being fit to drive. Part 2 has presented the evidence in favour of acuity assessment and reminded us that there is a public duty, not only on individuals, but also on legislators to ensure that all drivers meet the legal visual requirements. This part of the series introduces a model by which this can be achieved.

Driver vision screening in the UK can be improved substantially. This can be achieved at low cost and with only minor inconvenience to the driving population, on renewal of their licence. Moreover, this small cost would be offset by benefits for all road users and arguably the public purse. Improved driver vision screening would also allow the UK to build on other initiatives to improve road safety, such as enforcing the wearing of seat belts, banning the use of hand-held mobile phones, and lowering the drink-driving limit. This is an opportunity for the UK to use that momentum to continue to improve the record of road safety.

### What the Directive says

The visual acuity (VA) and visual fields standards specified in the 2009 EC Directive were described in detail



All drivers should attend for vision screening prior to the issuing of a provisional licence and when renewing

in Part 1 and are summarised here (Table 1).

We have also seen that Group 1 (car and motorcycle) drivers are distinct in law from Group 2 drivers (heavy goods vehicles and passenger transport vehicles carrying over 10 people). As has been outlined in Part 1, separate arrangements and standards are in

place for Group 1 and 2 drivers, with a more systematic assessment of Group 2 drivers' vision already implemented that will be updated by the 2006 and 2009 EC Driving Licence Directives.

The model outlined below is a recommendation for a more systematic assessment of the vision of Group 1 (and potentially also Group 2) drivers, which is a central pillar of the Optical Confederation's campaign for improved driver vision screening in the UK.

### Driver vision screening across Europe

Across Europe a range of systems of Group 1 driver vision screening is currently in place. To date, the most scientific and appropriate systems are in Finland and Ireland, followed by Germany. The systems in use in these countries involve screening VA and visual fields (except in Germany, at time of writing) that is directly comparable with the stated legal requirements from the Directives. The screening is performed by a 'competent authority' that understands not only the minimum visual standards, but can also discuss potential reasons for failing.

In Finland, Group 1 drivers are

TABLE 1

#### VA and visual fields standards from 2009 Directive

- **Group 1 drivers** require adequate VA and visual fields for driving power-driven vehicles. Directive 2009/113/EC defines a minimum VA of 0.5 (6/12) binocularly with corrective lenses if necessary. In addition, the drivers' visual field should be at least 120 and the extension should be at least 50° to the right and 50° to the left and 20° up and down. No defects should be present within a radius of the central 20°.
- **Monocular drivers** must have a VA of at least 0.5 (6/12) with corrective lenses if necessary, and a field of vision in that eye equivalent to above. Monocular vision should have existed for a sufficiently long time to allow adaptation.
- **Group 2 drivers** require VA of at least 0.8 (6/7.5) in the better eye and 0.1 (6/60) in the worse eye, with corrective lenses if necessary. If corrective lenses are needed to attain values of 0.8 and 0.1, the minimum acuity must be achieved either by correction by means of glasses with a power not exceeding ±8D or with the aid of contact lenses. This correction must be well tolerated. The horizontal visual field should be at least 160°, the extension should be at least 70° left and right and 30° up and down. No defects should be present within a radius of the central 30°. Driving licences shall not be issued to or renewed for applicants or drivers suffering from impaired contrast sensitivity or from diplopia.

From EC Directive 2009/113/EC Annex III

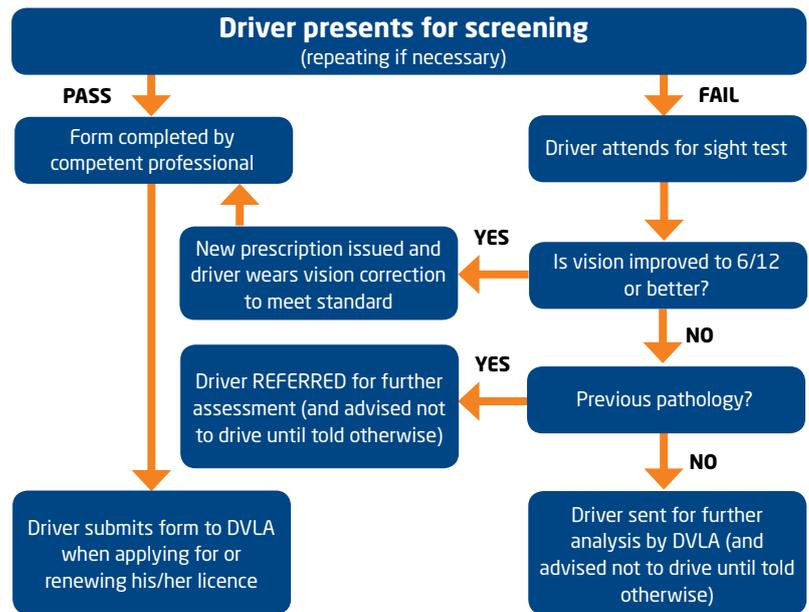
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required to attend for driver vision screening when applying for a provisional licence, at the age of 45, and again at the age of 70. Driver vision screening in Finland, which is a sub-set of a sight test or eye examination, requires that VA and visual fields are assessed against a minimum standard required to issue a driving licence. This assessment is done by a competent medical authority (usually an optometrist or medical doctor).

Having met the minimum visual requirements, a report is completed by the competent medical authority, and submitted with the applicant's forms to renew the licence. If the applicant does not pass driver vision screening, he/she attends for a sight test or eye examination which could result in new spectacles or contact lenses. Alternatively, should the examiner uncover an underlying eye disease or condition, the applicant is referred to have this investigated and treated as appropriate.

In Germany, Group 1 drivers are required to attend for driver vision screening performed by a competent authority when applying for a provisional licence. This model requires that VA be assessed under carefully controlled conditions and using specific equipment in order to standardise the results. The price of this assessment is set by the German federal government at €6.43. Should the driver pass this assessment, a report is completed and submitted to the licensing authority, as in Finland. If the applicant does not pass driver vision screening, they then attend for a sight test or eye examination, again as in Finland.

In the Republic of Ireland (ROI), the required assessment for vision has recently been updated in line with the 2009 Directive. Group 1 applicants for a learner permit (provisional licence) must be assessed for VA, field of vision, twilight vision, glare and contrast sensitivity. The competent authority must also assess for progressive eye disease and whether diplopia is present or has recently been present. This assessment must be performed by an optometrist or medical doctor and, if the applicant is successful, a D.502 Eyesight Report is completed by the examiner for submission to the licensing authority in the ROI.<sup>1</sup> When renewing a Group 1 licence, another assessment of vision may be required if the driver has diplopia, defective binocular vision or loss of visual field, or notes a specific deterioration in his/her vision which materially



affects ability to drive. Under those circumstances another D.502 form would be submitted on renewal.

Over the age of 70, Group 1 drivers in the ROI must undergo an assessment of their overall medical fitness to drive, which includes a check to ensure they still have adequate VA and visual fields to drive safely. Having passed this assessment, a licence is then issued for a maximum of three years. This assessment is repeated at the next licence renewal.

Irish Group 2 drivers may be referred for a full eyesight test when renewing their licence if the medical practitioner has any doubt about their ability to meet the minimum visual requirements, and the applicant would therefore submit a completed Medical Report Form D.501<sup>1</sup> and D.502<sup>2</sup> when renewing the same licence.

Driver vision screening in the three countries above is performed using tried and tested assessments under appropriate environmental conditions, and the assessment is recorded on file and repeatable.

By contrast, many European countries including France, the UK and the Netherlands lag far behind and continue to rely on an outdated test to screen drivers' vision which involves reading the licence plate at approximately 20 metres' distance when the applicant sits the practical driving test.

Part 1 of this series has outlined that the licence plate test is not standardised, is unscientific and inappropriate to assess an applicant's visual acuity. The reliance on self-reporting of problems

is also questioned. Part 2 of this series has reinforced the importance of acuity assessment. Moreover a Road Safety Research Report by the University of Warwick, commissioned by the Department for Transport, made specific recommendations for the DVLA to work with healthcare professionals to raise awareness, to introduce regular visual tests for all drivers, and to raise the current visual standards to bring the UK in line with other European countries.<sup>3</sup>

In order to seize the opportunity to improve the UK system, a model for a systematic and easily adopted system of driver vision screening is proposed below.

## A model for driver vision screening

All drivers should attend for driver vision screening conducted by a competent professional, prior to the issuing of a first provisional licence and at regular intervals, eg every 10 years, on renewal, to ensure they meet, and continue to meet, the legal requirements for vision (as detailed in Part 1). Driver vision screening would involve an appropriate investigation to determine that the applicant has adequate VA (with no recent or manifest diplopia) and meets the criteria for visual fields.

Driver vision screening could also easily be included as part of a sight test (or eye examination) with a supplementary visual fields' examination and analysis of results, or could be performed separately as screening of only VA and visual fields.

When the driver (or applicant for a provisional licence) passes

the visual requirements of EC Directive 2006/126/EC as amended by 2009/113/EC, the competent professional would fill out a Driver Vision Report (similar to that required in the Republic of Ireland, Finland or Germany), which would be submitted to the Driver and Vehicle Licensing Agency (DVLA) as a required document prior to issuing a provisional,<sup>4</sup> first full or renewed driving licence.

The model proposed here could operate for both Group 1 and Group 2 drivers. By also adopting this model for Group 2 drivers, it would ensure that all Group 2 drivers have an appropriate VA and visual fields assessment when renewing their licence.

An outline pathway of this model is shown in the flowchart opposite.

## Driver vision report

Having completed driver vision screening, a report form would be issued for the driver to submit to the DVLA, and would include the following information:

- Name of competent professional and address of the site of screening
- Name of driver, address, and date of birth (with validation of identification)
- Duration of the form's validity with DVLA (for example the current DVLA D4 report is valid for four months after signing)
- An outline of the legal minimum standards for vision
- Completion (with date) for Group 1 drivers by a competent professional stating whether:
  - The driver meets the standard above for VA (with no recent or manifest diplopia) and visual fields (if appropriate)
  - The driver needs to wear corrective lenses to meet the standard above and the current correction has been verified as sufficient
  - It has not been possible to ascertain whether the driver meets the standard above and further assessment is required (with details)
  - The driver fails to meet the standard
  - An indication of the advised date to repeat screening.

This information would enable not only drivers but also the DVLA to meet the requirements of the updated Directives. From 2013, driving licences must contain harmonised codes for driver's medical requirements, for example to indicate whether sight correction is needed. Having this information submitted by a competent

professional would doubtless assist the DVLA in administering this task.

## People who do not pass screening

Should a driver (or applicant for a provisional licence) fail to meet the visual requirements of the updated EC Directives, the competent professional would consider the following options:

- Identify the potential reasons for failing and repeat driver vision screening if necessary
- If the driver had attended for driver vision screening, then the driver would be referred for a full eye examination to assess all of the requirements for eyesight under Annex III EC Directive 2006/126/EC as amended by 2009/113/EC
- If the driver had attended for a sight test or eye examination, or had been subsequently referred for one following driver vision screening, then the outcomes would be:
  - Issuing a new prescription and completion of the driver vision report on collection or post-verification of new visual correction (glasses or contact lenses)
  - Referral to an ophthalmologist for diagnosis and, if necessary, treatment of underlying eye disease or condition that is impacting on vision (and the driver should not drive until advised otherwise)
  - Advice to the driver that his/her vision does not currently meet the standard for driving (and they should not drive until advised otherwise) and forwarding the case to the DVLA which subsequently would determine whether to issue a provisional, first or renewed driving licence.

The DVLA currently assesses exceptional cases where Group 1 drivers, who previously held a full driving licence, fall below the standard. The DVLA has the option of renewing licences in these cases with restrictions, for example that the holder can only drive during daylight hours. There would therefore be a built-in safeguard through which safe and responsible drivers who fall just below the required visual standard are provided with an opportunity to have their licensing reviewed by the DVLA.

## Competent professionals

In order to meet all of the requirements from the Directives, an appropriate investigation should be conducted by a competent professional with sufficient medical knowledge

and understanding of VA and visual field analysis. This would ensure that the number of false positive referrals of individuals for a sight test would be kept to a minimum by identifying technical or other reasons for failing, compensating for these, and repeating the screening if necessary. In addition, a competent professional will understand the psychological impact on any driver who fails screening and be prepared to answer questions about the possible reasons for failing. A competent professional should have access to a suitable work environment with the correct illumination and equipment to ensure the screening results are standardised.

## Inclusion of visual fields in the Directives and the issue of age

There is a low level of incidence of visual field loss in the younger population, although there is a clearly stated requirement that all drivers should meet a specified standard under the Directives. This model could be adapted to allow for less frequent screening of younger drivers, for example every 15 years (as allowed under the Directive). The incidence of visual field loss in the population rises significantly after the age of 45, due to the ageing retina and increasing prevalence of conditions such as glaucoma.<sup>5-7</sup> Therefore this model proposes that Group 1 drivers over 45 be screened for visual fields every 10 years, on renewal of their driving licence. Group 2 drivers are already required to be screened every five years after the age of 45, to ensure they meet the required standards of VA and visual fields.

## Cost and benefit analysis

The cost of vision screening to drivers would be modest, only fall on renewal (eg 10 years between renewals), and would be very low in proportion to overall costs of motoring. The cost of implementing this model of driver vision screening would also be minimal for the public sector. Driver vision screening could be available at many convenient locations in the community, which would be easily accessible for drivers. Moreover, many drivers would have attended for a sight test in any case during the period up to renewal, and would therefore incur no additional cost.

By introducing driver vision screening prior to issuing a provisional licence and on renewal of licences, the following benefits could be expected:

- A fairer, more scientific and validated

system of screening drivers' vision

- Reassurance to the individual driver that not only he/she, but the total driving population meets the required visual standards to drive safely

- A cultural change in drivers' minds and behaviour to reinforce the importance of good vision when driving (over the medium to long term)

- Since poor vision is one factor that can impair driver performance, it is anticipated that this model would lead to a lower number of minor and serious road accidents. Fewer road accidents (minor and serious) would mean a lower financial burden on the state and on drivers (eg NHS care following an accident, physical repairs following both serious and minor accidents, days off work after an accident) and human cost (fewer lives lost and reduced incapacity following serious accidents)

- Reassurance to the public (pedestrians, cyclists, passengers and drivers) that others on the road have adequate vision to drive safely. Indeed, recent reports indicate that over 90 per cent of the UK public would support regular driver vision screening.<sup>8</sup>

## Conclusion

We have seen that the UK lags significantly behind the best practice elsewhere in Europe when ensuring that all drivers have good vision for safe driving. The model presented here would allow for a systematic, proportionate and appropriate assessment of drivers' vision in the UK. The UK government is in the process of implementing the related EC Directives and the Optical Confederation, Eye Health Alliance, and partner road safety groups continue to lobby to use this opportunity to improve the screening of drivers' vision. ●

- In Part 4, Dr Colin Fowler looks at dispensing for drivers and the choice of spectacle lenses, contact lenses, tints, sunglasses and frames.

## References

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3 Hawley C. The attitudes of health professionals on giving advice on fitness to drive, 2010. [www.dft.gov.uk/pgr/roadsafety/research/rsrr/theme6/report91/pdf/report91summary.pdf](http://www.dft.gov.uk/pgr/roadsafety/research/rsrr/theme6/report91/pdf/report91summary.pdf)

4 For provisional licences see Annex I (12) 05.05 of EC Directive 2006/126/EC which includes limited use when accompanied by a holder of a driving licence.

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7 Tuck M and Crick R. The age distribution of primary open-angle glaucoma. *Ophthalmology*, 1988;5: 173-183.

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# Smoke and colours

In another of his research round-ups, **Bill Harvey** recounts some more eye-catching presentations from the recent American Academy of Optometry Conference

**T**he American Academy is always a fruitful source of new information with lectures, symposia, posters and presentations representing every aspect of optometry. Here is just a snapshot of some of the material of interest.

## Glaucoma

**Dr Mark Swanson** (Alabama) has been looking at the association between smoking and glaucoma, noting that the previous association was reliant on self-reporting of the habit. A possibly more accurate indicator of exposure to smoking is the measurement of serum cotinine which is a secondary metabolite of nicotine. It does not show the great fluctuations that nicotine levels do and also may reflect passive exposure too. By analysing this data along with self-reporting of smoking, measurements of cup/disc ratio and FDT fields assessment, Swanson was able to deduce that in 5,603 patients there was no significant correlation between disc changes or fields results and cotinine levels, thus questioning the validity of smoking as a risk factor.

Private practitioner **Dr Lisa Young** has some concerns that the very process of assessment for glaucoma causes anatomical changes that may influence the accuracy of subsequent results. By altering the sequence of



The i-care rebound tonometer

tonometry, gonioscopy, pachymetry, fields and nerve fibre analysis, she was able to show that the test sequence order resulted in differing corneal thickness measurements and this should be borne in mind – perhaps pachymetry before applanation?

A new study by **Dr Nicole Stuebiger** looking at 189 eyes confirmed that 'the rebound-tonometer is comparable with Goldmann applanation tonometry', which is good news for those of you, particularly the domiciliary optometrists, using the i-care rebound tonometer.

Obesity may have an association with glaucoma. **Dr Michael Maizel** (American Optometric Association) described the case of two obese patients who were ocular hypertensive and were not responding well to pressure-lowering drops. Both underwent weight reduction surgery and were found subsequently to have IOPs in the normal range without the need for any further topical intervention. This does hint at the interesting potential for systemic intervention with ocular hypertension patients.

A study by **Dr Jessica Neuville** (Kansas) compared glaucoma monitoring using SITA standard perimetry and the Cirrus OCT. She concluded that OCT measurements were correlated to visual function in early loss but they appeared to be a poor predictor of visual function at advanced levels of retinal nerve fibre loss.

## Vision therapy

The effect and use of colour overlays to help with reading difficulties always seem a little hit or miss to me. Too much prescribing seems to rely on the anecdotal – 'what harm could they do?' 'they appear to work'. This does leave such intervention open to the accusation of being a mere placebo, albeit often an effective one. A paper from a team led by **Professor Chris Chase** (Western University, California) and including **Dr Peter Allen** (Anglia Ruskin) has found that reading difficulties are associated with weak accommodative function in a sample of students. In