

## **Proposed replacement for**

# **Section 2 – Vision**

## **in “Guide for Physicians in Determining Fitness to Drive a Motor Vehicle”**

### **Introduction**

In 2000, the Canadian Ophthalmological Society (COS) Working Group on Driving Standards developed a set of recommendations for new vision standards for driving in Canada and a new standardized approach to the application of these standards. These recommendations were presented to the Canadian Medical Association for inclusion in the ongoing revision of the Physician’s Guide to Driver Examination. The recommendations represent the consensus opinion of the working group and are based on a literature review, the experience and expert opinion of the members of the working group and comments from other individuals and organizations. The recommendations contain substantial changes from the current BC “Guide for Physicians in Determining Fitness to Drive a Motor Vehicle,” with more liberal standards and an emphasis on binocular testing. It was the working group’s opinion that these changes reflected a more sensitive, evidence-based approach to the minimum vision requirements for licensing.

In 2004 further changes were recommended by the Canadian Ophthalmological Society Driving Standards Committee and were approved by the Canadian Ophthalmological Society the same year. These changes were also reviewed by the BC Society of Eye Physicians and Surgeons and have been widely accepted. The changes were recommended primarily out of a need to rationalize and standardize the methodology used in visual field testing, and to simplify the classification of drivers for the purpose of applying vision standards. Significant changes include the requirement for 50 degrees of field along the horizontal meridian on either side of fixation, and a further relaxation of acuity standards.

The 2004 amendments to the vision guidelines were presented to the Canadian Council of Motor Transport Administrators (CCMTA), an interprovincial association of licensing regulators, to consider for inclusion in the national guidelines governing driver fitness (the National Safety Code for drivers). The CCMTA will ask the provinces to vote on these changes in the near future. The editors of the BC Guide also wish to be ready to update Section 2 of our Guide in a timely way. We appreciate any feedback that you may have pertaining to these guidelines, as it will assist the Office of the Superintendent of Motor Vehicles in its voting decision and in making the necessary alterations to our BC “Guide.”

## **2000 C.O.S. Vision Standards**

### **Recommendations**

Good visual function is essential for safe driving. Any significant loss of visual function, such as visual acuity or visual field, will diminish a person’s ability to operate a motor vehicle safely on today’s congested, high-speed roadways. A

driver with a marked visual defect may fail to perceive a potentially dangerous situation altogether or may see it too late to react appropriately.

When a patient is visually impaired, the COS recommends that the physician inform him or her of the nature and extent of the visual defect and report the problem to the appropriate authorities, if required. Reporting by ophthalmologists, other physicians and optometrists is one of the most effective ways to screen for visual defects that may be incompatible with safe driving.

This report presents information about recommendations for mandatory standards, other important visual functions that should be taken into consideration in determining fitness to drive, and recommendations for exceptional cases that require individual assessment. It also provides further details on recommended testing procedures (Appendix 1), and a list of medical conditions with increased risk for vision problems and a statement on the use of vision aids in driving (Appendix 2).

## **Recommended vision standards for driving**

### **Visual acuity**

The corrected visual acuity standards are shown in Table 1. A driver's visual acuity must at least be such that s/he has time to detect and to react to obstacles, pedestrians, other vehicles and signs while moving at the maximum posted speed in daylight and in darkness. Greater levels of visual acuity are required for some classes to ensure public safety. Road signage should be designed to be easily legible at a safe distance for all drivers who meet the minimum visual acuity standard.

**Table 1 – Corrected visual acuity\* standards for the various classes of driving licenses**

<b>Class of license</b>	<b>Recommended standard</b>
5 (Personal Use)	Not less than 20/50 (6/15) with both eyes open and examined together
4 (Taxi) and 5 (Commercial)	Not less than 20/40 (6/12) with both eyes open and examined together. Worse eye not less than 20/200 (6/60).
1, 2, 3,4 (Emergency) and 6	Not less than 20/30 (6/9) with both eyes open and examined together. Worse eye not less than 20/100 (6/30).
*The recommended testing procedure is outlined in Appendix 1.	

## Visual field

The visual field standards are shown in Table 2. An adequate continuous field of vision is important to safe driving. Any significant scotoma or restriction in the binocular visual field can make driving dangerous. Conditions often associated with visual field loss are listed in Appendix 2. If a visual field defect is suspected (based on a medical condition, subjective report or confrontation field assessment), the patient should be referred to an ophthalmologist or optometrist for further testing.

**Table 2 – Visual field\* standards**

<b>Class of license</b>	<b>Recommended standard</b>
5 (Personal Use)	120 continuous degrees along the horizontal meridian and 15 continuous degrees above and below fixation with both eyes open and examined together
4 (Taxi) and 5 (Commercial)	120 continuous degrees along the horizontal meridian and 15 continuous degrees above and below fixation with both eyes open and examined together
1, 2, 3,4 (Emergency) and 6	150 continuous degrees along the horizontal meridian and 20 continuous degrees above and below fixation with both eyes open and examined together
*The recommended testing procedure is outlined at the end of this chapter.	

## Diplopia

Diplopia (double vision) within the central 40° (i.e., 20° to the left, right, above and below fixation) of primary gaze is incompatible with safe driving for all classes of license. Patients with uncorrected diplopia within the central 40° of primary gaze should be referred to an ophthalmologist or optometrist for further assessment. If the diplopia can be corrected completely with a patch or prisms to meet the appropriate standards for visual acuity and visual field, the patient may be eligible to drive. Before s/he resumes driving, there should be an adjustment period of 3 months or sufficient to satisfy the treating ophthalmologist or optometrist that adequate adjustment has occurred.

## Colour vision

The colour vision standards are shown in Table 3. Adequate colour vision is important for safe driving for certain classes of license. All affected patients

should be made aware of any abnormality of colour vision in order to allow them to compensate for this difference in their vision.

**Table 3 – Colour vision\* standards**

<b>Class of license</b>	<b>Recommended standard</b>
5 (Personal Use)	No required standard
4 (Taxi) and 5 (Commercial)	No required standard
1, 2, 3,4 (Emergency) and 6	Discrimination of red, green and yellow
* Any test that requires the discrimination of red, green and yellow can be used to assess colour vision for driving.	

## **Other important visual functions for driving**

### **Contrast sensitivity**

People with reduced contrast sensitivity may experience difficulty with driving, in spite of having adequate visual acuity to drive. However, it is unclear at this time what level of reduction in contrast sensitivity represents an unacceptable risk for driving. Loss of contrast sensitivity can be associated with increased age, cataract and refractive surgery as well as other ocular disorders. Patients should be made aware of any significant reduction in contrast sensitivity.

### **Depth perception**

Automobile accidents sometimes occur because of the driver's inability to judge distances accurately. However, judging distance is a skill that can be learned, even by people with monocular vision. Judgments of depth can be made based on monocular clues, such as the relative size or interposition of objects, and clearness of details. A more refined form of distance judgment, called stereopsis, is based on information coming from both eyes. A driver who has recently lost the sight of an eye or stereopsis may require a few months to recover the ability to judge distance accurately.

### **Dark adaptation and glare recovery**

The ability to adapt to decreased illumination and to recover rapidly from exposure to glaring headlights is of great importance for night driving. The partial loss of these functions in older drivers, particularly those with cataracts or macular disease, may at times justify limiting their driving to daylight hours.

## **Exceptional cases**

The loss of certain visual functions can be compensated for adequately, particularly in the case of long-standing or congenital impairments. When a person becomes visually impaired, the capacity to drive safely varies with his or her compensatory abilities. As a result, there may be people with visual deficits who do not meet the vision standards for driving but who are able to drive safely. On the other hand, there may be people with milder deficits who do meet the vision standards but who cannot drive safely.

In these exceptional situations, it is recommended that the person undergo a special assessment for fitness to drive. The decision regarding fitness to drive can be made only by the appropriate licensing authorities. However, the COS recommends that the following information be taken into consideration: favourable reports from the ophthalmologist or optometrist; good driving record; stability of the condition; no other significant medical contraindications; other references (e.g., professional, employment); and assessment by a specialist at a recognized rehabilitation or occupational therapy centre for driver training.

In some cases it may be reasonable to grant a restricted or conditional license to a driver to ensure safe driving. It may also be appropriate to make such permits exclusive to a single class of vehicles.

## **Appendix 1 – Recommended procedures for testing various visual functions**

### **Visual acuity**

The distance visual acuity of applicants should be tested using the refractive correction (spectacles or contact lenses) that they will use for driving. The examiner should assess visual acuity under binocular (both eyes open) or monocular conditions, if required by the standard. It is recommended that visual acuity be assessed using a Snellen chart or equivalent at the distance appropriate for the chart under bright photopic lighting conditions (i.e., greater than 80 cd/m<sup>2</sup>). Charts that are designed to be used at 3 m or greater are recommended.

### **Visual field**

When a confrontation test is carried out to screen for visual field defects, the following procedure is recommended as a minimum:

The examiner stands or sits about 0.6 m in front of the examinee with eyes at about the same level.

The examiner asks the examinee to fixate on the nose of the examiner with both eyes open.

The examiner extends his or her arms forward, positioning the hands halfway between the examinee and the examiner. With arms fully extended, the examiner asks the examinee to confirm when a moving finger is detected.

The examiner should confirm that the ability to detect the moving finger is continuously present throughout the area specified in the applicable visual field standard. Testing is recommended in an area of at least 180° horizontal and 40° vertical, centered around fixation.

If a defect is detected, the applicant should be referred to an ophthalmologist or optometrist for a full assessment.

When a full assessment is required, the binocular visual field should be assessed with the use of a III4e Goldmann-type target or the closest equivalent. The Esterman Functional Vision Test on the Humphrey Visual Field Analyzer or kinetic perimetry on the Goldmann perimeter is recommended. When binocular assessment is not possible, monocular assessment will be considered.

Some automated testing devices used in driver testing centres have a procedure for assessing the extent of the visual field. However, these tests are often insensitive to many types of visual field defect and thus may not be adequate for screening purposes.

### **Diplopia**

Any patient reporting double vision should be referred to an ophthalmologist or optometrist for further assessment.

### **Contrast sensitivity**

Assessment of contrast sensitivity is recommended for applicants referred to an ophthalmologist or optometrist for vision problems related to driving. Contrast sensitivity may be a more valuable indicator of visual performance in driving than Snellen acuity. The COS therefore encourages increased use of this test as a supplement to visual acuity assessment.

Contrast sensitivity can be measured by means of several commercially available instruments: the Pelli-Robson letter-based contrast sensitivity chart, the 25% or the 11% Regan low-contrast acuity chart, the Bailey-Lovie low-contrast acuity chart or the VisTech contrast sensitivity test. The testing procedures and conditions recommended for the specific test used should be followed.

### **Colour vision**

Any test that requires the discrimination of red, green and yellow can be used to assess colour vision for driving.

### **Depth perception**

There are no clinical tests available for assessing depth perception other than those used for stereopsis. If stereopsis assessment is required, the Titmus test can be used.

## **Dark adaptation and glare recovery**

Currently there are no standardized tests or procedures that can be recommended for assessing these functions.

## **Appendix 2 – Medical conditions with increased risk for vision problems, and vision aids for driving**

### **Medical conditions**

Some medical conditions have a greater risk of associated vision problems.

Examples include:

- Corneal scarring
- Eye movement disorders
- Refractive surgery
- Strabismus
- Cataract
- Stroke
- Diabetic eye disease
- Brain tumour/surgery
- Retinal disease
- Head injury
- Optic nerve disorders
- Neurologic disorders
- Glaucoma
- Multiple sclerosis

There are many other conditions that can cause vision problems. If a vision problem is suspected as a result of a medical condition, it is recommended that the patient be referred to an ophthalmologist or optometrist for further assessment of visual function.

### **Vision aids**

Although telescopic spectacles, hemianopsia aids, and other low-vision aids, may enhance visual function, there are significant problems associated with their use in driving a motor vehicle. These include loss of visual field, magnification causing apparent motion and the illusion of nearness. It is felt, therefore, that the use of such aids is incompatible with safe driving.

## **2004 C.O.S. Vision Standard Amendments by License Class**

### **Visual Acuity Standards**

Class 5 and 6 (private vehicles) not less than 20/50 (6/15) with both eyes open and examined together. Allow restricted\* licenses, not less than 20/70 (6/21) with both eyes open and examined together.

\*Restricted to daylight only and 80 KPH.

### Class 1 – 4 (Commercial vehicles)

Not less than 20/30 (6/9) with both eyes open and examined together. Worse eye not less than 20/400 (6/120).

### **Visual field standards**

#### Class 5 and 6 (personal vehicles)

120 continuous degrees along the horizontal meridian with a minimum of 50 degrees on either side of fixation, and 15 degrees above and below fixation with both eyes open and examined together. (Normal physiological blind spot or similar scotoma further from fixation will be accepted on a case-by-case basis).

#### Class 1 – 4- Commercial Vehicles

150 continuous degrees along the horizontal meridian and 20 degrees above and below fixation with both eyes open and examined together.

### **Diplopia Standards**

Class 1 – 6 No diplopia within the central 40 degrees (i.e.: 20 degrees left, right above and below fixation)

### **Colour Vision**

Review of the current literature does not support the need for a color vision requirement for safe driving.

### **2004 COS Visual Field Techniques Acceptable for Visual Standards (if confrontation technique or ocular disease warrants)**

- 1) Monocular or binocular Goldmann III4e – add V4e for assessing borderline cases.
- 2) Binocular or monocular Humphrey Estermann screener (single intensity – 10 or 0 decibels).
- 3) Humphrey 81, 120, 135, or 246 point screener (3 zone or single intensity – 0 or 10 decibels). Two zone Humphrey testing is inadequate.
- 4) Medmont 105 point screener.
- 5) Other visual field techniques will be accepted if appropriate. Normal physiological blind spot or similar scotoma further from fixation will be accepted on a case-by-case basis.

### Binocular Goldmann Driving Fields

- Map III4e and V4e isopters with kinetic targets.
- With a static III4e target, check central points at 2.5°, 5°, 10°, and 15°.
- Check the standard 24 temporal points on both sides with the static III4e target.
- Plot areas of field loss with the III4e target and then confirm its density with the V4e target.

### **Humphrey Field Analyzer Full Field Test Strategy for Driving Fields**

- Select FF 135 (preferable) or FF 120, 81, or 246 located in the library of screen field tests
- Enter patient data and proceed to “start of test” screen
- Press “change parameters”
- Test strategy should read “2 zone”
- Test mode must be changed to “single intensity”
- Stimulus size should read III (default setting)
- Press “selection complete”
- “Enter Intensity” table appears on the monitor; leave the setting at 10 dB
- Press enter
- Proceed with patient testing