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CCRP

TR-01-98 Vision Standards in the RCMP: Are They Reasonable and Fair?

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TECHNICAL REPORT
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Executive Summary

The Canadian Ophthalmological Society (COS) was asked by the Royal Canadian Mounted Police (RCMP) and the Canadian Human Rights Commission to review the current entry-level standards for vision. The objective was to determine if current standards are (1) reasonable; that is, they ensure competent and safe performance of tasks required by General Duty Constables; and (2) fair; that is, they do not unnecessarily exclude qualified candidates.

A comparison of the literature on the visual requirements for police work with a recent task analysis of the duties of the General Duty Constable indicates that the current vision standards in the RCMP are reasonable and fair.

The following paper was published in the Canadian Journal of Ophthalmology, 1997, Vol. 32, No. 3.

The Canadian Police Research Centre (CPRC) would like to thank Dr. M. Easterbrook, Dr. J. Brown, Dr. E.J. Casson, Dr. G.A. Wells and Dr. A. Trottier.

Résumé

La Gendarmerie royale du Canada et la Commission canadienne des droits de la personne ont demandé à la Société canadienne d'ophtalmologie de passer en revue les normes visuelles établies à l'engagement en vue de déterminer si elles sont 1) raisonnables; c'est-à-dire qu'elles permettent aux gendarmes affectés aux services généraux d'exécuter leurs tâches de façon compétente et en toute sécurité et 2) équitables; c'est-à-dire qu'elles n'excluent pas inutilement des postulants compétents

La comparaison des ouvrages qui traitent des exigences relatives à l'acuité visuelle pour les policiers avec l'analyse récente des tâches du gendarme aux services généraux indique que les normes visuelles de la GRC sont raisonnables et équitables.

L'étude qui suit a été publiée dans le Canadian Journal of Ophthalmology, 1997, vol. 32, n° 3.

Le Centre de recherches de la police canadienne tient à remercier de leur contribution les docteurs M. Easterbrook, J. Brown, E. J. Casson, G. A. Wells et A. Trottier.

On peut obtenir la version française de l'étude sur demande.

The ability of a General Duty Constable in the Royal Canadian Mounted Police (RCMP) to perform his or her job effectively depends on many factors, including adequate vision and hearing.' Public Safety often depends on each constable being able to perform his or her tasks efficiently with very little warning. It is therefore crucial that all active members of the RCMP meet minimum standards for each of these sensory factors.

The Canadian Ophthalmological Society (COS) was asked by the RCMP and the Canadian Human Rights Commission to review the current entry-level standards for vision, particularly those for best corrected and uncorrected acuity. The objective of this review was to determine (1) if the vision standards ensure effective and safe job performance by the General Duty Constable and (2) that these standards do not unnecessarily exclude qualified applicants. In this paper, we review the vision standards literature pertaining to police work and relate the findings both to the current standards for the RCMP and the results of a task analysis recently conducted by the RCMP on the job requirements and working conditions of a General Duty Constable.

Vision standards for the RCMP are defined in terms of visual acuity and colour vision. At issue are the standards for visual acuity (VA). Presently, the minimum standards for best corrected visual acuity are 6/6 (20/20) in one eye with at least 6/9 (20/30) in the fellow eye. The minimum standards for uncorrected vision are 6/12 (20/40) in one eye with 6/30 (20/100) or better in the other eye, or 6/18 (20/60) in each eye. In both cases, vision must be correctable to 6/6 in one eye with 6/9 or better in the other eye. A full description of the RCMP classifications and standards for visual acuity is provided in Table I.

A number of studies have looked at the visual acuity requirements for police officers. Typically, these studies investigate visual discriminations thought by experts (1) to be important for the safe and effective performance of police duties and (2) to place the highest demands on an individual's visual acuity. Studies of three important types of discriminations (license plate identification, facial recognition and the identification of suspicious behaviour

in order to make a shoot/no-shoot decision) are reviewed below in further detail. In addition, visual requirements for safe exit and driving, the impact of the environment on visual performance and performance under binocular versus monocular conditions are discussed.

License Plate Identification

Identification of license plates has been determined by a number of experts²⁻⁴ to be an important, high-demand, visual skill for police officers. Sheedy³ found that someone with 6/12 vision could not read a license plate from more than 50 feet (three car lengths away) and that 6/6 vision was required to accurately identify license plates at safe distances and to permit the reading of street signs while driving at varying speeds.² Similar results were reported by Giannoni⁴ from a simulation study completed for the California Highway Patrol involving identification of highway traffic signs at a safe distance (for a vehicle travelling at 50 mps).

Facial Identification

Sheedy³ used self-assessment to determine the acuity level required for face and feature detection. He viewed an illuminated, familiar person at night from 20 feet while using lenses to degrade his vision. He observed that visual acuity of 6/9 enabled identification, 6/12 visual acuity resulted in questionable identification and 6/15 caused the person's face to become homogeneous and unidentifiable. Good and Augsburger² reported similar results with police officers in Columbus Ohio, where they found that 6/12 acuity was required for facial identification at 20 feet under dim illumination. Bullimore, Bailey and Wacker⁵ confirmed these findings using photographs at normal viewing distance. They report that recognition decreases substantially when acuity is degraded below 6/6 VA and is at chance when vision is defocused to 6/24. In a related occupational study Johnson, Casson and Zadnik⁶ determined that a correctional officer's ability to distinguish between a guard and an inmate across an exercise yard in daylight conditions was significantly reduced when acuity was degraded below 6/6 by defocusing lenses.

Shoot /No-Shoot Decision

In 1981, Giannoni⁴ reported the results of a study that took six police officers with 6/6 vision and deconvoluted them to 6/12, 6/24 and 6/60. At each level of acuity, the officers were asked to identify whether a suspect was holding a gun or a comb at distances of 7, 15 and 25 yards in daylight condition. At 6/12, subjects correctly identified all the objects at 7 yards, but mis-identified 14% at 15 yards. With 6/24 vision subjects mis-identified 8% of the objects at 7 yards and 22% of the objects at 15 yards. No errors were made with 6/6 vision.

Good and Augsberger² also investigated this issue in relation to the police force of Columbus, Ohio. In preparation for their study they investigated the circumstances of shooting incidents involving police. They report a number of interesting facts:

- (i) In certain American cities, 80% of the shooting incidents occurred inside 20 feet (approximately 7 yards).
- (ii) In over 70% of the cases where an officer used his gun, sight alignment was not used.
- (iii) Shooting situations frequently occur at night and often with more than one adversary. Physical activity is involved at approximately 40% of the time.

Based on these facts, Good and Augsberger conducted a study of visual acuity requirements in a shoot/no shoot scenario. They blurred the vision of 50 subjects to degrade visual acuity. These subjects viewed life-size "friend or foe" target range targets and had one second to identify which target held the firearm. The best performance was obtained for the 6/6 level of visual acuity, with systematic reductions in performance for all visual acuity levels below 6/6. They determined that a visual acuity of 6/13.5 was required to maintain performance above a threshold of 75% accuracy. However, given the high cost of a performance failure in this situation, one might wish to set a higher threshold for acceptable performance. If a 95% correct (5% error rate) criterion is adopted, then the 6/6 visual acuity level is the only acceptable value.

The identification of the presence of weapons and/or suspicious behaviour has also

been investigated by Johnson and colleagues in two studies conducted for the California Corrections Department and the California Youth Authority.⁶⁻⁷ Johnson et al.⁶ demonstrated that any amount of defocus that reduced acuity below 6/6 impaired the ability of correctional officers to locate and identify suspicious behaviour/presence of weapons within a group of inmates moving about in a yard or in a day room situation. Johnson and Brintz⁷ found similar results for locating the identifying which of 15 wards was carrying a weapon at close range (5-7 feet) in a dormitory setting a night. At 6/6 visual acuity, there was 100% correct detection of the ward holding the object and 75% correct identification of the object. Detection fell to 80% and identification to 40% correct at 6/18 and to 60% and 25% respectively at 6/60. Furthermore, Johnson and his colleagues⁶⁻⁷ found that confidence in performance also drops significantly when acuity is decreased, which would make responses not only less accurate but also slower.

Safe Exit and Driving

Not all visual tasks require such a high level of visual acuity. For example, Johnson et al⁶ found that correctional officers were able to find their way to a “safe” exit in under one minute with vision degraded up to 6/60 VA in bright conditions. Visual acuity also may not be a crucial to driving performance as originally supposed. Numerous investigators have found little or no relationship between visual acuity and driving even when it is studied in large samples (17,000 to 30,000 drivers).⁸⁻¹⁶ However, driving performance is affected when visual acuity is reduced by disease processes such a retinitis pigmentosa or macular dystrophies.⁵ Other factors, such as peripheral visual field loss and reduced visual attention may play more of a role than acuity in driving performance.

Impact of the Environment

Many of the studies cited above have been conducted in bright illumination or daylight conditions, but several of the most dangerous tasks of a General Duty Constable must be performed in dim and/or low contrast environments. Johnson and Casson¹⁷ have shown that reductions in either contrast or luminance reduce visual acuity in a linear and additive fashion. For example, 6/6 (20/20) vision can be degraded to 6/18 (20/60) vision

under night time driving conditions and 6/12 (20/40) vision will be degraded to 6/60 (20/200) vision under the same circumstances. If a thick fog is added to the night time conditions, acuity will be further degraded to 6/30 (20/100) and 6/75 (25/250) respectively.

Effect of Binocular vs Monocular

Most vision standards are measured monocularly, while most tasks of the General Duty Constable and the task simulations reported above are performed binocularly. It is known that binocular acuity is superior to monocular acuity by approximately 15% under ideal conditions. This advantage has been demonstrated to increase under poor environmental conditions by up to 50%.¹⁸⁻²⁰ Most standards are set to have similar levels of acuity in both eyes and thus incorporate the binocular advantage. In the case of the RCMP, the current monocular standard is 6/18 in each eye, which would result in a binocular acuity advantage of close to 6/12 (assuming at least a 15/5 increase in acuity).

If one eye has significantly reduced visual acuity, this will reduce the binocular acuity advantage. Thus, it may be reasonable, under these conditions to require that the better eye exceed the minimum standard set for the case where both eyes have similar acuity. In the case of the RCMP, for example, the best-eye worst eye criterion is 6/12 and 6/30, which would ensure that the binocular acuity was at least 6/12.

Another factor to be considered is the impact of having a monocular standard for performance of monocular tasks. For example, the report of the POST commission²¹ recommends that prior to setting a standard requiring the same level of acuity in each eye, a police force should consider the relevance of the monocular standard to the occupational situation. If the occupation requires shooting around a barrier (as might be expected in a number of police occupations), the need to sight with the “good” eye might place some individuals at increased risk. Further, trauma to the “good” eye during a critical incident could leave some individuals without adequate vision in an emergency situation.

Discussion

The level of visual acuity is commonly (and sometimes incorrectly) used as an index of overall visual ability in occupational standards because it predicts the ability to perform a number of important high-demand visual discriminations. These include such tasks as letter detection, facial recognition and the identification of critical details about an individual and his/her behaviour at mid to far distances. From the literature, it seems clear that these tasks are similar to the critical tasks for most police officers, which have been determined by expert opinion to be license plate identification, facial recognition and identification of suspicious behaviour, as in a “shoot/no-shoot scenario”. Even under daylight conditions, the literature suggests that effective performance of these tasks requires 6/12 to 6/6 vision. This requirement becomes even more crucial when the impact of reduced visibility due to environmental factors is considered. For example, although an individual requires only 6/60 vision to perform adequately in the “save exit” scenario, under poor environmental conditions, one can reasonably expect an individual with less than 6/12 vision to be reduced to work than 6/60 acuity. Thus, if this individual lost their glasses or contact lenses, he or she would be at risk when attempting to make a safe exit under low luminance and/or foggy conditions.

To relate the literature to the specific situation in the RCMP, two further factors must be considered: (1) are the tasks described in the literature similar to those that are critical to the safe and effective performance of the job of a General Duty Constable in the RCMP and (2) are General Duty Constables likely to encounter poor environmental and lighting conditions.

Task Anal'sis: General Duty Constable

McGinnis and Fine²² report the results of a functional job analysis conducted recently for the RCMP. In this analysis, focus groups of experienced job incumbents identify the primary outputs of their work and the knowledge, skills and abilities (KSA'S) required to produce these outputs. This outputs are clustered and the incumbents are asked to specify the tasks associated with each output cluster and the KSA's that are required for effective

performance.

Some important tasks involving visual abilities, particularly visual acuity are as follows:

- (i) scanning scenes and people for weapons/drugs, often while officer and suspect are moving;
- (ii) pursuing a fleeing suspect, or a fleeing car, in a variety of weather and lighting conditions;
- (iii) entering a dark building where criminal activity may be in progress;
- (iv) visual scanning at night; alleys and areas in which criminal activity may be occurring (sometimes by an armed person and sometimes an unarmed person);
- (v) looking for children in hostile environmental conditions, both in terms of temperature and wind;
- (vi) distinguishing facial and body features, clothing and appearance of suspects (often while moving or at night with reduced, or no illumination).

From their analysis, McGinnis and Fine also determined that a General Duty Constable in the RCMP can be posted anywhere in Canada from Newfoundland to British Columbia and from Southern Ontario to the Arctic Circle. The variety of working conditions include the following:

- (i) Temperature ranges from -40 C to +40 C'
- (ii) Precipitation ranging from light mist to heavy fog, heavy snow, sleet, hail and freezing rain. Heavy winds can be associated with dust storms, and so forth;
- (iii) A variety of lighting conditions, ranging from bright sunlight to dark nights with no street lighting in rural areas; approximately a range of 100,000 cd/m² to 0.001 cd/m². Associated with this is a variety of conditions with glare: street lights and vehicle headlights, glistening off rain and wet roads, and sunlight glistening off snow.

Conclusion

The results of the task analysis for the General Duty Constable** confirm the criticality of tasks involving recognition of a face/individual, license plate/car identification and identification of suspicious behaviour/presence of a weapon at a distance. Our survey of the literature indicates that for these tasks, a visual acuity of 6/6 is optimal and 6/12 is necessary to ensure adequate performance. Safe performance under emergency situations appears to require at least 6/60 acuity.’ However, the study by Johnson and Casson¹⁷ suggest that poor environmental conditions, such as those that are faced by General Duty Constables across Canada on a daily basis, will seriously degrade vision, causing a person with 6/12 acuity to perform at a level of someone with 6/60 acuity. Thus, not only for adequate performance, but also to ensure safe performance in a wide variety of environmental and lighting conditions, it appears to be reasonable to require that applicants have 6/6 best-corrected visual acuity and at least 6/12 uncorrected visual acuity.

The determination of whether to use a single corrected and uncorrected acuity standards and/or a best eye-worst eye criterion will depend further study to determine the relative merit of binocular vs. Monocular entry-level standards for the RCMP.

COS Recommendations

The present corrected and uncorrected visual acuity standards are both reasonable and fair in that they ensure adequate and safe performance of the duties of a General Duty Constable, without unnecessarily excluding qualified applicants.

TABLE 1**Summary of Visual Acuity Classifications & Standards**

CODE	DUTY/CATEGORY	STANDARD/DESCRIPTION
V1	Duties of a Special nature requiring unaided, uncorrected visual acuity	Visual Acuity at least - 6/6 - 6/9 No corrective visual aids required
V2	Entry level for Constable or Special Constable member for duties in the General Duty Constable Task Analysis or equivalent	Visual Acuity at least 6/18 6/18 both eyes or 6/12 better eye & 6/30 poorer eye Correctable to 6/6 - 6/9
V3	For continuation of assignment to duties similar to Constable or for junior NCO. Duties assigned to officer & senior NCO functions which involve performance of policing duties when necessary	Visual Acuity not less than 6/60 - 6/60 both eyes Correctable to 6/12 - 6/12 with clear, soft contact lenses
V4	Duties assigned to officers & senior NCO's in which the loss of vision aids will not create a hazard to co-workers or the public and any need to perform policing duties would only be in emergency situations	Visual Acuity correctable to 6/9 better eye; 6/120 poorer eye Visual Acuity less than V2 and NOT correctable with soft, clear contact lenses to 6/12 - 6/12
V5	Restricted solely to administrative duties or law enforcement support functions with no requirement to perform policing duties.	Visual Acuity correctable to 6/9 in one eye. Regardless of vision of poorer eye
V6	Duty does not require the ability to see. This may apply to some specific duties in the C/M category in the IO-IM group	Visual Acuity less than 6/9 in the better eye with best correction. Regardless of vision in poorer eye

TABLE II
Summary of Various Canadian Police Force Vision Standards

Police force	Minimum Uncorrected	Minimum Best Corrected VA
RCMP	6/18 both eyes or 6/12 and 6/30	6/6 and 6/9
Royal Newfoundland Constabulary	6/18 both eyes or 6/12 and 6/30	6/6 and 6/9
Edmonton Police Service	6/18 both eyes or 6/12 and 6/30	6/9 both eyes
Quebec Police	6/12 and 6/30	6/6 and 6/9
Atlantic Police Academy	6/12 both eyes	6/9 both eyes
Winnipeg Police Force	6/18 and 6/24	6/6 and 6/9
Vancouver Police Force	6/12 and 6/30	6/6 and 6/9
Ontario Provincial Police	6/18 both eyes or 6/12 and 6/30	6/6 and 6/9
Montreal Police	6/12 and 6/30	6/6 and 6/9
Toronto Police	6/12 both eyes	6/9 both eyes
Calgary Police	6/18 both eyes or 6/12 and 6/30	6/6 and 6/9

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