

## **Ontario Association of Optometrists (OAO) Comments on Submissions to the HPRAC Questionnaire on Eye Care Sector Issues**

OAO is pleased to have the opportunity to reply to some of the stakeholder submissions posted by HPRAC in response to the questionnaire. Most of our comments are directed either at misconceptions or a lack of appreciation of the role that optometrists perform in eye care. OAO views this misunderstanding as a major obstacle to collaboration between physicians and optometrists. Further, OAO has identified areas of other submissions that require clarification.

Almost all of the eye care stakeholder submissions, including the responses from optometry, report that a significant obstacle to collaboration is the present professional misconduct regulation for optometrists that prohibit association between optometrists and opticians. Furthermore, none of the submissions have provided rational evidence that the “independent contractor” concept for the regulation of association would interfere with collaboration between eye care providers.

OAO understands that the present review of inter-professional collaboration in the eye care sector is a continuation of the original HPRAC review on collaboration for all regulated health professions from 2008. Consequently, OAO was surprised to read a proposal from the opticians groups for scope of practice expansion to include refraction as a procedure to alter a prescription from an optometrist or a physician. Accordingly, the OAO submission concentrated only upon issues that impede collaboration rather than providing information to address a scope of practice request by opticians. If an additional scope of practice review is considered, OAO would anticipate that HPRAC would only consider that review on a referral from the Minister.

OAO has identified the following specific submissions as noteworthy for comment.

### **Ontario College of Family Physicians (OCFP)**

The OCFP submission reveals that many family physicians (FP) are unfamiliar with the training, competence and scope of practice for optometrists. Further, there was a concern that access to urgent non-surgical eye care is difficult in certain communities in the province. OCFP has proposed training more medical ophthalmologists and providing additional education on eye disease for family and emergency physicians as a means to resolve access issues.

OAO appreciates that the lack of easy access to non-surgical eye care for FP is not conducive to good patient care. OAO recognizes that insufficient knowledge of the intensive training that optometrists bring to primary eye care contributes to the misunderstanding that optometrists are not competent to manage eye pathology. The recently developed OMA/OAO collaborative guidelines on the management of patients living with diabetes recognize the competence of optometrists to diagnosis and manage patients with eye pathology, specifically diabetic eye disease.

Since optometrists are widely distributed throughout the province, access to eye care by optometrists should not present a problem. Moreover, training physicians to provide only medical eye care is redundant as optometrists are already highly trained in eye care and are accessible to provide collaborative care for patients that require urgent assessment. Our healthcare funding system today is headed for a financial crisis and we must work towards removing inefficiencies as opposed to encouraging new ones. We must develop models that best utilize each trained professional's skills without compromising public safety.

In an effort to improve collaboration between optometrists and FP, OAO is prepared to meet with representatives of OCFP to reassure FP that optometrists have the necessary training and competence to manage non-surgical eye disease. Additionally, participation of OCFP in an eye health council with ophthalmology and optometry will improve collaboration between all groups.

OAO is pleased that OCFP has identified patient access as a key issue facing FP and we are committed to help resolve this issue through direct communication with OCFP.

### **OMA Section on General and Family Practice (SGFP)**

The SGFP submission suggests that ophthalmologists, optometrists and opticians work together and that they do not perceive problems with the arrangements. This is an interesting perception as eye care has been identified as an area where collaboration requires improvement. Nonetheless, the section also states that "At present there is generally not much communication between optometrists and family doctors".

OAO is aware that communication between optometrists and family physicians needs to be improved. We are working towards emphasizing this to our membership and developing tools such as summary patient reporting forms, to help address this issue. Moreover, we are prepared to discuss further remedies for this obstacle to collaboration in any consultations between OAO and OCFP.

## Vision Council of Canada

OAO would like to comment on the following statement from the submission:

***We are advised that the College of Optometrists believes that optical corporations will put undue pressure on optometrists to, for instance, over prescribe or to limit their time to patients who will generate an optical prescription. We further understand that no evidence supporting this contention has ever been produced, and that, at best, the allegation is based on unsubstantiated anecdotal evidence.***

All stakeholders agree that the removal of prohibitions on association between optometrists, opticians and non-professionals will enhance collaboration. To this end, the College of Optometrists (COO) has agreed to propose changes to conflict of interest regulations that will permit free association between those three groups. In the interests of public protection, COO has also proposed limiting the association of optometrists with other entities to that of independent contractor. The purpose of this limitation is to ensure that optometrists are not subject to control, coercion or influence that could interfere with their independent judgement over practice situations including;

- the services that are provided;
- who is accepted as a patient;
- the release to the patient with a copy of his or her prescription, order, requisition or similar document that reflects the true recommendations of the health care professional;
- the fees charged; and
- the maintenance, care custody and control of patient's records.

These five principles are central to safe and effective patient care and must be the overriding feature of any relationship between an optometrist and a third party. The introduction of an employer/employee relationship adds an unacceptable additional interest into the fiduciary relationship between the optometrist and the patient. The optometrist must maintain full control over all of the five principles without any influence from the third party. Moreover, the ability of the patient to take possession of their eye wear prescription is critical to minimize any conflict inherent in the prescriber/dispenser relationship.

The VCC suggests in their submission that there is no evidence to support the claim that there is influence or control of the optometrist by an optical corporation. Nonetheless, OAO is aware of various situations where optometrists in Ontario have entered arrangements that could expose the practitioner to allegations of professional misconduct. Further, in many situations the optometrist is required to sign a confidentiality agreement prior to accepting the arrangement.

Once an arrangement has been established, there is subtle pressure on the optometrist to increase volumes of prescriptions through a variety of methods including:

- limiting non-dispensing patient recalls,
- pressure to over prescribe,
- increasing the number of patients seen per hour,
- personally delivering patients to the dispensary, and
- recommending multiple appliances or expensive additions.

All of these pressures compromise the optometrist's ability to comply with the principles established by the College of Optometrists for safe and effective patient care.

While a written agreement between the optometrist and the corporation may not include these requirements, the practitioner as an employee will be subject to the pressures of the relationship to either comply with the employer's expectations or face dismissal.

Due to the surreptitious nature of these types of arrangements, involved optometrists are not prepared to expose their professional reputation in print.

To reiterate, OAO is confident that the "independent contractor" concept will provide optometrists and their regulatory body with the necessary tools to manage conflict of interest and also provide an opportunity for open collaboration between eye care providers.

### **Ontario Opticians Association (OOA)**

OAO regrets that the OOA continues to persist in their accusations that optometrists and their leadership are responsible for the failure of collaboration between opticians and optometrists. The vitriolic tone of the OOA submission is not conducive to inter-professional collaboration. Furthermore, OAO does not oppose refraction for opticians or any trained technician but refraction must be done under the direct supervision of an optometrist or physician to inform a comprehensive eye examination. Refraction must not be done in isolation at a separate time or place. OAO continues to support all of the HPRAC recommendations on the *Regulation of Opticians* from *New Directions*.

## **College of Opticians of Ontario (COO)**

OAO has identified several areas in the COO submission that either misrepresents the facts or is not accurate. These misrepresentations are identified as follows:

- *An optician's dispensary is often the first place where members of the public go when they believe they are experiencing visual problems.*

The public visit optician's stores when they are shopping for new eyeglasses. Most of the public seek the services of an optometrist or their family physician when they are experiencing vision problems. In fact, the SGFP submission states that patients come to physicians on a regular basis for various major and minor complaints about the eye.

- *Opticians help consumers decide if a new refraction is necessary*

Only a proper eye examination can determine if a new prescription for eye wear is necessary

- *The College of Opticians does not accept that the public will be well served by the draft regulation in particular the definition of "independent contractor status"...members of the College of Optometrists will have difficulty complying with the regulation*

OAO is confident that optometrists can and will comply with the proposed regulation. Furthermore, and in contradiction of the COO statement, case law and Ministry of Health and Long-Term Care policy supports free association and is not inconsistent with an "independent contractor" concept.

- *Having the authority to prescribe and gain financially from the sale of ocular appliances to remedy prescriptions is a conflict of interest that is prohibited for all other health care professions.....*

All regulated health professionals that assess, diagnose and /or provide treatment within their scope of practice have the potential for conflict of interest. There is no greater or lesser potential for conflict of interest for optometrists who prescribe and treat by dispensing than for other health professionals. Dentists prescribe and sell dental appliances and cosmetic procedures; physicians prescribe and sell cataract lenses and laser eye surgery; podiatrists sell orthotics and naturopaths sell various medicines. Moreover, patients have always had the choice of who their ophthalmic dispenser would be, independent of who performed their eye examination. That freedom of choice will be preserved for the public with the new regulation mandating prescription release to all patients.

- *As HPRAC articulated in its advice to the Minister of Health and Long Term Care in 2000 regarding refractometry, the scope of practice defines the “minimum requirements”, as opposed to the “outer boundaries”.*

In the 2000 report, HPRAC used this reference in support of the recommendation that notwithstanding that refraction is a public domain act; refractometry is not within the scope of practice for opticianry. The sentence has been misinterpreted in support of a broad interpretation of the scope of practice statement when in fact the point speaks to strict controls. The preceding sentence reads: “Colleges must set entry to practice requirements and standards of practice which, at minimum, reflect the scope of practice statement in the profession specific acts”.

- *Opticians Assessment – obtain a full medical history, which includes the patient’s present complaint, any previous illnesses, social history, and family history;*
- *Screen patients at risk for hereditary conditions and potentially preventable disorders*
- *Treatment Management – Provide care and monitoring of chronic illnesses*
- *Maintain the medical record of each patient*
- *Manage care of patients with diseases or disorders of the eye.*

COO defines the scope of practice for opticians as: *The practice of opticianry is the provision, fitting and adjustment of subnormal vision devices, contact lenses or eyeglasses.* OAO cannot appreciate how “providing care of chronic illness and managing care of patients with diseases or disorders of the eye” are services that fall within the designated scope of practice statement for opticians.

- *Must expend his or her best efforts, in conjunction with the authorized prescriber to ensure that the Canadian Ophthalmological Society evidence-based clinical guidelines for periodic eye examinations in adults in Canada are adhered to.*

Although the published guidelines are titled “evidence based”, the authors acknowledge that the guidelines are: “as evidenced based as possible and sensitive to the resources available in Canada”. The author’s state: “In the absence of evidence, recommendations were developed on the basis of consensus of the expert committee” and “Good data are available only for the population over 40”. Further, the American Academy of Ophthalmology (AAO) suggests intervals between comprehensive eye exams more frequent than the COS guidelines. (Include Robinson study here)

- *The College of Physicians and Surgeons of Alberta (CPSA) has been most supportive of legislative change in Alberta to allow opticians to perform refractometry, as evidenced by the letter.....*

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Although opticians in Alberta and British Columbia can perform refraction tests, opticians require a prescription from either a physician or an optometrist to dispense eyewear. Both CPSA and the College of Physicians and Surgeons of British Columbia do not condone remote prescribing.

Thank you for the opportunity to provide these additional comments and clarification on the stakeholder responses.

## The new COS guidelines for frequency of eye examinations – Where is the evidence?

### Les nouvelles lignes directrices de la SCA sur la fréquence des examens de la vue – Où sont les preuves?

The Canadian Ophthalmological Society (COS) released a new guideline for the frequency of eye examinations that is available in the online version of the Canadian Journal of Ophthalmology.<sup>1</sup> The guideline's intended audience is "any Canadian health care professional who refers or sees patients for a comprehensive oculo-visual examination". Optometrists, ophthalmologists and other physicians are specifically mentioned. One objective of the document was to provide an evidence-based recommendation for the frequency of comprehensive eye examinations for adults 19 to 64 years of age. It is surprising then that the only recommendation that includes a level of evidence other than consensus is for people over the age of 65 years.

#### Levels of evidence

One of the first groups to make an effort to specify the strength of practice recommendations or "level of evidence" was the Canadian Task Force on Preventive Health Care (CTFPHC) established in 1976. This group uses "a standardized methodology, employing explicit analytic criteria, for evaluating the effectiveness of preventive health care interventions".<sup>2</sup> The recommendations provided by this group have a graded strength that is based on the quality of published medical evidence. The quality of the medical evidence is assessed by looking at both the design and quality of individual studies. Criteria used to judge quality

are design-specific. The highest quality evidence is found in well-designed randomized controlled trial(s). The Canadian Task Force methodology was adopted by the United States Preventive Services Task Force and has achieved international recognition.

The criteria used by the COS differ from those of the Canadian Task Force. The criteria listed and levels of evidence assigned appear to be based more on methodological quality rather than strength of study design. All studies, regardless of design, were judged by the same criteria and were required to meet Level 2 (4 of the 5 criteria) before being included as evidence for recommendations. It is likely that not all evidence available was included in this review given the lack of design-specific criteria.

#### Flawed Assumptions

Evidence does exist that would contradict several of the consensus-based recommendations. Several of these recommendations appear to be based on incorrect assumptions. The first of these is the assumption that asymptomatic patients are unlikely to have eye disease. Studies looking at the prevalence of undetected eye disease have found that one-third to one-half of people with eye disease were unaware that they had a problem.<sup>3-5</sup> It has been reported that the proportion of those with eye disease who are unaware is highest in the younger age groups, less than 40 years of age.<sup>3</sup>

Secondly, the statement is made that

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simple vision testing has a very good correlation with the presence of eye disease. It is true that people with a reduction in visual acuity are more likely to have eye disease but it is incorrect to assume that visual acuity testing alone is able to detect eye disease. There is evidence that a majority of people with eye disease have good visual acuity (80% with VA  $\geq$  6/9).<sup>3</sup> Several studies have measured the poor sensitivity and specificity that vision tests have for detecting eye disease when compared to the “gold standard” of a full eye examination.<sup>6,7</sup> There is also evidence that when people have vision loss they may not notice any change or may not seek timely eye care.<sup>8</sup> Studies in the United Kingdom and in Australia have found high prevalence of uncorrected or under corrected refractive error in their adult populations.<sup>9-11</sup> One study in Australia found that 59% of visual impairment was due to under corrected refractive errors.<sup>12</sup>

Thirdly the recommendations assume that people who are at a higher risk for eye problems will be aware of their status. This will definitely not be true for a significant number of people with diabetes. It is estimated that one-third of people in Canada with diabetes are currently undiagnosed.<sup>13,14</sup> Prevalence estimates of retinopathy at clinical diagnosis of Type II diabetes range from 9.9% up to 40%.<sup>15,16</sup> The diagnosis may be prompted by a referral to their family physician from their optometrist.<sup>17</sup>

## Public Health Concerns

Studies that have evaluated the re-

lationship between frequent eye examinations and improved visual outcomes have usually targeted older age groups (65 years of age and older) or people with specific risk factors such as diabetes.<sup>17,19,20</sup> All results show that people who have more frequent eye examinations are less likely to experience vision loss. Most studies conclude with a statement about the importance of early detection and treatment of the major causes of vision loss. It is not clear what the public health impact might be of a 10 year interval between eye examinations for “low risk” patients 19 to 40 years or a 5 year interval for people 41 to 55 years of age, as recommended by the COS.

The CTFPHC provides guiding factors for decision-making when evidence is unclear. These factors include minimize harm and focus on conditions with a high burden of illness. One way of measuring the burden of illness is to look at the prevalence of the problem. When we consider blindness and visual impairment it is important to look not only at the prevalence but also at the patient perspective on the impact of disease and vision loss on everyday activities. Preventing all avoidable cases of blindness and visual impairment is what should be our focus when we consider the frequency of eye examinations.

The frequency of eye examinations recommended by the COS represents a minimalist approach rather than what may be indicative of an optimum approach. There is no evidence that the frequency of eye examinations that they recommend will promote early detection of eye

disease and prevent blindness. The COS has taken steps to provide an evidence-based recommendation but further steps would appear warranted. A guideline where the frequency of eye examinations recommended attempts to prevent the loss of vision rather than respond after loss has occurred would be ideal.

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**L**a Société canadienne d'ophtalmologie (SCA) a publié de nouvelles lignes directrices sur la fréquence des examens de la vue; la version en ligne est disponible sur le site Web du Journal canadien d'ophtalmologie<sup>1</sup>. Le groupe ciblé par les lignes directrices sont les professionnels des soins de santé canadiens qui dirigent ou accueillent des patients pour un examen oculo-visuel complet. On y nomme spécifiquement les optométristes, les ophtalmologistes et les autres médecins. Un des objectifs du document était de faire une recommandation factuelle sur la fréquence des examens de la vue complets chez les adultes de 19 à 64 ans. Il est surprenant de constater que la seule recommandation reposant sur un niveau de preuve autre qu'un consensus concerne les personnes de plus de 65 ans.

## Niveaux de preuve

Le Groupe d'étude canadien sur les soins de santé préventifs (GHCSSP) créé en 1976 a été un des premiers groupes à tenter de préciser la valeur des recommandations sur la pratique, ou le « *niveau de preuve* ». Ce groupe utilise une méthodologie normalisée

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recourant à des critères analytiques explicites pour évaluer l'efficacité des interventions de soins de santé préventifs<sup>2</sup>. Les recommandations produites par ce groupe sont classées en fonction de la qualité des données probantes médicales publiées. La qualité de ces données médicales est évaluée d'après la conception et la qualité des études individuelles. Les critères d'évaluation de la qualité sont spécifiques à la conception. Les meilleures données probantes proviennent des essais contrôlés randomisés bien conçus. La méthodologie du Groupe d'étude canadien a été adoptée par le *Preventive Services Task Force* des États-Unis et est reconnue à l'échelle internationale.

Les critères utilisés par la SCA sont différents de ceux du Groupe d'étude canadien. Les critères énumérés et les niveaux de preuve attribués semblent reposer davantage sur la qualité méthodologique que sur la force de la conception des études. Toutes les études, quelle que soit leur conception, ont été évaluées au moyen des mêmes critères et devaient atteindre le niveau 2 (quatre critères sur cinq) avant d'être incluses comme données probantes aux fins des recommandations. Il semble que toutes les données probantes n'ont pas été incluses dans cette évaluation en raison du manque de critères spécifiques à la conception.

### Hypothèses sans fondement

Il existe des preuves qui pourraient contredire plusieurs des recommandations fondées sur un consensus. Plusieurs de ces recommandations semblent reposer sur des hypothèses

incorrectes, la première étant que les patients asymptomatiques ne sont pas susceptibles de contracter une maladie de l'œil. Les études sur la prévalence des maladies de l'œil non détectées révèlent qu'entre 33 % et 50 % des personnes affectées par une maladie de l'œil ne le savent pas<sup>3-5</sup>. On indique que la proportion de ces personnes est plus élevée dans les groupes d'âge plus jeunes, c'est-à-dire avant 40 ans<sup>3</sup>.

Deuxièmement, on affirme qu'il y a une très bonne corrélation entre un simple examen de la vue et la présence d'une maladie de l'œil. Il est vrai que les personnes ayant un problème d'acuité visuelle sont plus susceptibles d'avoir une maladie de l'œil, mais il est incorrect de présumer qu'on peut déceler une maladie de l'œil sur simple examen de l'acuité visuelle. Il est prouvé qu'une majorité des personnes ayant une maladie de l'œil affichent une bonne acuité visuelle (80 % avec AV  $\geq$  6/9)<sup>3</sup>. Plusieurs études ont mesuré la piètre spécificité et sensibilité des tests visuels à déceler une maladie de l'œil par rapport à l'excellent examen de la vue complet<sup>6,7</sup>. Il est aussi prouvé que des personnes ayant une perte de vision peuvent ne pas déceler un changement ou ne pas demander de soins opculo-visuels opportuns<sup>8</sup>. Des études réalisées au Royaume-Uni et en Australie indiquent une prévalence élevée de l'erreur de réfraction non corrigée ou sous-corrigée chez leur population adulte<sup>9-11</sup>. Une étude australienne indique que 59 % des handicaps visuels sont causés par des erreurs de réfraction sous-corrigées<sup>12</sup>.

Troisièmement, les recommandations présument que les personnes ayant un risque plus élevé de problèmes visuels sont conscientes de leur état. Cela ne s'applique assurément pas pour un nombre élevé de diabétiques. On estime qu'un tiers des diabétiques au Canada sont actuellement non diagnostiqués<sup>13,14</sup>. Les estimations de prévalence de la rétinopathie lors d'un diagnostic clinique du diabète de type 2 se situent entre 9,9 % et 40 %<sup>15,16</sup>. Ces diagnostics peuvent s'expliquer parce que les personnes ont été dirigées vers leur médecin de famille par leur optométriste<sup>17</sup>.

### Préoccupations de santé publique

Les études qui ont évalué la relation entre la fréquence des examens de la vue et une amélioration visuelle ont habituellement ciblé des groupes de personnes plus âgées (65 ans et plus)<sup>18</sup> ou des personnes ayant des facteurs de risque spécifiques comme les diabétiques<sup>17,19,20</sup>. Tous les résultats révèlent que les personnes qui font l'objet d'examens de la vue plus fréquents sont moins sujettes à une perte de vision. La plupart des études insistent sur l'importance d'une détection et d'un traitement précoces des principales causes de la perte de vision. On ne sait pas quelle serait l'incidence sur la santé publique d'un intervalle de 10 ans entre les examens de la vue chez des personnes à faible risque âgées de 19 à 40 ans, ou d'un intervalle de cinq ans chez des personnes de 41 à 55 ans, comme le recommande la SCA.

Le GHCSSP propose des facteurs décisionnels lorsque les preuves

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ne sont pas claires, par exemple : réduire le préjudice et cibler les états où la maladie représente un fardeau élevé. Une façon de mesurer le fardeau de la maladie est d'examiner la prévalence du problème. Lorsque nous examinons la cécité et le handicap visuel, il est important de ne pas s'arrêter uniquement à la prévalence mais aussi au point de vue des patients sur l'incidence de la maladie et de la perte de vision sur les activités quotidiennes. Nous devrions cibler la prévention de tous les cas évitables de cécité et de handicap visuel lorsque nous étudions la fréquence des examens de la vue.

La fréquence des examens de la vue que recommande la SCA représente plutôt une approche minimaliste qu'optimale. Il n'y a aucune preuve que la fréquence des examens de la vue qu'elle recommande favorisera la détection précoce des maladies de l'œil et la prévention de la cécité. La SCA a voulu présenter une recommandation factuelle, mais il semblerait justifié d'approfondir la question. L'idéal serait des lignes directrices recommandant pour les examens de la vue une fréquence visant à prévenir plutôt qu'à traiter une perte de vision.

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# Prevalence of Asymptomatic Eye Disease

## Prévalence des maladies oculaires asymptomatiques



### Abstract:

*Purpose:* To determine the proportion of people presenting for an eye examination who are unaware that they have an eye disease.

*Methods:* A cross-sectional clinical study with a consecutive sampling of patients from the practices of 133 optometrists across Canada.

*Results:* Data was collected for 24,570 patients (57.2% female, 42.8% male) from mid-October 2000 to the end of January 2001. The prevalence of asymptomatic eye disease in this optometric patient population was 14.4% (95% CI, 13.9% to 14.8%). Almost half of patients (48.3%) with eye disease were asymptomatic. Two-thirds of people with eye disease had a best-corrected visual acuity of 6/7.5 or better. *Conclusions:* In this study almost one out of every 7 people presenting for an eye examination had asymptomatic eye disease. A good visual acuity does not rule out the presence of eye disease. This study supports the importance of a full ocular health assessment with each eye examination.

### Résumé:

*Objet:* Déterminer le pourcentage de personnes subissant un examen de la vue qui ignorent qu'elles sont affectées d'une maladie oculaire.

*Méthodes:* Étude clinique transversale constituée d'un échantillon consécutif de patients provenant des cabinets de 133 optométristes au Canada.

*Résultats:* Les données ont été recueillies auprès de 24 570 patients (57,2 % de femmes et 42,8 % d'hommes) entre la mi-octobre 2000 et la fin de janvier 2001. La prévalence d'une maladie oculaire asymptomatique dans cette population de patients optométriques s'établit à 14,4 % (IC de 95 %, de 13,9 % à 14,8 %). Presque la moitié des patients (48,3 %) affectés d'une maladie oculaire ne présentaient aucun symptôme. Les deux tiers des personnes ayant une maladie oculaire affichaient une acuité visuelle avec correction maximale de 6/7,5 ou mieux.

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### Key words:

prevalence,  
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aging

### Mots clés:

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vieillesse.

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*Conclusions: Dans cette étude, presque une personne sur sept se présentant à un examen de la vue était affectée d'une maladie oculaire asymptomatique. Une bonne acuité visuelle ne signifie pas l'absence d'une maladie oculaire. Cette étude appuie l'importance d'une évaluation complète de la santé oculaire lors de chaque examen de la vue.*

## INTRODUCTION

The most common functional problems reported by Canadians are vision problems. Fifty percent of Canadians report that they have reduced visual function due to being near-sighted, far-sighted or blind.<sup>1</sup> The 1999 Statistical Report on the Health of Canadians considered aging and diabetes to be two major risk factors for eye problems that may lead to blindness.<sup>2</sup> The report then states that, "A regular eye examination to assess vision, prescribe corrective lenses, and check for eye diseases such as glaucoma is thus a recommended practice."

The importance of regular eye examinations in the early detection of glaucoma was highlighted in a study that looked at the socio-economic risk factors for first presentation advanced glaucomatous visual field loss.<sup>3</sup> The authors concluded that there was strong evidence that the longer since the last visit to an optometrist the greater the likelihood that someone will have advanced glaucomatous visual field loss when first diagnosed with the disease.<sup>3</sup> A population-based prevalence survey found that approximately half of those with glaucoma were unaware of their illness.<sup>4</sup>

The two principal reasons that Canadians give for seeking a regular eye check-up are usually listed as the wish to "make sure everything is OK" or to update a prescription.<sup>2</sup> How frequently are eye diseases found during one of these routine eye examinations? The purpose of this study was to assess the prevalence of eye disease in an apparently asymptomatic population.

## METHODS

This is a cross-sectional clinical study with a consecutive sampling of patients from the practices of optometrists across Canada. Optometrists were selected by stratified random sampling. The strata were composed of 6 regions across Canada based on provincial boundaries; the Atlantic region includes Newfoundland, Prince

Edward Island, Nova Scotia and New Brunswick. Inclusion criteria for optometrists consisted of those registered or licensed to practice and those who provide 30 or more patient care hours per week.

An initial letter from the Canadian Association of Optometrists was sent to all optometrists across Canada. This letter outlined the purpose of the study and advised them that those selected to participate would be contacted by phone by the company contracted to distribute the study questionnaires, H.I.T. Research Group. The letter also stipulated they were free to decline to participate. The Canadian Association of Optometrists granted optometrists a credit of 5 hours of continuing education for participating in the study.

Data collection took place from October 2000 to January 2001. Recruited optometrists were asked to fill in reports concerning the next 200 patients that they saw for a diagnostic visit. The optometrists were provided with recording sheets for each patient that included basic demographic information as well as the reason for the visit, history of previous eye disease or eye surgery, risk factors for eye disease, and best corrected visual acuity. They were provided with diagnostic codes and asked to indicate any diagnosis of eye disease. They were also asked to indicate if the patient was aware of eye diseases that were diagnosed. Information collected did not include individual identifiers such as patient names and addresses.

<b>Table 1.</b> <b>Distribution of</b> <b>optometrists</b>	<b>STUDY</b>	<b>CANADA</b>
Region	n (%)	n (%)
Atlantic	14 (10.53)	201 (6.47)
Quebec	43 (32.33)	1133 (36.47)
Ontario	42 (31.58)	939 (30.22)
Manitoba / Saskatchewan	10 (7.52)	200 (6.44)
Alberta	10 (7.52)	294 (9.46)
British Columbia	14 (10.53)	340 (10.94)
Total	133	3107

Age range (yr)	STUDY POPULATION n (%)	POPULATION OF CANADA (2000) n (%)
≤ 9	2086 (8.58)	3821748 (12.43)
10 to 24	4980 (20.47)	6201940 (20.17)
25 to 34	2104 (8.65)	4392936 (14.29)
35 to 44	3312 (13.62)	5306804 (17.26)
45 to 54	4058 (16.68)	4364941 (14.19)
55 to 64	2665 (10.96)	2811821 (9.14)
65 to 74	2812 (11.56)	2135166 (6.94)
75 to 84	1888 (7.76)	1298770 (4.22)
≥ 85	419 (1.72)	415961 (1.35)
Total	24,324	30,750,087

## RESULTS

Eighty-five percent of optometrists completed the study (133 out of 157). The distribution of study optometrists by region closely resembles the national distribution (Table 1). There was no statistically significant difference in the two distributions when measured by chi-square ( $\chi^2 = 4.606$ ,  $P = 0.466$ ). The doctors collected data for 24,570 patients (57.2% female, 42.8% male). On average each doctor completed reports for 185 patients with the average length of data collection being 26.47 days.

Age was reported for 99% of the patients (24,324 out of 24,570). When compared to the population of Canada in the year 2000<sup>5</sup> the optometric patient population has a higher proportion of people in the 45 and over age categories (Table 2). This difference is especially notable in the population 65 years and over. In the study sample, 21.05% of patients (5,119 out of 24,324) were 65 years of age or older compared to 12.52% (3,849,897) of the population of Canada ( $Z = 39.88$ ,  $P < 0.001$ ).

The most common reason given for visiting the optometrist at 32.6% (7896) was for a regular eye exam with no apparent problems. Concern about the health of their eyes or a follow-up visit for a previously diagnosed problem were the reasons for 20.23% of patient visits. This corresponds to the 17.9% of people who were found to have a previously diagnosed eye disease.

The probability of a previous diagnosis of eye disease increased dramatically with age. The percentage of those with a previous diagnosis changed from 4% in the under 25 years of age category to 76.9% in those who are 85 years of age or older. The proportion doubles with each decade from the age of 54 years to 74 years. There is a small but statistically significant difference between the proportion of females with previously diagnosed eye disease and the proportion of males (18.97% versus 16.60%,  $Z = 4.70$ ,  $P < 0.001$ ).

Diagnosis	Number	Percent (95% CI)
Cataract or IOL opacification	3157	12.85 (12.43 to 13.27)
Conjunctivitis	458	1.86 (1.7 to 2.04)
Keratoconjunctivitis sicca	628	2.56 (2.36 to 2.76)
Keratitis	164	0.67 (0.57 to 0.78)
Corneal degeneration, dystrophy, keratoconus	261	1.06 (0.94 to 1.20)
Keratopathy	172	0.70 (0.60 to 0.81)
Contact lens complication	201	0.82 (0.71 to 0.94)
Episcleritis/ Scleritis	30	0.12 (0.08 to 0.17)
Foreign body	80	0.33 (0.26 to 0.41)
Glaucoma - Acute angle-closure	40	0.16 (0.12 to 0.22)
Glaucoma - Chronic open-angle	276	1.12 (1.00 to 1.26)
Iritis	50	0.20 (0.15 to 0.27)
Lid diseases/ defects	472	1.92 (1.75 to 2.10)
Optic nerve – papilledema, atrophy, neuritis	100	0.41 (0.33 to 0.49)
Retinal detachments	52	0.21 (0.16 to 0.28)
Retinal tear or hole without detachment	80	0.33 (0.26 to 0.41)
Diabetic retinopathy	182	0.74 (0.64 to 0.86)
Macular degeneration	804	3.27 (3.05 to 3.50)
Peripheral retinal degeneration	199	0.81 (0.70 to 0.93)
Vitreous degeneration	287	1.17 (1.04 to 1.31)
Vitreous hemorrhage	11	0.04 (0.02 to 0.08)

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**Table 4.**  
**Awareness of eye disease by age**

Age range (yr.)	Aware of Eye disease n (%)		
	Yes	No	Total
≤ 24	262 (40.87)	379 (59.13)	641
25 to 44	500 (44.25)	630 (55.75)	1130
45 to 64	959 (47.62)	1055 (52.38)	2014
65 to 84	1802 (57.59)	1327 (42.41)	3129
≥ 85	219 (67.38)	106 (32.62)	325

The timing of their last full eye exam was a significant factor in who had a previous diagnosis of eye disease. People who were previously examined within the last 2 years were 4.27 times more likely to have such a diagnosis than those whose last examination was 7 years or more.

The response rate for "previous eye surgery" was 96.2%. Of those responding, 9.96% had a previous eye surgery. The most frequently reported surgery was for cataracts with 1402 or 5.93% of optometrists' patients reporting a procedure involving cataracts.

Many risk factors for eye disease, other than age, were reported. The four most frequently reported were hypertension at 8.94%, then a family history of eye disease at 7.46%, followed by diabetes at 4.74% and finally heart disease at 4.46%. The prevalence of self-reported diabetes in Canada is currently estimated to be 3.2%.<sup>6</sup> The prevalence of self-reported diabetes in this study should be higher due to an older population and self-selection.

Prevalence of specific eye disease ranged from a high of 12.85% for cataracts to a low of 0.04% for vitreous hemorrhage (Table 3). Prevalence values for anterior segment disorders were similar to those found in a study of Ontario optometrists conducted in 1997.<sup>7</sup>

The prevalence of eye disease that people are not aware of in the optometric patient population was 14.4% (95% CI, 13.9% to 14.8%) or 3497 out of 24324 (Table 4). Optometrists reported that their patients were unaware of the presence of 48.3% of eye diseases that were diagnosed. In other words 48.3% of disease was

**Table 5.**  
**Best corrected distance visual acuity n (%)**

Best corrected visual acuity (right eyes)	Best corrected distance visual acuity n (%)			
	6/6 or better	6/7.5	6/9	6/12 or worse
With disease	2422 (42.34)	1397 (24.42)	770 (13.46)	1132 (19.79)
Total reported	17781(74.71)	2972 (12.49)	1326 (5.57)	1722 (7.23)

asymptomatic. The proportion of disease that was asymptomatic was higher in some categories of "reason for visit". The majority of people (79.77%) who see an optometrist do not indicate an ocular complaint as their reason for the visit. They most commonly report that they require a regular eye exam, their spectacles need updating or their vision is reduced. Twenty percent of these people (3857 out of 19317) have an eye disease and 57.84% were unaware of the eye disease.

Awareness of eye disease was also related to patient's age and time since last full eye examination. Older patients were more likely to be aware of the presence of an eye disease than younger patients were (Table 4). People whose last full examination prior to the current visit was 1 year or less had the highest probability of knowing about the eye disease.

Best-corrected visual acuity was recorded for 96.87% of the optometric patients. A best corrected visual acuity of 6/6 or better is not indicative of the absence of disease (Table 5). Many of the optometric patients with eye disease, 42.34%, had a best-corrected visual acuity of 6/6 or better. This proportion increases to 66.8% when one line worse than 6/6 is included, 6/7.5 or better. However, there is a statistically significant difference in the distribution of visual acuity in the right eyes of the total population versus the right eyes of the people with eye disease,  $\chi^2 = 2305$ ,  $P < 0.001$ . A reduced best-corrected visual acuity may indicate the presence of eye disease.

Table 6 shows the distribution by age group of the four major causes of blindness in the Canadian population. Each age group has some risk of these diseases with the prevalence increasing sharply in those 65 years of age and older. The proportion of people who were unaware of having each specific eye disease ranges from 41 to 50 percent.

## DISCUSSION

This is the first study to look at the prevalence of asymptomatic or undetected eye disease in an optometric patient population. Studies have looked at the prevalence of undetected eye disease in general medicine populations.<sup>8,9</sup> Wang et al's study in Baltimore found that 50.6% of patients (n=405) in a primary care clinic population had clinically important ocular pathology.<sup>8</sup> They found that one-third of those affected (n=68) were unaware of their eye disease, and 26% (n=18) of these 68 patients required immediate medical or surgical intervention.

The prevalence of undetected eye disease and the specific rates of disease awareness were similar between the current study and that of Wang et al.<sup>8</sup> In Baltimore the overall prevalence of undetected eye disease was 16.67% with 49% of the cataract cases, 60% of those with diabetic retinopathy, and 42% of the glaucoma cases and suspects unaware of their diseases. The corresponding rates for this optometry study: 14.4% prevalence of undetected disease, 45% of cataract cases unaware of their disease, 41% with diabetic retinopathy, and 50% of the glaucoma cases and suspects.

Many studies have demonstrated the importance of early detection and treatment of eye disease in the prevention of blindness. The majority of studies focus on diabetic eye disease. One study reviewed the evidence on screening for diabetic retinopathy and estimated 260 new cases of blindness in England and Wales would be prevented each year.<sup>10</sup> This estimate was based on a program where patients with diabetes mellitus are systematically referred to optometrists for a retinal examination

(88% detection of serious retinopathy, 87% of cases treatable). A study which compared the performance of an optometrist and an ophthalmologist found 77% total agreement about the presence or absence of diabetic retinopathy.<sup>11</sup> The optometrist's sensitivity of referral for moderate or severe background diabetic retinopathy was 92%. In another study in England where optometrists were given a defined protocol for referable eye disease, optometric screening for diabetic eye disease produced a sensitivity of 100% and a specificity of 94%.<sup>12</sup>

The impact of a national diabetic eye-screening program is illustrated in Iceland where they have seen a reduction in the prevalence of blindness due to diabetic eye disease. The prevalence of blindness in patients with Type I diabetes decreased from 2.4% in 1980 to 0.5% in 1994, 14 years after the institution of the diabetic eye screening program.<sup>13</sup> The authors of the study conclude that, "visual impairment in diabetics can be prevented with active regular screening and standard laser therapy."

In this study almost one out of every seven people presenting for an eye examination had asymptomatic eye disease. A good visual acuity did not rule out the presence of eye disease. This study and other similar studies support the importance of regular eye examinations and a full ocular health assessment with each eye examination.

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**Table 6. Prevalence of specific eye diseases by age group and proportion unaware**

Eye Disease	Age group (yr)				Unaware
	≤ 24	25 to 44	45 to 65	≥ 65	
Cataract / IOL opacification	24 (0.34)	67 (1.24)	576 (8.57)	2465 (48.15)	45%
Glaucoma cases & suspects	42 (0.59)	192 (3.55)	462 (6.87)	473 (9.24)	50%
Diabetic retinopathy	0 (0)	15 (0.28)	88(1.31)	78(1.52)	41%
Macular degeneration	6 (0.08)	19 (0.35)	136 (2.02)	623 (12.17)	48%

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