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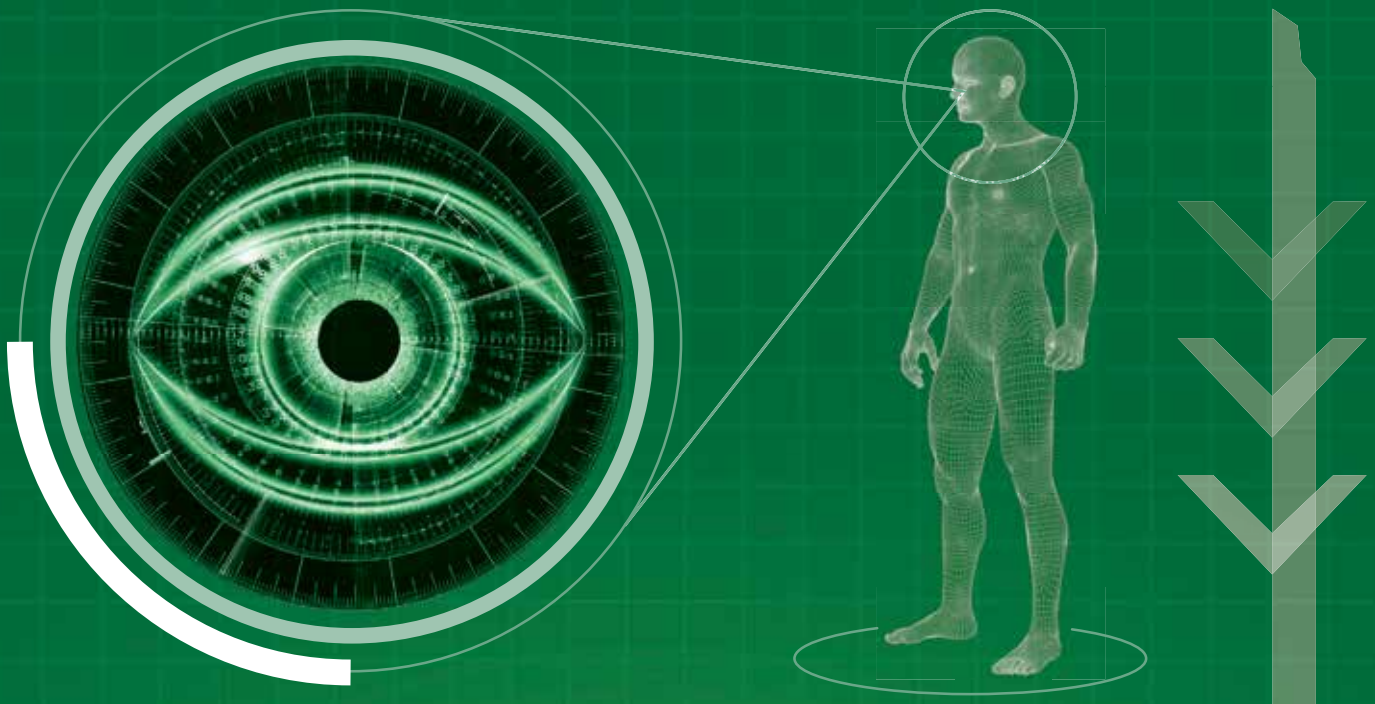

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In this issue, we have a guest editorial by Drs. Christian, Labreche and Hrynchak of the University of Waterloo School of Optometry & Vision Science on the experiential learning opportunities provided in the external geriatric and pediatric clinics. Providing care for these two demographics of our population sometimes requires skills and knowledge that practitioners do not exercise regularly while providing for the needs of the "average" patient. Their comments provide good food for thought. We round out this issue with a couple of interesting clinical papers which I hope you will enjoy. In many optometric practices, the autorefractor has replaced retinoscopy. Corneal mappers and topographers have supplanted keratometers, and a vast array of imaging techniques has largely consigned direct ophthalmoscopy to a very limited role in assessment of the posterior segment. Recently, liquid crystal lenses have been introduced for occlusion therapy as an alternative to eye patches. The many different types of single vision and progressive addition lenses available to us belies the belief of one of my long-departed colleagues in ophthalmic optics that "optics will never change."

In addition to the usual flow of submissions and revisions that cross our desks, the editorial team is also working on a couple of supplements for this year's volume. As I write this editorial, the first supplement on specialty contact lenses is nearly completed, while work is just beginning on the second. As with the two supplements we published in 2015, I hope that you will find this year's supplements stimulating and informative.

B. Ralph Chou, MSc, OD, FAAO
Editor-in-Chief

Dans ce numéro, les Drs Christian, Labreche et Hrynchak de l'École d'optométrie et des sciences de la vision de l'Université de Waterloo nous proposent un éditorial sur les possibilités d'apprentissage par l'expérience offertes dans les cliniques gériatriques et pédiatriques externes. Soigner des personnes issues de ces deux tranches de la population nécessite parfois des habiletés et des connaissances que les praticiens n'utilisent pas régulièrement auprès du patient « moyen ». Les propos de ces trois éditorialistes invités constituent une bonne matière à réflexion. Nous complétons ce numéro par deux intéressants rapports d'étude clinique qui, je l'espère, sauront vous plaire.

En plus du flot habituel de soumissions et de révisions qui circulent sur nos bureaux, l'équipe de rédaction prépare quelques suppléments pour le volume de cette année. Au moment où j'écris ces lignes, le premier supplément sur les lentilles de contact spécialisées est presque prêt alors que le travail commence à peine pour le deuxième. Comme ce fut le cas pour les deux suppléments que nous avons publiés en 2015, je souhaite que vous trouverez matière à vous informer et à vous stimuler dans les suppléments de cette année.

B. Ralph Chou, M. Sc., O.D., F.A.A.O
Éditeur en chef

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CONTENTS

University of Waterloo Optometry intern Abraham Yuen and clinical supervisor Dr. Staci Boon from the External Geriatric program perform full exam at nursing home.

Photo by Jay Parson

Student Satisfaction with Experiential Learning in External Geriatrics and External Paediatrics

Lisa W. Christian OD, FCOVD, FAAO; School of Optometry and Vision Science, University of Waterloo, Waterloo, Ontario
Tammy Labreche OD; School of Optometry and Vision Science, University of Waterloo, Waterloo, Ontario
Patricia Hrynchak OD, MScCH(HPTE), FAAO; School of Optometry and Vision Science, University of Waterloo, Waterloo, Ontario
Correspondence may directed to lisa.christian@uwaterloo.ca

Students benefit from educational experiences which occur in the context of actual practice.[1] Knowledge, skill and attitudes are more easily recalled when learning occurs in the same context as in which it is applied.[1] Exposing students to patients with conditions help them to turn a basic understanding of the condition into a more complex mental model rich with nuances and variations in ways in which patient's present.[2] Therefore, exposing students to learning opportunities in addition to a typical clinical setting prepares them optimally for practice with a richer set of experiences.[1] Based upon social learning theory, students become "legitimate peripheral" participants watching and learning from the encounters.[3]

Les étudiants bénéficient d'expériences d'éducation dans le contexte de la pratique réelle[1]. Il est plus facile de se rappeler des connaissances, des compétences spécialisées et des attitudes lorsque l'apprentissage se déroule dans le même contexte que celui où elles sont appliquées[1]. L'exposition des étudiants à des patients qui ont des problèmes les aide à transformer une compréhension fondamentale du problème en un modèle mental plus complexe, riche de nuances et de variations au niveau de la présentation des patients[2]. L'exposition des étudiants à des possibilités d'apprentissage en plus d'un contexte clinique type les prépare donc de façon optimale à exercer, dotés d'un ensemble plus riche d'expériences[1]. Compte tenu de la théorie de l'apprentissage social, les étudiants deviennent des participants « légitimes en périphérie » qui regardent et apprennent grâce à ces contacts[3].

The external geriatrics and external paediatric services provided by the University of Waterloo, School of Optometry and Vision Science (UWOVS) program are two examples of this type of enhanced experiential learning. Third and fourth year clinical interns have the opportunity to participate in these services. In addition to optimizing learning, these educational experiences expose students to career options and styles of practice that they might not otherwise have considered. Having optometrists pursue these avenues of service provides a significant benefit for the communities within which they practice.

The external geriatrics service provides care to the geriatric population living in long term care facilities (LTC) or retirement dwellings. It is well known that the average age of the Canadian population is increasing. In 2013, 15.3% of the Canadian population was over the age of 65 and by 2030 it is projected that approximately 25% of the population will be in this age group. The proportion of older seniors (>80 years old) will also increase from 4.1% to 9.6% of the total population by 2045 or represent 39.4% of seniors. In 2011, 7.9% of seniors were living in a retirement, (LTC) or health care facility.[4,5] The impact of the overall increase in representation of seniors in the population means that there will be an increasing need to provide service for this population within retirement dwellings.

Vision impairment is 3 to 15 times higher in seniors who reside in a LTC facility or retirement home than seniors residing in the community.[6] This is consistent with the higher prevalence of ocular disease in those residing in a LTC facility or retirement home.[7] A study by Labreche et al[8] of seniors residing in LTC facilities or retirement communities in the Waterloo region confirmed that the prevalence of AMD is higher (41.2%) than published data for those in the general population over the age of 80 years of age (13.6%).[9] At a more basic level, it has been found that approximately 37% of those residing in a facility would benefit from suitable correction of refractive error.[10]

Visual impairment has been shown to lead to an increased

risk of falls and fractures[11] and to an increase in short-term mortality.[12] Visual impairment also negatively impacts activities of daily living and leisure activities, decreases quality of life and is associated with increased risk of depression.[12-14] Since health-related quality of life due to visual impairment is not worsened by a co-existing cognitive impairment, improvement of visual function could increase quality of life measures even for those multiply impaired individuals.[15] Correction of refractive error leading to increased visual acuity alone improves quality of life scores and reduces symptoms of depression.[6]

There is evidence in the literature that LTC facilities are consistently underserviced with vision care. A recent survey of 196 LTC facilities in Quebec revealed that although 84% of facilities enquired about vision upon admission, only 8.7% of facilities had a room available for eye exams on site. The vast majority (85.9%) had access to an optometrist or ophthalmologist off-site. However, eye exams were not provided to all residents. For those that were assessed, it was not at the same frequency as practice guidelines recommend.[16]

This limited access to eye care may be due to the lack of willingness of optometrists to conduct eye exams in an external setting. A study of barriers for Canadian medical doctors choosing geriatrics as their specialty described that one barrier was insufficient exposure to the field of practice. It was suggested that exposure to the specialty early on in training and provision of sufficient clinical experience may translate into increased desire to practice geriatrics. Good role models and mentors were also key.[17] It is reasonable to assume that optometry would be similar.

UWOVS provides complete oculo-visual assessments and follow-up care with therapeutic management, low vision rehabilitation, and access to optical services to 20 LTC facilities. Students in the third and fourth year of training are exposed to this unique clinical teaching environment. Aside from gaining greater comfort with implementation of different and portable assessment techniques and skills, students learn to assess patients and communicate more effectively with those with speech and/or cognitive impairments. They are also introduced to working collaboratively within a multi-professional environment. Our intended outcome for this clinical experience is to produce practitioners with the knowledge and skills to willingly provide care to this expanding segment of our population.

In addition to the external geriatric program, UWOVS also has an external paediatric program which provides vision care to children from the age of 6 months to 12 years in the Kitchener-Waterloo area.

Vision disorders are common among the paediatric population in Canada; with an estimated 25% of children between the ages of 0-18 years affected. At 6 months, the average child can reach for and grasp a toy with one hand, sit up with support, and is cognitively aware of their surrounding environment making this an appropriate age for the first eye and vision examination.[18,19] In addition, at 6 months of age, manifestations of strabismus, high refractive error, and anisometropia can be detected.[20] While treatment varies depending on the severity these conditions, it should be initiated as soon as possible (when indicated). There is increased success when the condition is diagnosed and treated earlier rather than later in life.[21] Delaying the onset of treatment can impair binocular interaction and/or acuity development, and may inhibit future perceptual, cognitive and social development.[22,23] It is therefore recommended, that a child receives their first eye examination around 6 months of age.[24]

While research has shown that the prevalence of eye and vision disorders in children is significant, it is estimated only 5% of children between the ages of 0-4 years receive a comprehensive vision examination. Based on these results, the UWOVS initiated an external pediatric program in 2004 to promote and provide paediatric vision care in the Kitchener-Waterloo community.

UWOVS currently provides full vision examinations, round-table discussions and seminar presentations to three specific focus groups: elementary schools, public childhood educational centres, and under-serviced communities. Currently the program services over a dozen different facilities, and has seen over 1,000 children who had not previously received vision care. Between 2004 and 2014, the program performed 1,246 full eye exams at local elementary schools and found 283 children (22.7%) who had a refractive, binocular vision and/or ocular problem. While UWOVS is making a difference in paediatric vision care within the Kitchener-Waterloo community, more programs are needed to promote vision exams throughout the province of Ontario; with the ultimate goal of expansion throughout Canada. The UWOVS external paediatric program will hopefully serve as a model for other optometrists and optometry schools to encourage and provide pediatric vision care in their community.

So how do we know how well we are doing in educating optometrists to provide care for these special populations? The goal of optometric education is to produce optometrists with an entry level of proficiency in a defined set of competencies.[25] The development of an optometry school curriculum includes planning content and structure, deciding on educational activities and assessing learners. A very important additional component is program evaluation. In program evaluation,

information is gathered and used to make judgements about the value of the program which can lead to avenues for improvement.[26] Different models can be used for program evaluation which can focus on various aspects of process and/or outcome. A popular model that focuses on the outcome of education is Kirkpatrick's model.[26] This model has four levels of evaluation; reaction or satisfaction, learning, behaviour and results.[26] We looked at learner satisfaction with experiential learning in the external geriatrics and paediatrics programs.

A pre-validated satisfaction survey was given to optometry students upon completion of their third year of the program. The students had an opportunity to participate in the external geriatric and paediatric service provision during the year. The survey included questions regarding clinical supervision, the learning environment, the working environment and the physical environment. Each category was assessed using a 6-point Likert scale and overall satisfaction of the program was rated on a scale of 0 to 100. The results showed that students were satisfied with the supervision in the external programs. The learning, working and physical environment were less satisfactory as would be expected. LTC facilities and schools require adapting spaces for different purposes forcing the students to use modified techniques thereby enhancing their repertoire of skills. Next steps in our research will include determining if exposure to these experiences increases the probability that the services will be delivered by graduates in their own communities.

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Canadian Optometric Low Vision: Predictive Factors and Regional Comparisons

Norris Lam MSc, OD, FAAO
Susan J. Leat, PhD, FCOptom, FAAO
Correspondence may directed to nhylam@gmail.com

Abstract

Purpose: To investigate the regional differences in low vision (LV) provision across Canada and to identify predictive factors for the provision of more extensive low vision services (LVS).

Methods: Practising optometrists across Canada were invited to participate in a questionnaire that investigated personal and practice demographics, levels of LVS offered, patterns of referrals and barriers to provision of LVS.

Results: 459 optometrists responded. Predictive factors for providing more extensive LVS included: optometrists with >15 years of practice, having a local LV optometrist/ophthalmologist within one day's travel, not having a multi-disciplinary LV clinic within one-day's travel, working in a practice in a population of <50,000, and having 2+ optometrists in the same practice. Regional differences were found in the following variables: the presence of an optometrist offering LVS within the respondent's primary practice, referral criteria, the type of LV provider receiving the referral, and the perceived quality of LVS.

Conclusions: LVS are provided differently across Canada and the availability of government-funded LVS appeared to enhance optometric referrals to multidisciplinary low vision clinics. Optometrists who were in a group practice setting, who had practiced for >15 years and who worked in a less populated area were more likely to provide more extensive LVS.

Key Words: low vision, low vision services, visual impairment, rehabilitation, service provision, barriers

Résumé

Objet : Étudier les différences régionales dans la prestation de services sur la basse vision (BV) au Canada et déterminer des facteurs prédicteurs de la prestation de services plus poussés sur la basse vision.

Méthodes : On a invité des optométristes en exercice de partout au Canada à répondre à un questionnaire portant sur les caractéristiques démographiques de la personne et du cabinet, les niveaux de services plus poussés sur la basse vision offerts, les tendances des aiguillages et les obstacles à la prestation de services plus poussés sur la basse vision.

Résultats : 459 optométristes ont répondu. Les facteurs prédicteurs de la prestation de services plus poussés sur la basse vision comprenaient les suivants : optométristes exerçant depuis plus de 15 ans, présence à moins d'une journée de route d'un optométriste/ophtalmologiste local spécialisé en BV, absence de clinique multidisciplinaire de BV à moins d'une journée de route, travail dans un cabinet situé dans une agglomération de moins de 50 000 habitants et présence de 2 optométristes et plus dans le même cabinet. On a découvert des différences régionales au niveau des variables suivantes : présence d'un optométriste

offrant des services plus poussés sur la basse vision dans la pratique principale du répondant, critères d'aiguillage, type de fournisseur de services plus poussés sur la basse vision recevant l'aiguillage et qualité perçue des services plus poussés sur la basse vision.
Conclusions : Les services plus poussés sur la basse vision sont fournis différemment au Canada et la disponibilité de tels services financés par l'État a semblé améliorer les aiguillages optométriques vers des cliniques multidisciplinaires de services sur la basse vision. Les optométristes qui exerçaient en groupe, qui exerçaient depuis plus de 15 ans et qui travaillaient dans une région moins peuplée étaient plus susceptibles de fournir des services plus poussés sur la basse vision.

Mots clés : services sur la basse vision, déficit visuel, réadaptation, prestation de services, obstacles

Introduction

The demand for low vision services (LVS) in Canada will rise in the next few decades, due mainly to the aging of the Canadian population[1,2] and the association between age and vision loss.[2,3] Despite this fact, there is no consistent model for the provision of LVS among the Canadian provinces, with LVS being provided by a variety of professions (optometrists, ophthalmologists, CNIB LVS personnel, opticians), singularly or together, and in a variety of settings (private practices, CNIB offices, multi-disciplinary clinics, hospitals). Funding for low vision is also inconsistent, with LVS and LV devices being fully or partially covered under health care plans in some provinces, but not in others, and for some professionals who provide the service and not others.[2,4] In order to build a more effective and consistent model across Canada,[5,6] the first step is to document what is currently being provided.

This paper is the second report on a Canadian nationwide survey on LVS provision by optometrists. The previous paper illustrated that while many optometrists were willing to provide LVS, access to optometric LVS appeared to be hindered by the lack of remuneration, device subsidy, education, and collaboration between different low vision providers.[4] The purpose of the current paper is to examine the factors which predict the provision of LVS beyond basic levels (the basic level being defined as what can be offered with routine optometric equipment and similar to level 1 and 2 in the SmartSight model[7]). The differences in optometric low vision provision among four different geographic regions in Canada are compared.

Methods

This study was approved and received ethics clearance through the Office of Research Ethics at University of Waterloo and adhered to the tenets of the Declaration of Helsinki. The questionnaire design and data collection have been described previously.[4] The questionnaire is summarized in the Appendix. Optometrists were sampled at the rate of 30% in more populated provinces (Ontario, Quebec, Alberta and British Columbia) and at 100% in the other provinces, in order to obtain similar numbers of responses from each area.

The provision of LVS was divided into basic or more extensive. Basic LVS was defined as managing patients with equipment available in a typical primary optometric setting, including recognition of a LV case, assessment of the impairment and disability, and managing patients with minimum disability with high-powered additions and lighting (similar to Levels 1 and 2 in the SmartSight model).[7] More extensive LVS included managing patients using optical devices such as hand and stand magnifiers, filters, and more specialized LV equipment and devices such as telescopes, electronic LV aids, and custom-designed microscopes, up to and including managing patients with more complex goals.

Statistical analysis

Statistical analyses were conducted using SPSS v.21. An alpha level of 0.05 was considered statistically significant. Univariate logistic regression was used to determine the predictor variables associated with the provision of LVS at a more extensive level. The predictor variables that were studied are listed in Table 1. Those found to be potentially statistically associated in the univariate analyses ($p<0.30$) were included as possible predictors in an automated forward stepwise, multiple logistic regression. The entry criteria was a p-value of <0.20 and the exit criteria was $p>0.10$. Odds ratios, confidence intervals and p-values are reported.

Chi-square analysis was used to compare the four geographic regions: Eastern Provinces (New Brunswick, Newfoundland and Labrador, Nova Scotia and Prince Edward

Island), Quebec, Ontario and the Western Provinces (British Columbia, Alberta, Saskatchewan and Manitoba). For some of the multiple choice questions (e.g. the type of provider to which the optometrist would refer and the hypothetical patient-case questions), the respondent was asked to check off as many answers as they deemed fit. As a result, the answers were not mutually exclusive. To overcome this, a chi-square test was run for each of the multiple choice answers. The alpha value for significance was adjusted using a modified Bonferroni test (Keppel[8]). If an adjusted residual was greater than +/-1.96, the particular observed count in a cell was deemed significantly different than expected.

Results

Of the 1851 optometrists sampled, 459 (25%) responded, although not answered all the questions. The proportion of female respondents was 48.8%. The years of practice of the respondents followed a bimodal distribution with one peak (25%) at 0-5 years and another at 26 or more years (25%). Private group practice or cost-sharing practice (defined as 2 or more optometrists in association or sharing the expenses of a practice) was the most frequent type of practice at 56%. The modal city/town population of our respondents' primary practice was 500,000. Other details of the population are described by Lam et al.[4]

Table 1: Univariate analysis of potential predictive factors of performing Low Vision Services (LVS) at a more extensive versus basic level. Those marked with * were put into the multivariate analysis which followed.

Predictive Factors (comparison group vs. reference group)	Coefficient	Odds Ratio (Lower CI, Upper CI)	*P* value
Gender (male, female)	-0.46	0.63 (0.43, 0.92)	0.016*
Years of practice (16 years more vs. less than 16 years)	1.06	2.89 (1.97, 4.25)	<0.0005*
Number of patients seen by respondent (61-120+ vs. 0-60)	0.38	1.46 (1.01, 2.13)	0.046*
Number of patients seen by all optometrists within primary practice (61-120+ vs. 0-60)	0.40	1.50 (0.93, 2.40)	0.094*
Type of LVS available within one-day's travel – local optometrist or ophthalmologist (Yes vs. No)	0.53	1.69 (1.12, 2.55)	0.012*
Type of LVS available within one-day's travel – CNIB (Yes vs. No)	-0.14	0.87 (0.49, 1.56)	0.645
Type of LVS available within one-day's travel – multi-disciplinary LV Clinic (Yes vs. No)	-0.58	0.56 (0.38, 0.83)	0.004*
Population (50,000 or more vs. less than 50,000)	-0.74	0.48 (0.33, 0.70)	<0.0005*
Type of Practice (optical vs. private)	-0.39	0.68 (0.35, 1.3)	0.240*
Type of Practice (institutional vs. private)	-1.11	0.33 (0.16, 0.67)	0.002*
Number of optometrists in primary practice (2+ vs. 1)	0.65	1.91 (1.30, 2.81)	0.001*

Table 2: Multivariate analysis of predictive factors of providing more extensive versus basic low vision services.

Factor	Coefficient	Odds Ratio (lower and upper CI)	*P* value
Years of practice (16 years or more vs. less than 16 years)	1.09	2.98 (1.97, 4.51)	<0.0005
Other optometrist/ophthalmologist providing LVS within 1 days travel	0.65	1.92 (1.22, 3.02)	0.005
Multidisciplinary LV clinic within 1 day's travel	-0.78	0.46 (0.30, 0.71)	<0.0005
Population of practice location (50,000 or more vs. less than 50,000)	-0.86	0.42 (0.28, 0.65)	<0.0005
Number of optometrists in office (2 or more vs. 1)	0.81	2.24 (1.46, 3.45)	<0.0005
Final Cox and Snell R2CS = 0.152 and Nagelkerke's R2N = 0.203,			

Table 3: Summary of regional differences in low vision practice patterns and services

Characteristics	Geographic Regions Count (% Region)				Chi², df, 2-sided p
	Western Provinces	Ontario	Quebec	Eastern Provinces	
Provision of LVS					
Basic (see text for definition)	68 (46.3)	55 (35.3)	25 (35.2)	47 (66.2)	**21.58, 3, <0.0005**
More extensive	79 (53.7)	101 (64.7)	46 (64.8)	24 (33.8)	
Column Total	147	156	71	71	
The presence of an optometric colleague(s) offering LVS within respondent's primary practice					
Yes	46 (62.2)	50 (37.9)	26 (41.3)	34 (59.6)	**8.89, 3, 0.031**
No	74 (37.8)	82 (62.1)	37 (58.7)	23 (40.4)	
Column total	120	132	63	57	
Level of BCVA at which respondent would refer to specialized services for persons with visual impairment					
Better than 6/21	38 (27.3)	39 (27.3)	11 (15.7)	18 (26.1)	**19.29, 6, 0.004**
6/21 to < 6/60	61 (43.9)	76 (53.1)	51 (72.9)	31 (44.9)	
6/60 and worse	40 (28.8)	28 (19.6)	8 (11.4)	20 (29.0)	
Column total	139	143	70	69	
Level of total visual field diameter at which respondents would refer to specialized services for persons with visual impairment?					
>50°	25 (20.0)	21 (16.4)	12 (18.5)	14 (21.2)	**18.44, 9, 0.030**
35° to 49°	41 (32.8)	49 (38.3)	37 (56.9)	22 (33.3)	
20° to 34°	35 (28.0)	41 (32.0)	14 (21.5)	22 (33.3)	
<20°	24 (19.2)	17 (13.3)	2 (3.1)	8 (12.1)	
Column total	125	128	65	66	
Type of LV provider to which respondents refer for LVS					
Do not refer					
Yes	4 (2.7)	2 (1.3)	1 (1.4)	2 (2.8)	1.14, 3, 0.763*
No	144 (97.3)	155 (98.7)	70 (98.6)	70 (97.2)	
Column total	148	157	71	72	
CNIB					
Yes	139 (93.9)	128 (81.5)	38 (53.5)	66 (91.7)	**59.77, 3, <0.0005**
No	9 (6.1)	29 (18.5)	33 (46.5)	6 (8.3)	
Column total	148	157	71	72	
Local OD/OMD					**11.61, 3, 0.009**
Yes	39 (26.3)	57 (36.3)	12 (16.9)	27 (37.5)	
No	109 (73.7)	100 (63.7)	59 (83.1)	45 (62.5)	
Column total	148	157	71	72	**69.62, 3, <0.0005**
MDLVC					
Yes	29 (19.6)	60 (38.2)	44 (62.0)	3 (4.2)	
No	119 (80.4)	97 (61.8)	27 (38.0)	69 (95.8)	
Column total	148	157	71	72	

Table 3 continued:

Characteristics	Geographic Regions Count (% Region)				Chi², df, 2-sided p
	Western Provinces	Ontario	Quebec	Eastern Provinces	
Rating of the availability of local LV service					
Don't know	9 (6.1)	9 (6.0)	5 (7.1)	0	
Poor or None	43 (29.4)	36 (24.2)	18 (25.7)	24 (34.8)	
Fair	57 (39.0)	62 (41.6)	34 (48.6)	29 (42.0)	16.15, 12, 0.185
Good	15 (10.3)	23 (15.4)	7 (10.0)	3 (4.3)	
Outstanding	22 (15.1)	19 (12.8)	6 (8.6)	13 (18.8)	
Column total	146	149	70	69	
Rating of the quality of local LV services					
Don't know	15 (10.4)	16 (10.9)	7 (10.0)	1 (1.4)	
Poor or None	37 (25.7)	33 (22.4)	8 (11.4)	24 (34.8)	
Fair	56 (38.9)	60 (40.8)	37 (52.1)	31 (44.9)	**40.93, 12, <0.0005**
Good	18 (12.5)	29 (19.7)	18 (25.7)	3 (4.3)	
Outstanding	18 (12.5)	9 (6.1)	0	10 (14.5)	
Column total	144	147	70	69	
Frequency of receiving a report after referral (% of the time)					
Almost never (0-5%)	59 (43.7)	59 (41.3)	21 (31.3)	33 (50.0)	
Rarely (6-25%)	28 (20.7)	26 (18.2)	10 (14.9)	17 (25.8)	
Sometimes (26-74%)	15 (11.1)	16 (11.2)	14 (20.9)	10 (15.2)	20.30, 12, 0.062
Often (75-94%)	20 (14.7)	20 (14.0)	13 (19.4)	3 (4.5)	
Almost always (95-100%)	13 (9.6)	22 (15.4)	9 (13.4)	3 (4.5)	
Column total	135	143	67	66	
Action(s) taken for a hypothetical patient with early ARMD, BCVA = 6/12 and a main goal of reading					
Refer to another OD					
Yes	6 (4.1)	16 (11.8)	2 (2.8)	2 (2.9)	**9.10, 3, 0.028**
No	140 (95.9)	135 (88.2)	69 (97.2)	67 (97.1)	
Column total	146	151	71	69	
Refer to CNIB					
Yes	17 (11.6)	18 (11.9)	8 (11.3)	12 (17.4)	1.74, 3, 0.628
No	129 (88.4)	133 (88.1)	63 (88.7)	57 (82.6)	
Column total	146	151	71	69	
Refer to MDLVC					
Yes	1 (0.7)	9 (6.0)	8 (11.3)	1 (1.4)	**15.22, 3, 0.002**
No	145 (99.3)	142 (94.0)	63 (88.7)	68 (98.6)	
Column total	146	151	71	69	
Assess for basic magnification and lighting requirement					
Yes	135 (92.5)	125 (82.8)	59 (83.1)	62 (90.0)	7.77, 3, 0.051
No	11 (7.5)	26 (17.2)	12 (16.9)	7 (10.0)	
Column total	146	151	71	69	

Table 3 continued:

Characteristics	Geographic Regions Count (% Region)				Chi², df, 2-sided p
	Western Provinces	Ontario	Quebec	Eastern Provinces	
Action(s) taken for a hypothetical patient with advanced ARMD, BCVA = 6/60 and goals of reading, TV and writing Refer to another OD					**15.49, 3, 0.001**
Yes	17 (12.7)	34 (22.7)	4 (5.6)	6 (8.8)	
No	127 (87.3)	116 (77.3)	67 (94.4)	62 (91.2)	
Column total	144	150	71	68	
Refer to CNIB					
Yes	88 (61.1)	80 (53.3)	36 (50.7)	46 (67.6)	6.04, 3. 0.110
No	56 (38.9)	70 (46.7)	35 (49.3)	22 (32.4)	
Column total	144	150	71	68	
Refer to MDLVC					
Yes	23 (16.0)	34 (22.7)	35 (44.3)	1 (1.5)	**51.43, 3, <0.0005**
No	121 (84.0)	116 (77.3)	36 (55.7)	67 (98.5)	
Column total	144	150	71	68	
Assess for basic magnification and lighting requirements and then refer					
Yes	43 (29.9)	37 (24.7)	11 (15.5)	28 (41.2)	**12.53, 3, 0.006**
No	101 (70.1)	113 (75.3)	60 (84.5)	40 (58.8)	
Column total	144	150	71	68	
Undertake rehabilitation, including magnification, lighting and advice re: writing devices					
Yes	31 (27.4)	18 (12.0)	6 (8.4)	14 (20.6)	**9.16, 3, 0.027**
No	113 (72.6)	132 (88.0)	65 (91.6)	54 (79.4)	
Column total	144	150	71	68	
Action(s) taken for a hypothetical patient with bilateral homonymous hemianopia who is having difficulty with reading and mobility Provide information about reading techniques					
Yes	45 (32.4)	37 (25.3)	11 (15.7)	19 (27.5)	6.80, 3, 0.079
No	94 (67.6)	109 (74.7)	59 (84.3)	50 (82.5)	
Column total	139	146	70	69	
Provide information about reading techniques and prescribe sector Fresnel or Peli prism					
Yes	33 (23.7)	34 (23.3)	5 (7.1)	22 (31.9)	**13.24, 3, 0.004**
No	106 (76.3)	112 (76.7)	65 (92.9)	47 (68.1)	
Column total	139	146	70	69	
Refer to CNIB					
Yes	80 (57.6)	74 (50.7)	34 (48.6)	50 (72.5)	**10.97, 3, 0.012**
No	59 (42.4)	72 (49.3)	36 (51.4)	19 (27.5)	
Column total	139	146	70	69	
Refer to MDLVC					
Yes	35 (25.2)	55 (37.7)	36 (51.4)	7 (10.1)	**32.69, 3, <0.0005**
No	104 (74.8)	91 (72.3)	34 (48.6)	62 (89.9)	
Column total	139	146	70	69	

LVS = Low vision service, LV = Low vision, OD = Optometrist, OMD = Ophthalmologist, MLVC = Multi-disciplinary low vision clinic, BCVA= Best corrected visual acuity

Note: Those in bold are significant *4 cells or 50% cell have an expected count of less than 5

Provision of more extensive Low Vision Service

The factors that were associated with the provision of more extensive LVS (Table 1) were male gender (p=0.016), having practised for 16 years or more (p<0.0005), seeing >60 patients a week (p=0.046), having another local optometrist/ophthalmologist who provides LVS within one day's travel (p=0.012), not having a multi-disciplinary LV clinic (MDLVC) within one-day's travel (p=0.004), working in a practice located in a community of <50,000 people (p<0.0005), working in a private practice versus institution (p=0.002) and having two or more optometrists in the same practice (p=0.001).

Table 2 shows the final factors that were included in the multivariate model for providing more extensive LVS. These were the optometrist having practiced for 16 years or more (p<0.0005), having a local LV optometrist/ophthalmologist within one day's travel (p=0.005), not having a MDLVC within one-day's travel (p<0.0005), working in a practice located in a population of <50,000 (p<0.0005), and having two or more optometrists in the same practice (p<0.0005).

Comparisons between Regions

Of all the respondents, 9 did not indicate the province of their practice and therefore were not included in the comparison across provinces. Table 3 shows a summary of the regional comparisons. Regarding the availability of local LVS, no statistically significant regional differences were found in the frequency of: receiving a written report from the LV provider to which a referral was made, referring an early or more advanced ARMD patient to the CNIB, assessing an early ARMD patient for basic magnification and lighting, and providing information about reading techniques to a patient with hemianopia.

The provision of more extensive LVS differed between regions, such that optometrists in the Eastern provinces were more likely to offer more extensive LVS. The presence of an optometrist offering LVS in the respondent's primary practice also significantly differed across regions (p=0.031), being more likely in the Eastern Provinces. Note that this question did not specify the level of LVS (basic versus extensive).

Referral Criteria

Respondents from Quebec were less likely to refer patients to LVS when the patient's BCVA was better than 6/21, more likely when the patient's BCVA was 6/21 to better than 6/60 and less likely when the patient's BCVA was 6/60 and worse. This may be because they have already referred these patients before their BCVA dropped to 6/60. Respondents from the Western Provinces seemed less likely to refer when the patient's BCVA was 6/21 to better than 6/60 and more likely to refer when the patient's BCVA was 6/60 and worse.

Respondents from Quebec were more likely to refer patients to LVS when the patient's total visual field diameter was between 35° to 49° and less likely to refer when the patient's total visual field diameter was <20°. Conversely, respondents from the Western Provinces were more likely to wait until the patient's total visual field diameter was <20°.

Patterns of Referrals to Other Low Vision Providers

Respondents from the Western and Eastern provinces were more likely to refer patients to CNIB, whereas respondents from Quebec were less likely to do so. Respondents from Ontario tended to be more likely to refer patients to local optometrists/ophthalmologists, whereas respondents from Quebec were less likely to make such a referral. Respondents from Quebec and Ontario were more likely to refer patients to MDLVC, while respondents from Eastern and Western Provinces were less likely to do so.

Quality of Low Vision Services

Respondents from the Eastern Provinces were less likely to report not knowing the quality of LVS, less likely to report the quality of LVS as outstanding and more likely to report the quality of LVS as fair. Respondents from Quebec were more likely to report the quality of LVS as outstanding and less likely to report the quality as fair, poor or none.

Hypothetical Case Questions

For the patient with early ARMD, respondents from Ontario were more likely to refer the patient to a local optometrist. Respondents from Quebec were more likely to refer to a MDLVC, whereas respondents from the Western Provinces were less likely to refer to a MDLVC. These remained significant when applying the adjusted Bonferroni p value.

For the patient with advanced ARMD, respondents from Quebec were less likely to refer to another optometrist whereas those from Ontario were more likely to refer to fellow optometrists. Respondents from the Eastern and Western Provinces were less likely to refer to a MDLVC. In contrast, respondents from Quebec were more likely to refer to a MDLVC. Respondents from Quebec were less likely to assess for basic magnification and lighting and then refer whereas respondents from the Eastern Provinces were more likely to assess and then refer. Lastly, respondents from the Western and Eastern provinces were more likely to undertake full vision rehabilitation by themselves, including distance and near magnification, lighting and advice about writing devices.

For the hypothetical patient with hemianopia, respondents from Quebec were less likely to provide information and prescribe prism whereas respondents from the Eastern Provinces were more likely to do so. Respondents from the Eastern Provinces were more likely to refer the patient to CNIB than those in other provinces. Respondents from the Eastern provinces were less likely to refer the patient to a MDLVC whereas respondents from Ontario and Quebec were both more likely to refer to a MDLVC.

Discussion

Characteristics of Optometrists Who Provide More Extensive Low Vision Care

The multivariate logistic regression analysis found that optometrists with 16+ years of practice were more likely to provide more advanced LVS. There has been an increasing concern about the scarcity of optometry students who were expressing interest in LV as a "clinical subspecialty."[9] The cost of providing LVS may be a barrier and it is possible that optometrists in more advanced years of practice have more financial means to set-up and equip their office with specialized LV equipment. Also, perhaps older optometrists empathize more with older adults who suffer from vision loss.

MDLVCs or more specialized LVS tend to be situated in urban centres. Optometrists in less populated communities may therefore be more inclined to provide more extensive LVS. What is more surprising is that having another optometrist or ophthalmologist or a MDLVC within a day's travel was also predictive for providing more extensive LVS and these were independent factors. It is possible that having one professional provide services actually encourages others to do so or perhaps optometrists feel that they do not want to "lose" their patients to other local offices.

Respondents who worked in a group practice were found to be more likely to provide more extensive LVS. Group practice may allow the individual optometrist to have more time and freedom to accommodate patients with vision impairment. Also, it may be easier to establish a patient-base for low vision as fellow colleagues in the same practice may become the referral sources.

Geographic comparisons

As would be anticipated, the regional comparisons suggest that the character of referrals is influenced by the services available and their eligibility criteria.

In each of the hypothetical cases, respondents from Quebec were more likely to refer to a MDLVC than respondents from other regions. Also, more respondents from Quebec than other provinces reported the quality of the LVS to be outstanding. In Quebec, there are full multi-disciplinary, government-sponsored rehabilitation centres, and assessments are provided by optometrists, occupational therapists, orientation and mobility counsellors, psychologists and social workers in one location.[10] In contrast, some clinics in other provinces are sometimes considered multi-disciplinary but may only consist of an optometrist or ophthalmologist who performs the LV assessment and a LV therapist who performs rehabilitation training. The eligibility criterion for assessment and device coverage in the Quebec LV centres is a BCVA of <6/21 in each eye or a visual field of <60°.[10] Our results found that respondents from this province referred to other LVS at these levels of vision loss.

Optometrists from the Western provinces were more likely to refer to CNIB than multi-disciplinary clinics. However, some ambiguity exists in these two choices as there is a partnership between MDLVCs and CNIB in service delivery. To be eligible for device subsidy, patients in Alberta have to be registerable with CNIB (i.e. legally blind)[11] and patients in Saskatchewan need a BCVA of 6/45 or worse, or fields <20 degrees[12,13] Respondents from the Western provinces were more likely to assess for basic magnification and lighting requirements and then refer, which may reflect the more stringent criteria for device eligibility compared to Quebec. This preferred course of action may also reflect that private practice optometrists in British Columbia and Alberta can claim a fee for LVS under the provincial health plan.

In Ontario, MDLVCs are found in Waterloo, Toronto and Ottawa, but are generally not as fully multi-disciplinary as those in Quebec. Patients outside these catchment areas may be referred to local optometrists or ophthalmologists for LVS. Since 2008 LVS provided by or under the supervision of an ophthalmologist became covered under the Ontario Health Insurance Plan.[14] Thus optometrists in Ontario may be more likely to refer patients to "local optometrists or ophthalmologists". The optometrists in Ontario had a wider spread of referral criteria which may reflect the variety of options available and the lack of one clear criterion.

The population of most communities in the Eastern and Western provinces is smaller and more spread out than Ontario and Quebec. Low vision assessments are covered by the provincial health plan in Nova Scotia by optometrists[15] and ophthalmologists,[16] and in Newfoundland and Labrador by an ophthalmologist. However, in these eastern provinces, there is no device coverage. To the authors' knowledge there are no MDLVCs in the Eastern provinces which may explain why respondents from these provinces tended to have optometric

colleagues in their primary practice who offer LVS and were more likely to offer more extensive LVS themselves. Referral to CNIB may be the only choice in some localities. Additionally, respondents from the Eastern provinces tended to intervene more in each of the hypothetical cases, likely due to the availability of provincial coverage for optometric low visions services in Nova Scotia and the lack of MDLVCs.

Limitations of the study

As with all surveys, the results of this survey may be biased towards the characteristics of those who have an interest or feel strongly about the topic. Therefore, the numbers of optometrists who offer more extensive LV services may be overestimated. Additionally, not all optometrists responded to all questions. In particular, fewer respondents answered the questions regarding the presence of an optometrist within the respondent's primary practice offering LVS. Perhaps these respondents were more likely not to have a colleague in the office. Also, fewer respondents answered the question regarding their visual field referral criteria. This may be because visual fields are not always measured, being typically used for detection or monitoring of specific eye disease, rather than for functional purposes. The term "multidisciplinary LV clinic" was not defined and can mean anything from an optometrist working with a low vision therapist to a full multidisciplinary team, including optometrists, ophthalmologists, opticians, social workers, low vision trainers, counsellors, orientation and mobility specialists and occupational therapists.[17] Indeed, there is a wide array of arrangements in these clinics across Canada. Since only an English version of the survey was available, the results may be biased towards respondents who are able or willing to communicate in English, especially in Quebec. However, a sub-analysis of the distribution of responses from Quebec indicated that primarily Anglophone areas were not over-represented. For example, over half (n=31) of the respondents from Quebec practice in towns/cities with populations of <500,000. Of these smaller towns/cities, only four have an Anglophone population of >5%.[18]

Conclusion

This study shows that optometrists who worked in less populated areas were more likely to provide more extensive optometric LVS, and thus optometrists do adapt to offer needed services. They are also prepared to refer when more specialized LVS are available. Optometrists have the optical and health knowledge required to become competent providers of basic and more extensive LVS.[6] They are well distributed geographically to offer these services in less populated areas or in areas where MDLVCs do not currently exist. How LVS are provided clearly differs between regions, with Quebec's model being the most comprehensive. Further studies should investigate the benefits of a more consistent model of low vision provision across Canada, the strategic placements of more regional MDLVCs and the possible adoption of a model such as the Quebec model in other provinces/territories in Canada.

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Appendix. Summary of the questionnaire

	Question	Description	Multiple Choices Available
Demographics - Respondent's profile	A1	How many years have you been practicing optometry?	0-5 years 6-10 years 11-15 years 16-20 years 21-25 years 26 or more years
	A2	Gender	Male Female
Demographics – Primary practice profile	B1	In which province is your primary practice situated?	BC, SK, MN, AL, ON, QC, NS, NB, PEI, NL
	B2	Please estimate the population of the city/town where your primary practice is located?	Under 2500 2,500 to 9,999 10,000 to 49,999 50,000 to 99,999 100,000 to 499,999 500,000+
	B3	In what type of practice do you work (regarding your primary practice)?	Private single practice (one optometrist in solo practice) Private group practice/Cost-sharing (two or more optometrists working in association or sharing the expenses of the practice) Practice beside an optical (dispensing optician practice) Practice within an optical Educational institution
	B4	How many optometrists are practicing at this office at one time (i.e. are physically working at the office simultaneously)?	1 ,2, 3, 4, More than 4
	B5	In a typical week, please estimate the percentage of patients seen in each of the following categories at your primary practice (i.e. by all practitioners):	Open answer – respondent gives the percentage
	B6	How does this practice see patients? (check all that apply)	By appointment only By a mixed drop-in/appointment system Accepts emergencies Does not accept emergencies Other

	Question	Description	Multiple Choices Available
Demographics – Primary practice profile	B7	In a typical week, please estimate how many patients are seen in your primary practice (including all optometrists)?	0-20 21-40 41-60 61-80 81-100 101-120 >120 (please specify)
	B8	Which of the following low vision services are within one day's travelling distance for your patients? (check all that apply)	Local OD or ophthalmologist CNIB Multi-disciplinary low vision clinic Other
	B9	Does any optometrist in your primary practice specifically offer the following services (check all that apply)	Binocular vision therapy Paediatric care Low vision care Special contact lenses Geriatric care Assessments for children with reading/learning difficulties Other
Demographics – Respondent's patient profile	C1	In a typical week, please estimate the percentage of patients seen in each of the following categories by you:	Open answer – respondent enters the percentage
	C3	In a typical week, please estimate how many patients are seen by you?	0-20 21-40 41-60 61-80 81-100 101-120 >120 (please specify)
	C4	On average, please estimate what percentage of your patients have best corrected visual acuity in the better eye of:	Open answer – respondent enters the percentage for the following: % Better than 6/12 % 6/12 to better than 6/21 % 6/21 to better than 6/60 % 6/60 and worse
Low Vision Practice Pattern	C5	For a patient with early ARMD with VA = 6/12 in the better eye and with a main goal of reading, would you:	Referral to OD Referral to CNIB Referral to multi-disciplinary low vision clinic Assess for basic magnification and lighting requirements Other
	C6	For a patient with more advanced ARMD, with best VA = 6/60, and goals of reading, TV and writing, would you:	Referral to OD Referral to CNIB Referral to multi-disciplinary low vision clinic Assess for basic magnification and lighting requirements and then refer Undertake rehabilitation, including distance and near magnification, lighting and advice re: writing devices Other
	C7	For a patient with bilateral homonymous hemianopia who is having difficulty with reading and mobility, would you:	Provide information about reading techniques Provide information about reading techniques and prescribe sector Fresnel or Peli prism Refer to CNIB Refer to multi-disciplinary low vision clinic Other

	Question	Description	Multiple Choices Available
Demographics – Primary practice profile	C9	Which of the following equipment do you have in your practice (check as many as apply)?	logMAR VA chart Feinbloom chart Paper contrast sensitivity chart Computer contrast sensitivity chart Lighthouse continuous text card for adults or equivalent Range of selective transmission tints/fit-overs Range of full field microscopes Range of prism half eyes Range of hand magnifiers Range of internally illuminated stand magnifiers Range of hand held telescope Other
	C10	What level(s) of LV service do you provide? (check all that apply)	A. Recognition of a LV case B. Assessment of visual impairment C. Assessment of disability D. Manage a patient with minimum visual disability and simple goals using high powered additions and lighting E. Manage a patient with minimal visual disability and simple goals using optical devices such as hand and stand magnifiers and filter lenses F. Manage a patient with more than minimum visual disability who requires more than basic devices (ex. Telescopes, electronic low vision aids, custom-designed microscopes, etc) G. Manage a patient with complex goals (ex. Vocational, requiring multiple interventions)
Referral Pattern	C8	At what level of vision loss would you refer to specialized services for persons with visual impairment? Check one answer for VA and one for fields	VA Better than 6/12 6/12 to better than 6/21 6/21 to better than 6/60 6/60 and worse VF >50 deg 35-49 deg 20-34 deg <20 deg
	D1	Who or which organization(s) do you refer to, if any, for low vision service? (check all that apply)	Do not refer CNIB Local OD or ophthalmologist Multi-disciplinary low vision service Other
	D2	Rate the low vision services in your local area, other than any low vision services provided by you, in terms of availability or quality. Please check the box that applie	Availability Outstanding, Good, Fair, Poor, None, Don't know Quality Outstanding, Good, Fair, Poor, None, Don't know
	D4	Of the referrals you make for low vision services, how often do you receive a written report of the results? Please check the box that applies.	Almost never Rarely Sometimes Often Almost always

	Question	Description	Multiple Choices Available
Exploratory Questions	C11	If you do not manage many low vision patients at levels D and E in question 10 above, please indicate your reasons for not seeing these patients (select only those that apply and rank in order of importance; where 1 = most important reason. If you do manage patients at levels D and E, skip to question 14.	Lack experience Lack knowledge Inadequate equipment to do reliable examination No devices to do a trial of low vision aids No fee claimable for LV assessment Time consuming Lack of interest Too frustrating Partner(s) or associate(s) sees the LV patient Other
	C12	If your answer to #11 was that you do not have adequate equipment or devices, then please let us know what factors might influence the decision not to acquire LV equipment. (select only those that apply and rank in order of importance; where 1 = most important reason)	Lack of interest Not financially viable Not enough foreseeable demand No funding for devices Funding is available but paperwork too time consuming No time to train staff and/or limited staff resource Other
	C14	If you do not manage many low vision patients at levels D or E in question 10, please indicate what would need to change for you to be willing to manage more of these patients (check all that apply and number in order of importance; where 1 = most important reason).	More education More equipment A fee for low vision service Funding for low vision devices Nothing would entice me Other
	C13	Do you feel that you would want to benefit from more education on the subject of low vision? If so, please give information about what aspects of training/education of low vision would be useful and how this might best be achieved?	Open answer
	C15	Please let us know any other comments that you have about provision of LV services in your practice or area.	Open answer

Bilateral Anterior Ischemic Optic Neuropathy During Treatment with Pegylated Interferon and Ribavirin

Jason Rinehart OD FAAO; Wilmington VA Medical Center, Wilmington, Delaware
Lisa Stottlemyer OD FAAO; Wilmington VA Medical Center, Wilmington, Delaware
Correspondence may be directed to jason.rinehart@va.gov

Abstract

Hepatitis C virus (HCV) is a blood-borne pathogen that often results in chronic liver infection leaving patients at risk for cirrhosis, liver decompensation and hepatocellular carcinoma. The goal of therapy is to eliminate the virus in order to minimize morbidity and mortality from HCV infection. Traditional treatment has utilized a combination of pegylated-interferon (IFN) and ribavirin that often causes both systemic and ocular side effects. The most common ocular side effects are retinal hemorrhages and cotton wool spots, although in rare circumstances more significant ophthalmic adverse events have been attributed to IFN therapy.

Here we discuss a case of bilateral anterior ischemic optic neuropathy (AION) that occurred during treatment with IFN and ribavirin for HCV genotype 1. We review the proposed pathogenesis of ocular side effects associated with this regimen, as well as the pathogenesis and risk factors associated with AION itself. Finally, we will offer clinical recommendations for screening for more than retinopathy should a patient present with ophthalmic complications.

Keywords: interferon, hepatitis C, anterior ischemic optic neuropathy, retinopathy, side effects

Introduction

Hepatitis C virus (HCV) is a blood-borne pathogen classified into 6 major genotypes that can cause both acute and chronic liver infection. While 15-25% of those infected may clear the virus without treatment, the majority of individuals will develop chronic liver infection leaving them at risk for cirrhosis, liver decompensation, and hepatocellular carcinoma.[1] It is estimated that chronic HCV infection affects between 130-150 million people worldwide.[1,2]

The goal of therapy is to eliminate the virus in order to minimize morbidity and mortality from HCV infection. Until recently, the mainstay of therapy has been a combination of pegylated-interferon alpha (IFN) and ribavirin over a course of 48 weeks. Side effects of this regimen are essentially inevitable and can be quite severe. Rapid advances in HCV treatments offer higher cure rates and fewer side effects than IFN therapy. However, these emerging therapies are not yet widely employed in the treatment of HCV, mainly due to the significant cost burden associated with these regimens.3

The ophthalmic side effects of IFN therapy are well established, most commonly involving retinal hemorrhage and cotton wool spots, which often go unnoticed due to the lack of associated visual disturbance. In rare circumstances, more significant ophthalmic adverse events, including central retinal vein occlusion (CRVO) and anterior ischemic optic neuropathy (AION), have been attributed to IFN therapy. As these more ominous ocular sequelae require discontinuation of treatment to allow for visual improvement, it would behoove the clinical optometrist to be able to recognize these adverse events and their association with IFN use.

Case Report

A 55-year-old white male presented to the eye clinic reporting a visual disturbance described as "missing spots" in his vision for one week. The patient's ocular history was unremarkable. His systemic history was notable for hypertension controlled with hydrochlorothiazide/lisinopril 20mg daily and chronic hepatitis C genotype 1 treated with ribavirin 1200mg daily and pegylated-inferferon alpha-2A injections 180µg weekly. The patient had tolerated this therapy well and had no detectable virus by his 20th week of treatment. By his 22nd week he developed ribavirin-induced anemia with symptoms

including shortness of breath, dizziness and fatigue. These symptoms improved with a reduction in dose from 1200mg to 800mg daily. Four weeks prior to his presentation to the eye clinic, the patient had developed an intermittent fever with myalgia, nausea, vomiting and diarrhea. At that time, he was evaluated in the emergency room with a fever of 103.7°F and reduced blood pressure measuring 99/66.

At presentation to the eye clinic, the patient was in his 44th week of interferon therapy. His visual acuities were 20/30 (6/9) in the right eye (OD) and 20/25 (6/7.5) in the left eye (OS). The pupils were round and equally reactive to light, without an afferent pupillary defect. Confrontation visual fields were restricted superiorly in each eye. Slit lamp examination was remarkable for trace nuclear sclerotic cataracts bilaterally. Goldmann applanation tonometry readings were 9 mm Hg OD and 9 mm Hg OS at 9:15am. Blood pressure was measured at 112/65 RAS. Dilated fundus exam revealed subtle, sectoral optic disc edema associated with flame-shaped hemorrhages. In addition, focal retinal arteriole occlusions were present bilaterally (Figure 1). Automated visual field testing demonstrated a superior altitudinal defect in each eye corresponding to the areas of greatest optic disc edema.

Given the atypical presence of bilateral optic nerve head edema, a MRI was obtained which did not reveal any intracranial abnormalities or enhancement of the optic nerves. Given the severity of his systemic symptoms, he was admitted and underwent an infectious disease workup. The patient was ultimately diagnosed with interferon-associated retinopathy in conjunction with bilateral non-arteritic anterior ischemic optic neuropathy. The findings were relayed to the patient's gastroenterologist with the recommendation to discontinue interferon and ribavirin treatment.

The patient was monitored in the eye clinic over a 6-week period, during which time his symptoms subsided, his visual acuity returned to 20/20 (6/6) in each eye, and his optic disc edema and retinal findings gradually resolved (Figures 2 and 3). Retinal arteriolar occlusions and anterior ischemic optic neuropathy were both considered as contributory to visual field loss at presentation. Insofar as the improvement of disc edema yielded improvement in the visual field defect, the visual field defect was most likely a manifestation of AION.

Treatment with interferon and ribavirin had yielded an end of treatment response with no virus detectable by the 20th week, remaining so until treatment was discontinued in his 44th week. After treatment was discontinued, the patient relapsed and virus was detectable several months later. Treatment was eventually restarted with ledipasvir 90mg/sofosbuvir 400mg (Harvoni) and ribavirin 1200mg, both daily. He has had no detectable virus at weeks 4, 8 and 12 post-re-initiation of treatment.

Discussion

Interferons are naturally occurring glycoproteins with anti-viral, anti-tumor and anti-angiogenic properties.[4,5] For the treatment of HCV, IFN is usually administered weekly by subcutaneous injection. Patients on this regimen commonly experience fever, chills and flu-like symptoms; nausea, vomiting and systemic hypotension can occur, albeit rarely.[4,6] Reports of incidence of retinopathy vary widely, attributed to differences in study design. Lack of formal screening leads to under-reporting, while evaluation of symptomatic or at-risk patients leads to over-reporting of ocular sequelae.[7] Raza et al report the overall incidence of retinopathy in patients treated with IFN and ribavirin to be approximately 27%; patients with diabetes (DM) and hypertension (HTN) are 5 to 6 times more likely to develop retinopathy than patients without these systemic conditions.[5]

Interferon-associated retinopathy typically occurs 2 to 12 weeks after initiation of therapy.[7] Patients are generally visually asymptomatic, but exhibit retinal hemorrhages and/or cotton wool spots on dilated fundus examination. These changes are proposed to be the end result of disturbances in retinal microvascular circulation.[8] The pathophysiology is not fully understood, but many suggest a role of endothelial dysfunction where platelet aggregation with leukocyte adherence to the vascular endothelium form microthrombi capable of focal microinfarction.[7,9-12]

Interferons act by binding to receptor cells and initiating the production of effector proteins. In the event of an interferon-associated AION, it is theorized that these circulating proteins could lead to hyperviscosity and result in compromised perfusion to the capillary beds of the optic nerve head.[6] Hayreh has long argued that AION results from a transient decrease in perfusion of the optic nerve head, usually during sleep, and is therefore a hypotensive event rather than an embolic disorder.[13-16] Systemic hypotension is a well-known finding associated with IFN treatment. Our patient was hospitalized with a hypotensive event in the weeks preceding the onset of visual symptoms.

No standard recommendations for the screening of patients for interferon-associated retinopathy exist. This is likely due to the fact that the retinopathy is generally not associated with vision loss, follows a benign course, and is self-limiting, usually resolving shortly after the completion of the course of treatment. In general, most clinicians agree that screening high risk patients for interferon-retinopathy is prudent, however, O'Day et al suggest that routine screening is unnecessary, even for patients with HTN and DM, unless they are visually symptomatic.[7] As vision loss in patients with identified IFN-associated retinopathy is rare, treatment is generally continued despite retinopathy being identified especially given the greater risk to the overall health of a patient with premature cessation

of interferon treatment. However, if vision loss occurs during treatment, suspicion for a less common adverse event such as CRVO or AION should be explored. In such cases, the best visual outcome exists with cessation of treatment.[12]

Figure 1

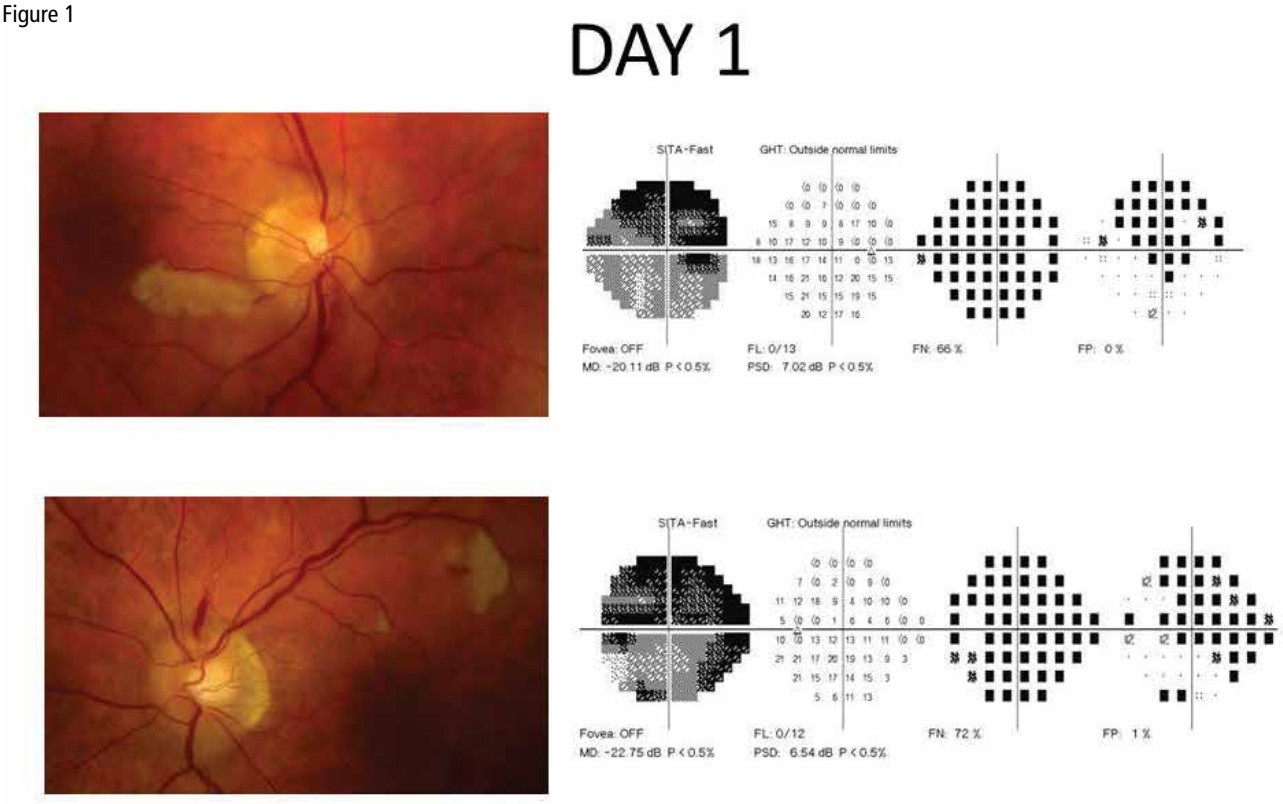


Figure 2

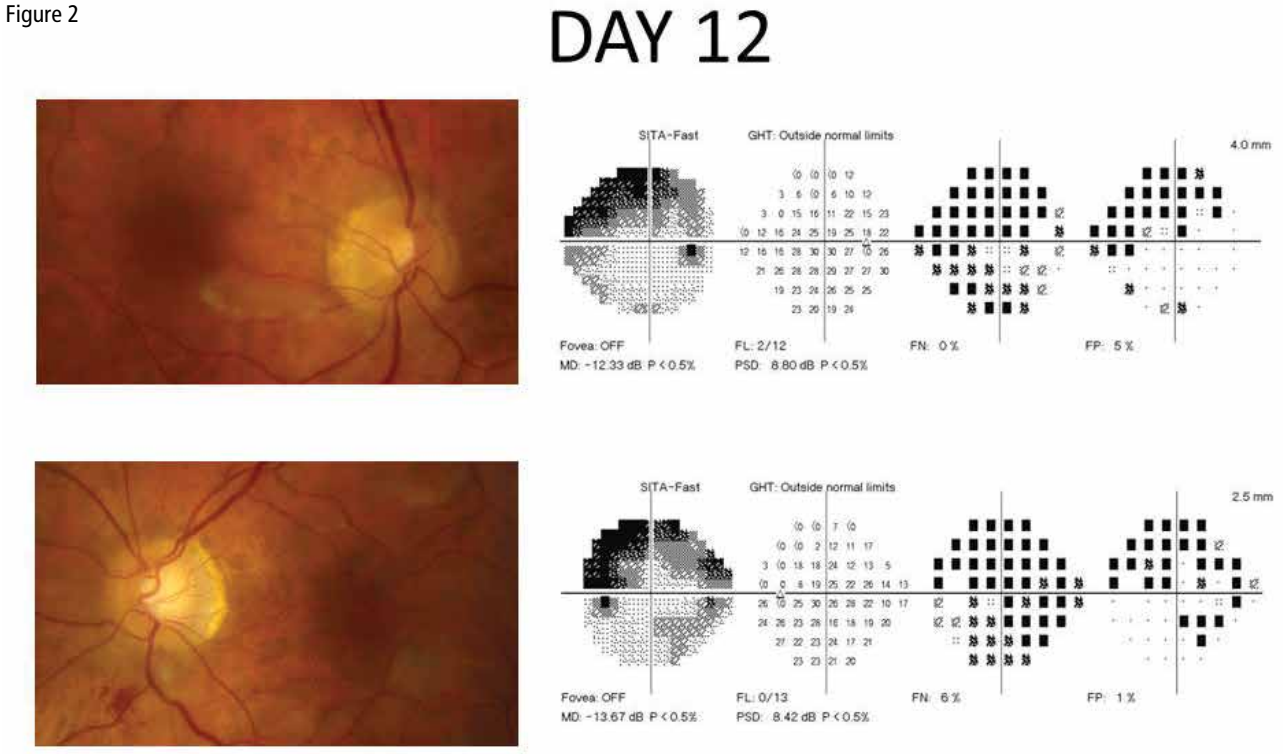
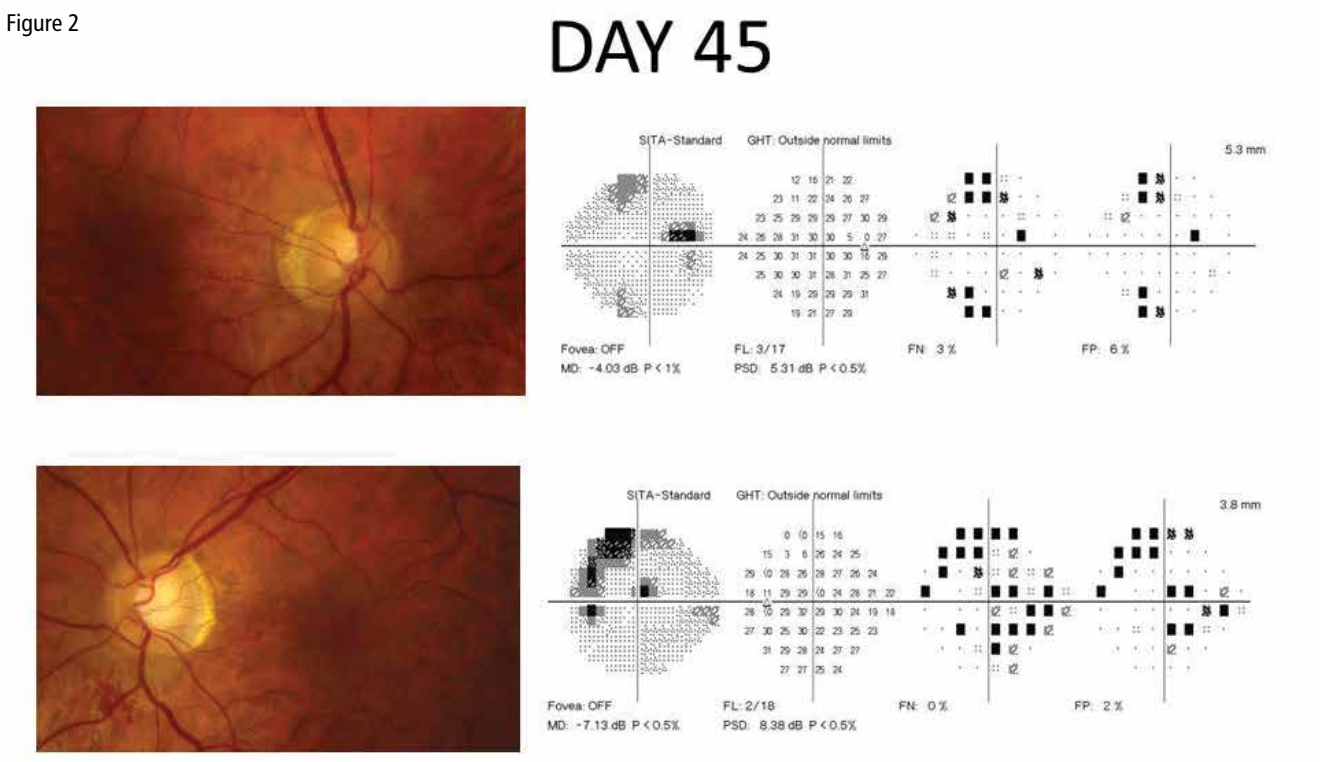


Figure 2



Final Thoughts

In the ever-changing landscape of HCV treatment, pegylated-interferon seems likely to have a reduced presence in many treatment protocols, as direct-acting antiviral agents such as Sovaldi and Harvoni offer shorter treatment courses, superior cure rates, and fewer side effects. However, for a number of reasons, including treatment cost, IFN will continue to have a place in the armamentarium of HCV treatment, and an understanding of potential ocular sequelae associated with this regimen remains necessary to allow for optimal care of these patients.

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La neuropathie optique ischémique antérieure bilatérale durant le traitement à l'interféron et à la ribavirine

Jason Rinehart OD FAAO; Wilmington VA Medical Center, Wilmington, Delaware
Lisa Stottlemyer OD FAAO; Wilmington VA Medical Center, Wilmington, Delaware
Veuillez adresser toute correspondance à jason.rinehart@va.gov

Résumé

Le virus de l'hépatite C (HC) est un agent pathogène à transmission hématogène qui cause souvent une infection chronique du foie et expose les patients à la cirrhose, à la décompensation hépatique et au carcinome hépatocellulaire. Le traitement vise à faire disparaître le virus afin de réduire au minimum la morbidité et la mortalité causées par l'hépatite C. Comme traitement traditionnel, on utilise une combinaison interféron pégylé (IFN) et ribavirine qui cause souvent des effets secondaires à la fois systémiques et oculaires. Les hémorragies rétiniennes et les nodules cotonneux constituent les effets secondaires oculaires les plus courants, même si l'on a attribué, dans de rares cas, des événements indésirables ophtalmiques plus importants au traitement à l'IFN.

Nous discutons ici d'un cas de neuropathie optique ischémique antérieure (NOIA) bilatérale qui s'est produit au cours d'un traitement à l'IFN et à la ribavirine contre l'hépatite C de génotype 1. Nous passons en revue la pathogénèse proposée des effets secondaires oculaires de ce traitement, ainsi que la pathogénèse et les facteurs de risque associés à la NOIA même. Enfin, nous formulerons des recommandations cliniques portant sur le dépistage d'autres problèmes en sus de la rétinopathie si un patient se présente avec des complications ophtalmiques.

Mots clés : interféron, hépatite C, neuropathie optique ischémique antérieure, rétinopathie, effets secondaires

Introduction

Le virus de l'hépatite C (VHC) est un agent pathogène à transmission hématogène réparti en six grands génotypes qui peut causer des infections tant aiguës que chroniques du foie. De 15 à 25 % des personnes infectées peuvent se débarrasser du virus sans traitement, mais la majorité aura une infection chronique du foie, ce qui les expose au risque de cirrhose, de décompensation hépatique et de carcinome hépatocellulaire[1]. On estime que de 130 à 150 millions de personnes dans le monde vivent avec une infection chronique par le VHC[1,2].

Le traitement vise à faire disparaître le virus afin de réduire au minimum la morbidité et la mortalité causées par l'hépatite C. Jusqu'à récemment, le traitement reposait principalement sur une combinaison interféron alpha-pégylé (IFN) et ribavirine administrée pendant 48 semaines. Les effets secondaires du traitement sont essentiellement inévitables et peuvent être très graves. Les progrès rapides des traitements de l'hépatite C produisent des taux de guérison plus élevés et des effets secondaires moins nombreux que le traitement à l'IFN. Ces nouveaux traitements ne sont toutefois pas encore généralisés pour traiter l'hépatite C, principalement parce qu'ils coûtent cher[3].

Les effets secondaires ophtalmiques du traitement à l'IFN sont bien connus et entraînent le plus souvent une hémorragie rétinienne et l'apparition de nodules cotonneux qui, souvent, ne sont pas remarqués à cause de l'absence de troubles connexes de la vision. Dans de rares circonstances, on a attribué au traitement à l'IFN des événements indésirables ophtalmiques plus graves, y compris l'occlusion de la veine rétinienne centrale (OVRC) et la neuropathie optique ischémique antérieure (NOIA). Comme ces séquelles oculaires plus inquiétantes obligent à interrompre le traitement afin de laisser la vision s'améliorer, il incomberait à l'optométriste clinique de pouvoir reconnaître ces événements indésirables et leurs liens avec l'utilisation de l'interféron.

Rapport de cas

Un homme blanc de 55 ans se présente à la clinique de l'œil se plaignant d'un trouble de la vision qu'il décrit comme une « disparition de points » depuis une semaine. Le patient a des antécédents oculaires sans histoire. Ses antécédents systémiques présentent une hypertension contrôlée par une dose quotidienne de 20 mg d'hydrochlorothiazide/lisinopril et une hépatite C chronique de génotype 1 traitée au moyen d'une dose quotidienne de 1 200 mg de ribavirine et d'injections hebdomadaires de 180 µg d'interféron pégylé alpha 2A. Le patient avait bien toléré ce traitement et n'avait plus de virus détectable au cours de la 20e semaine de traitement. Au cours de la 22e semaine, une anémie causée par la ribavirine a fait son apparition, accompagnée de symptômes comme l'essoufflement, les étourdissements et la fatigue. Ces symptômes se sont résorbés lorsqu'on a ramené la dose de 1 200 à 800 mg par jour. Quatre semaines avant qu'il se présente à la clinique de l'œil, le patient avait une fièvre intermittente avec myalgie, nausées, vomissements et diarrhées. Il a alors été évalué à l'urgence, où il avait une fièvre de 103,7°F et une tension artérielle qui était tombée à 99/66.

Lorsqu'il s'est présenté à la clinique de l'œil, le patient en était à la 44e semaine de traitement à l'interféron. Son acuité visuelle était de 20/30 (6/9) dans l'œil droit (OD) et de 20/25 (6/7,5) dans l'œil gauche (OS). Les pupilles étaient rondes et réagissaient autant à la lumière sans qu'il y ait de défaut pupillaire afférent. La périmétrie par confrontation était restreinte au niveau supérieur dans chaque œil. L'examen à la lampe à fentes a révélé la présence de cataractes sclérotiques nucléaires résiduelles des deux côtés. Les lectures de tonométrie par applanation de Goldmann s'établissaient à 9 mm Hg OD et 9 mm Hg OS à 9 h 15 le matin. La tension artérielle a été mesurée à 112/65 SRA. L'examen du fond d'œil sous pupille dilatée a révélé un œdème sectoriel subtil du disque optique associé à des hémorragies en flammèches. Il y avait aussi présence, des deux côtés, d'occlusions en foyer des artérioles rétiniennes (Figure 1). L'examen automatisé du champ visuel a démontré une perte altitudinale supérieure dans chaque œil correspondant aux zones où l'œdème du disque optique était le plus prononcé.

Étant donné la présence atypique d'un œdème de la papille optique des deux côtés, on a soumis le patient à une IRM qui n'a pas révélé d'anomalie intracrânienne ni de stimulation des nerfs optiques. Compte tenu de la gravité de ses symptômes systémiques, le patient a été hospitalisé et a été soumis à un examen de dépistage des maladies infectieuses. On a finalement diagnostiqué chez le patient une rétinopathie associée à l'interféron conjuguée à une neuropathie optique ischémique antérieure non artéritique des deux côtés. On a transmis les résultats au gastroentérologue du patient en lui recommandant d'interrompre le traitement à l'interféron et à la ribavirine.

Le patient a été suivi à la clinique de l'œil pendant six semaines, période au cours de laquelle ses symptômes se sont estompés, son acuité visuelle est revenue à 20/20 (6/6) dans chaque œil et l'œdème du disque optique et les résultats rétiniens se sont résorbés graduellement (Figures 2 et 3). On a considéré que les occlusions des artérioles rétiniennes et la neuropathie optique ischémique antérieure pouvaient tous deux contribuer à la perte de champ visuel évocatrice de trouble lorsque le patient s'est présenté. Dans la mesure où la résorption de l'œdème du disque a entraîné une amélioration du défaut du champ visuel, celui-ci était fort probablement une manifestation de NOIA.

Le traitement à l'interféron et à la ribavirine avait obligé à interrompre le traitement et il n'y avait aucun virus détectable au cours de la 20e semaine, situation qui n'a pas changé jusqu'à ce qu'on interrompe le traitement dans sa 44e semaine. Après l'interruption du traitement, le patient a eu une rechute et le virus était détectable plusieurs mois plus tard. On a recommencé le traitement à raison de 90 mg de ledipasvir/400 mg de sofosbuvir (Harvoni) et de 1 200 mg de ribavirine une fois par jour dans les deux cas. Il n'y avait aucun virus détectable 4, 8 et 12 semaines après la reprise du traitement.

Discussion

Les interférons sont des glycoprotéines naturelles qui ont des propriétés antivirales, antitumorales et antiangiogènes[4,5]. Pour le traitement de l'hépatite C, on a administré habituellement l'interféron une fois par semaine sous forme d'injection sous-cutanée. Les patients qui suivent ce traitement ont habituellement de la fièvre, des frissons et des symptômes quasi grippaux. Les nausées, les vomissements et l'hypotension systémique sont possibles, mais rares[4,6]. Les déclarations sur l'incidence de la rétinopathie varient énormément et ces variations sont attribuées à des différences au niveau de la conception de l'étude. L'absence de dépistage officiel entraîne une sous-déclaration tandis que l'évaluation de patients symptomatiques ou à risque entraîne une surdéclaration de séquelles oculaires[7]. Raza et coll. signalent que l'incidence globale de la rétinopathie chez les patients traités à l'interféron et à la ribavirine s'établit à environ 27 %. Les patients vivant avec le diabète (DS) et l'hypertension (HTN) sont de 5 à 6 fois plus susceptibles d'avoir une rétinopathie que ceux qui n'ont pas ces problèmes systémiques[5].

La rétinopathie associée à l'interféron fait habituellement son apparition de 2 à 12 semaines après le début du traitement[7]. Les patients ne présentent en général aucun symptôme visuel, mais ils ont des hémorragies rétiniennes ou des exsudats

Figure 1

JOUR 1

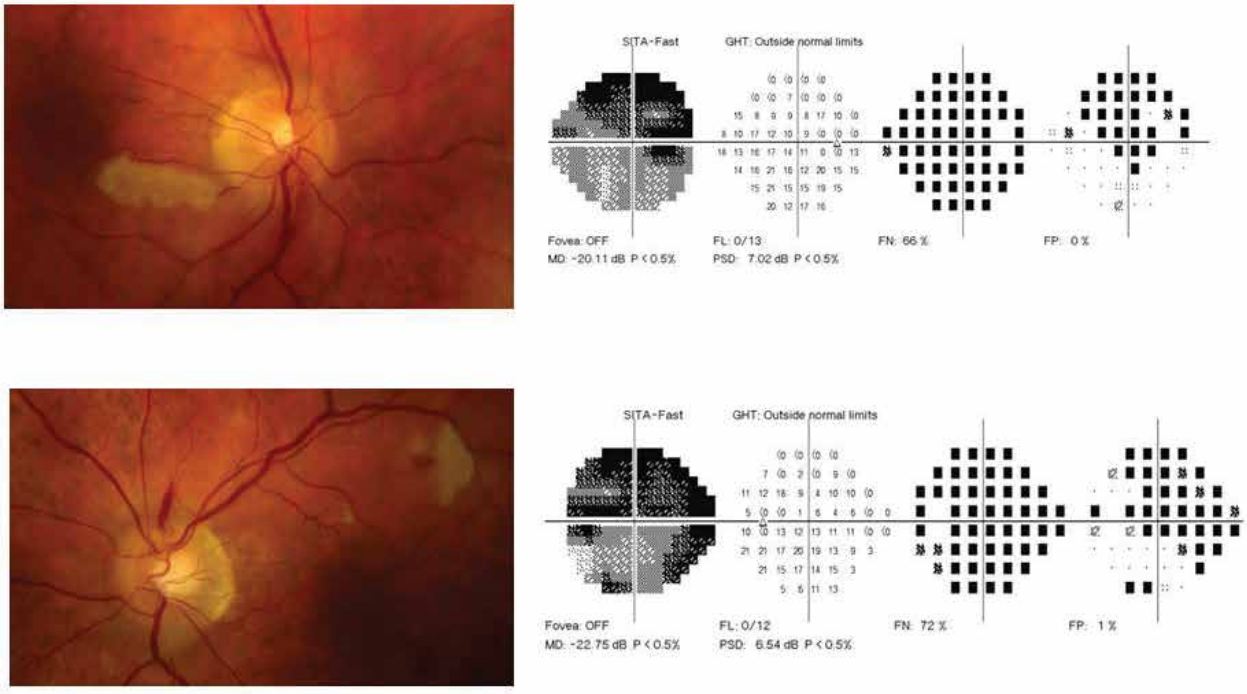


Figure 2

JOUR 12

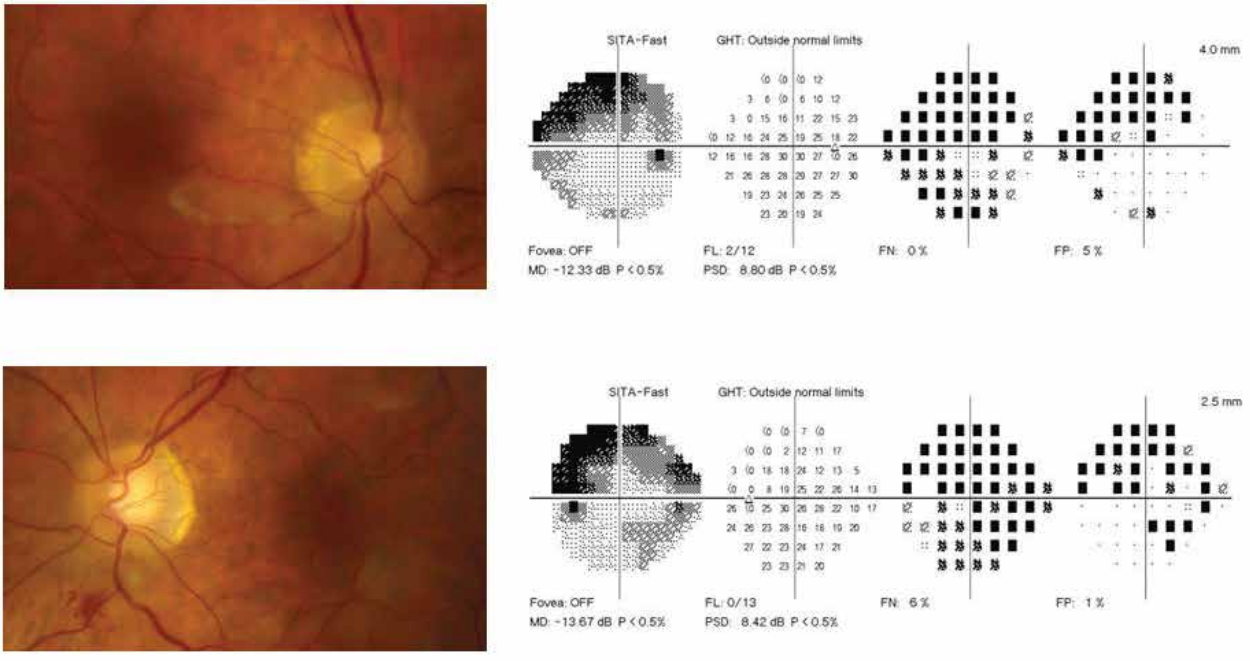
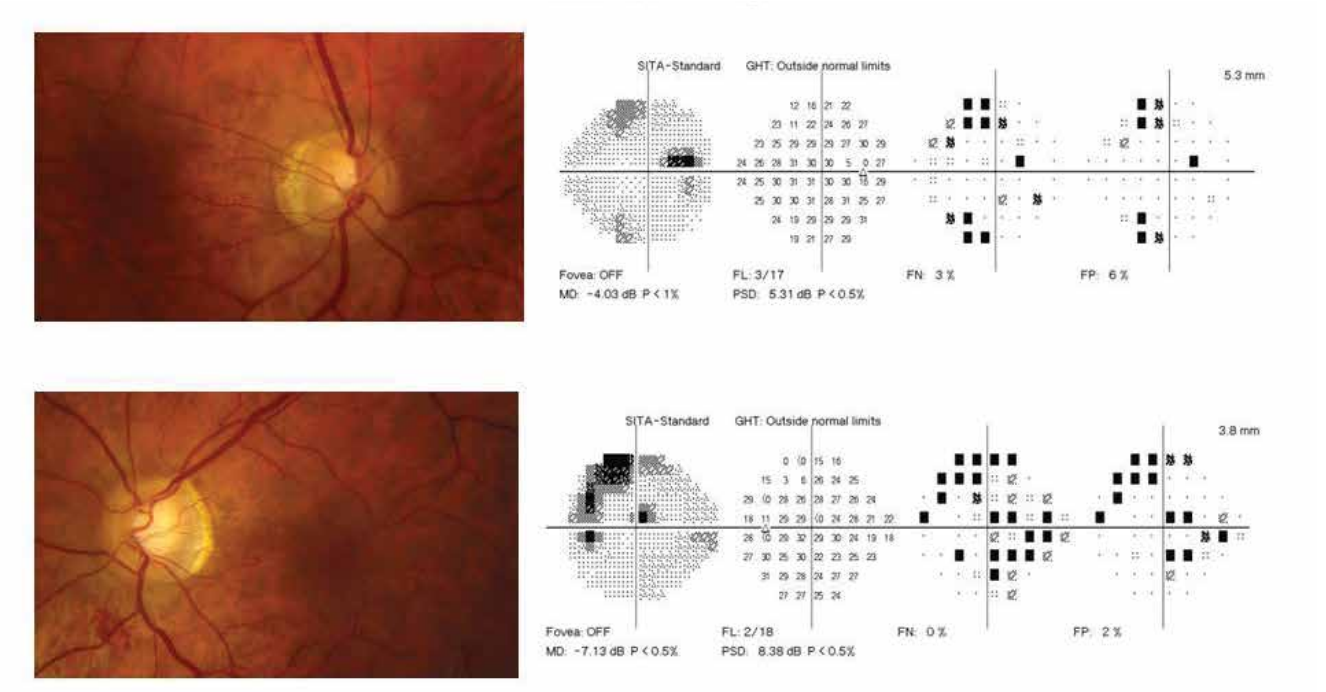


Figure 2



cotonneux révélés par l'examen du fond de l'œil dilaté. On pose en hypothèse que ces changements constituent le résultat final de troubles de la circulation microvasculaire rétinienne[8]. On ne comprend pas à fond la pathophysiologie, mais nombreux sont ceux qui laissent entendre que la dysfonction endothéliale joue un rôle dans le cadre duquel l'agrégation plaquettaire et l'adhérence des leucocytes à l'endothélium vasculaire forment des microcaillots capables de causer des micro-infarctus en foyer[7,9 12].

Les interférons agissent en se fixant aux cellules réceptrices et en commençant à produire des protéines effectrices. En cas de NOIA associée à l'interféron, on pose en théorie que ces protéines en circulation pourraient entraîner une hyperviscosité et compromettre la perfusion vers les lits capillaires de la tête du nerf optique[6]. Hayreh soutient depuis longtemps que la NOIA découle d'une diminution transitoire de la perfusion de la papille optique, habituellement au cours du sommeil, et constitue donc un événement hypotensif plutôt qu'un trouble embolique[13 16]. L'hypotension systémique est un résultat bien connu associé au traitement à l'interféron. Notre patient a été hospitalisé à cause d'un événement hypotensif au cours des semaines qui ont précédé l'apparition des symptômes visuels.

Il n'existe pas de recommandations normalisées sur le dépistage de la rétinopathie associée à l'interféron chez des patients, probablement parce que la rétinopathie n'est généralement pas associée à la perte de vision, évolue de façon bénigne, est autolimitative et se résorbe habituellement peu après la fin du traitement. En général, la plupart des cliniciens conviennent qu'il est toutefois prudent de soumettre les patients à risque élevé à un dépistage de la rétinopathie liée à l'interféron, mais O'Day et ses collaborateurs sont d'avis que le dépistage de routine est inutile, même dans le cas des patients vivant avec l'hypertension et le diabète sucré, sauf s'ils présentent des symptômes visuels[7]. Comme la perte de vision chez les patients qui ont une rétinopathie diagnostiquée associée à l'interféron est rare, on poursuit en général le traitement même si l'on détermine qu'il y a rétinopathie, étant donné particulièrement le risque plus important pour l'état de santé global des patients chez lesquels on interrompt prématurément le traitement à l'interféron. S'il y a perte de vision au cours du traitement, il faut toutefois soupçonner un événement indésirable moins courant comme une OVRC ou une NOIA. Dans de tels cas, l'interruption du traitement produit le meilleur résultat visuel[12].

Dernières réflexions

Dans le monde toujours mouvant du traitement de l'hépatite C, il semble probable que l'interféron pégylé sera moins présent dans beaucoup de protocoles de traitement, car des agents antiviraux à action directe comme le Sovaldi et l'Harvoni offrent des traitements de plus courte durée, des taux plus élevés de guérison et causent moins d'effets secondaires. Pour un certain nombre de raisons, toutefois, y compris le coût du traitement, l'interféron continuera d'avoir sa place dans l'arsenal thérapeutique du traitement de l'hépatite C et il devient nécessaire de comprendre les séquelles oculaires possibles associées à ce traitement afin d'optimiser le soin des patients en cause.

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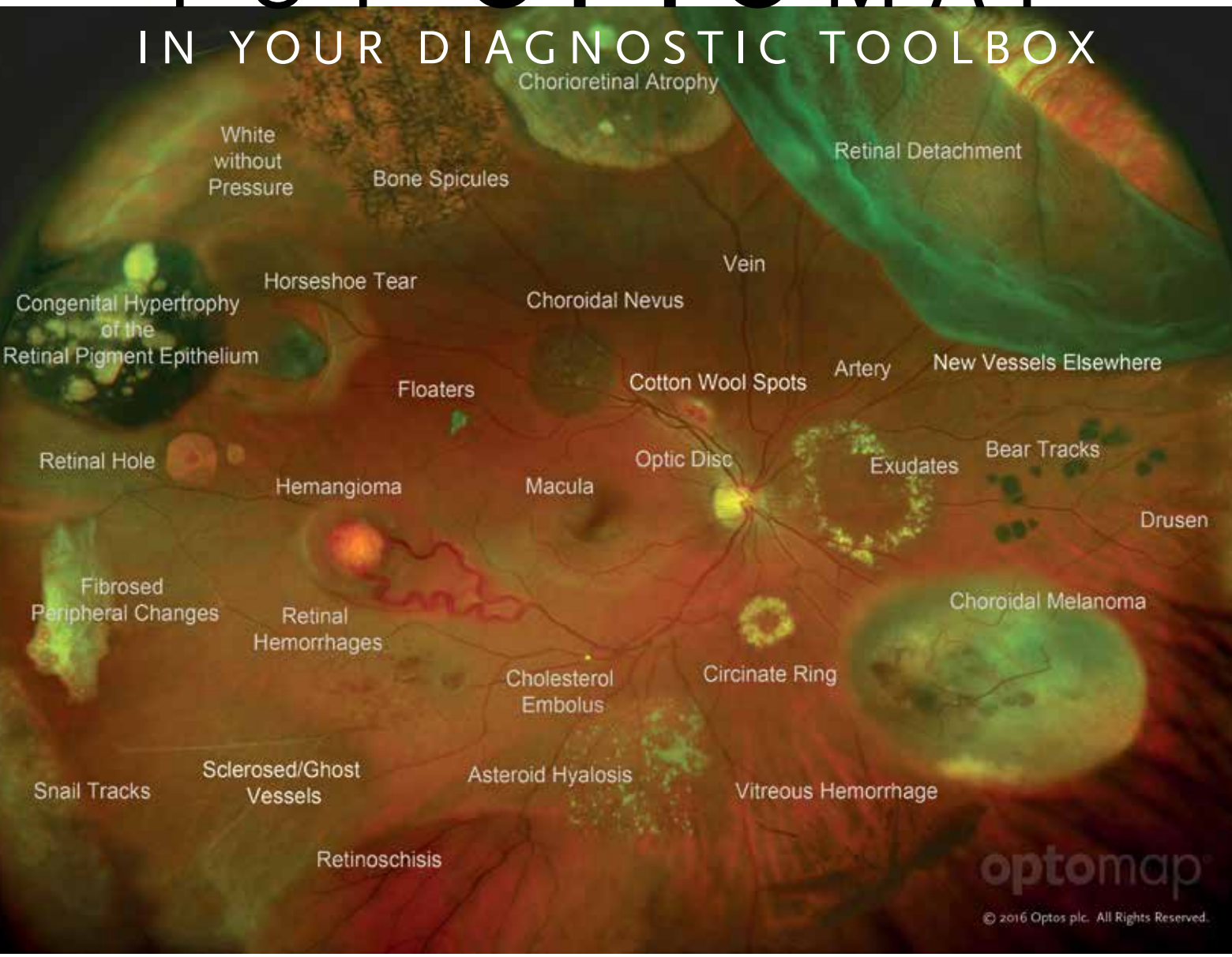

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Pauline Blachford consults optometrists on how to reduce unbooked appointments, increase eyewear sales, and improve employee productivity. She has abundant experience in the eye health industry, including 17 years at White Rock Optometry in BC. Pauline frequently presents at optometry conferences and is a regular columnist for the CJO. For more information, visit paulineblachford.com.

Most optometrists intuitively know that their business assets require care. Whether it's continuing medical education, insurance or equipment maintenance, it takes forethought, planning and the continuous investment of resources to ensure your clinic continues to provide excellent care to your patients.

This outlook of course also applies to a clinic's optometry team, and their ability to provide patients with the best service possible. Despite being one of the biggest assets of any company, employees aren't always viewed as an asset that requires investment. In fact, 60% of independent optometry practice owners say they do not train their staff, and 8% admit to never before having offered staff any training whatsoever.[1] This is a missed opportunity to increase staff performance and help each employee become a revenue generator for the clinic.

I have written before on some of the many benefits brought to your practice by training employees, including increased engagement, boosted morale and higher employee retention, all of which in turn positively impact your practice.[2] The case is there as to why optometrists should train their employees: but what should employees be trained in, and how should decisions around training be made?

Human resource experts have found that training and development in many companies "aren't focused on producing a targeted result for the business"[3] and should be in line with company goals. This type of situation means your money isn't working for your practice.[4]

To avoid such an outcome, the first step is to identify your practice's goals. Optometrists may establish a target number of referrals, or aim to boost their eyewear sales by a certain percentage each month. Many I've worked with hone in on reducing the number of unbooked appointments at their practice. Whatever the goal, it should be S.M.A.R.T. – specific, measurable, achievable, results-focused and time-bound.[5] Measurability is key as this will allow you to evaluate whether the investments you make toward each goal – investments in training, time or tools – are giving you an appropriate return.

Once clear goals are established, the next step is to consider what is required of you and your team in order to reach them. Working from the desired results backward forces optometrists to look to the future,[6] and figure out what kind of training will get your practice to where you want it to be.

Before investing in training, taking a skills inventory of all employees will allow you to identify which existing strengths can be used to drive your practice toward its goals. A full inventory will also highlight skill gaps on which you can target your training. Conducting a survey is a great way to begin gathering this information.[7] One that asks staff to identify not only their own skills, but those they think are missing from your team, and those that would support them in their respective roles, can offer optometrists a different perspective on the operations of their practice, and the challenges staff may face as they work to provide excellent customer service, book more appointments, or sell more eyewear.

Employees in a practice can range from millennials just starting their careers, to industry veterans, to those who have plenty of career experience but are new to optometry. Each employee brings with him or her a skillset that can, with some planning, be utilized to benefit your practice. Younger staff members may have an aptitude for managing social media in a way that complements your practice's traditional marketing strategy; a long-term employee who is familiar to patients may have a prime opportunity to consistently build customer loyalty with the right skillset. Along with a skills survey, the unique skills and talents of employees should be a strong consideration when it comes to determining which employees undergo what training.

With a plan for your practice in place, deciding what to train employees in becomes much more streamlined as there is no shortage of training opportunities available. First, if one employee has skills or knowledge that other employees need, you can use your own employees to train each other. Additionally, major eye conferences – such as those put on by CAO Congress,

Eye Recommend and the provincial chapters of CAO – offer a host of excellent training opportunities for all members of the optometry team. If travel costs are a concern, there are many speakers and consultants available to bring conference-level training directly to your practice.

Training staff on recalling can address many goals related to revenue generation. My clients are always surprised at how quickly a newly trained recaller can book an additional 20 appointments each week (which are individually valued on average at US$306).[8] My clients are also shocked to learn that despite often having the most comprehensive vision software on the market, their staff are unaware of the features of that software's recalling module. In my experience, staff are generally *under*trained when it comes to utilizing the technical equipment related to running an optometry business. Be alert to such potential knowledge gaps when you are conducting your skills inventory, as helping your employees maximize their use of the software can be an easy way to quickly and dramatically improve the efficiency of your practice.

Basic customer service training should not be overlooked. It is "vitally important" to increasing patient demand, and it should be consistent.[9] In addition to how their eye health exam went, your patients will remember how your recaller booked their appointment, how they were greeted upon arrival and how their optician handled their lens questions. All aspects of your practice contribute to your patients' experience of it. As 70% of buying experiences are based on how the customer feels they are being treated, the patient experience your practice creates can have a drastic impact on eyewear sales and customers' keenness to return to your practice.

Offering opticians sales training to complement their extensive knowledge of eyewear can be another profitable training investment. 71% of people base their buying decisions on trust and believability, and this comes from a salesperson's understanding of a customer's wants and needs, and their ability to connect and communicate with each customer.[11] Basic sales techniques can give opticians the tools – and much needed confidence – to make the most of the time they have with patients, be it to turn mild interest into real sales, or to continue to build customer loyalty.

Before working with my clients, I inform optometrists that implementing a training program comes with obstacles. One is the challenge of embracing change while juggling the day-to-day work involved in running a clinic; another is the potential reticence of staff who are asked to change their routines and responsibilities.

Business owners also tend to expect immediate results during and after investing in training for their staff. While immediate results can come from certain types of training, such as training for recallers and sales training for opticians, the benefits of other types of training (such as customer service training) may at first be subtle and difficult to quantify. Research shows customers are far more likely to speak out on negative experiences over positive ones, so training may result in reduced feedback.[12] Irrespective of how quick and marked the results, it is imperative to stick to the training and the new strategies long enough to obtain a definitive answer as to whether they are helping your practice achieve the initial goal.

Overall, the benefits of investing in training significantly outweigh the associated costs, and the results often speak for themselves: if a newly trained recaller begins generating an additional 20 appointments a week, the five-figure boost to a practice's monthly revenue makes a compelling argument for enhancing the skills of your recallers. Likewise if your optician begins selling more or higher value eyewear, or your patients start mentioning how well they were served by your reception team. And when staff benefit from their revitalized roles as revenue-generators – through acquiring new skills, increased engagement, and a structured incentive program – there is no limit to the rewards reaped from providing your team with the business skills to help you run and grow a s successful practice.

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Negotiating Renewal-Option Clauses and How to Best Exercise Them – For Optometry Tenants

By Jeff Grandfield and Dale Willerton – The Lease Coach

Dale Willerton is the founder of The Lease Coach and Jeff Grandfield recently joined him as partner. Dale and Jeff are commercial lease consultants who work exclusively for tenants, and are also professional speakers and co-authors of Negotiating Commercial Leases and Renewals For Dummies. *Got a leasing question? Need help with your new lease or renewal?*

Call 1-800-738-9202, email DaleWillerton@TheLeaseCoach.com, or visit www.TheLeaseCoach.com. For a copy of our free CD, Leasing Dos & Don'ts for Commercial Tenants, please email your request to DaleWillerton@TheLeaseCoach.com.

Readers of our book, *Negotiating Commercial Leases & Renewals for Dummies*, will learn (in-part) that the renewal-option clause in a lease exists for the sole benefit of the tenant. Essentially, its purpose is to ensure that you're allowed to lease your space for another lease term – as long as you meet the predetermined conditions listed in your lease agreement. Not all landlords automatically include renewal-option periods or terms in their offer to lease or formal lease agreement. As an optometry tenant, it's your responsibility to request, insist on, or negotiate for renewal-option rights.

Most lease-renewal terms are the same length as the initial term. Therefore, if an optometry tenant signs an initial five-year lease term, it's common for the landlord to grant one five-year renewal-option period. Although there are no hard and fast rules, some landlords resist giving a renewal-option term that's longer than the initial term. The larger the financial investment you make in a location, the longer or more renewal-option terms you typically want or need to recoup your costs.

Remember that a renewal-option term for the tenant doesn't give the landlord any particular benefit. From your perspective, it may be better to have several short options terms, because longer may not be better for you. The renewal-option term in most lease agreements is for a set period of time (e.g. three or five years) and you must make a full-term commitment if you do exercise the renewal-option. Just because you have an initial lease term with a 10-year renewal-option, this may not be ideal for you. What if you plan to move, retire, or sell and only want to renew for just two years? In this case, you will have to forgo exercising the 10-year option and negotiate for just two more years instead.

If you can persuade the landlord to agree to a renewal-option term that's up to five years as determined by the tenant, you can have maximum flexibility to exercise your renewal-option term, but potentially for a shorter period of time. Landlords typically resist this tactic because they want to retain as much control as possible. It costs you nothing to try for this up to clause, but it's not often that the landlord agrees.

The majority of lease agreements don't preset the rental rate for the renewal-option term for a couple of reasons:

- Landlords want to be able to maximize the return on their real estate investment. No one has a crystal ball, so the landlord is simply keeping options open for the maximum future rent increase possible.
- A landlord can constructively evict an undesirable tenant by simply dictating a much higher rental rate on the renewal term than is justified. When the tenant refuses to pay this increased rental rate and moves out, the landlord does a deal with a more desirable tenant.

As a result, most lease agreements will state that the rent for a renewal-option term is determined by fair market value. However, it is important there is a mechanism such as arbitration that determines how the fair market rents will be decided in the event the tenant and landlord cannot agree. This can help you avoid the constructive eviction noted previously.

A landlord might hedge his bets by including language in the renewal-option clause that states that under no circumstances (if the renewal-option clause is exercised) can the rental rate go down. If you've done your homework and determined that market rental rates have declined, then exercising the renewal-option clause can actually work against you.

Though not common, presetting the rental rate for the renewal-option term in advance may be an alternative. In most cases, if the landlord agrees to preset the renewal term rental

rate, it's usually at an artificially high rate which often makes it useless to the tenant. However, over a 10-year lease term, the country can undergo major positive economic changes which could make a preset rate work in your favor.

Annual increases can be determined in a number of ways:

- Preset annual increases for the renewal term are often calculated as annual percentage increases (e.g. 3, 4, or 5 percent). This means the rent is compounded by these annual percentage increases each year – regardless of what the market rental rate really is.
- Consumer Price Index (CPI) annual increases can also be used to calculate future rents. In some cases, a lease agreement states that the annual rental rate increase may be 5 percent or the rise in CPI, whichever amount is greater. So, if CPI goes down (or if the economy enters a period of deflation), the tenant's rent goes up anyway – if they exercised their renewal-option clause.
- Rental rates are a dollar figure. Some landlords set a one- or two-dollar-per-square-foot (for example) rent increase per year for the renewal term.

It's important to get the renewal-option clause wording right. Normally, the landlord constructs the actual wording of the lease renewal-option clause – often with plenty of forethought and deliberation. Other times, however, smaller landlords may use boilerplate lease agreements (provided by attorneys) which may or may not give careful consideration to the renewal-option clause. Landlords are accustomed to agreeing to renewal-option terms often fully loaded with clauses with takeaway conditions. Protectionist wording may, in fact, completely dilute the clause's benefit to you.

Here are some typical clauses or conditions a landlord may add to the renewal-option clause for his own benefit and/or protection – and why:

- Default (or uncured) default by the tenant, meaning nonpayment of rent or other non-material defaults, generally nullify the tenant's renewal-option rights. Even if a tenant corrects the default, it may too late to salvage the renewal-option clause rights.
- If the tenant wants to sell the business, the sale of the business and assignment of the lease agreement often render the renewal-option clause void. This is where the landlord states that the renewal-option clause is personal to the tenant and for the sole benefit of the original tenant – and not the person you sell the business to.
- Failure to hit certain sales volumes – especially if the landlord expects you to make percentage rental payments – can nullify the renewal-option clause. If the tenant is struggling, and their sales can prove it, the landlord may want to replace you with another tenant who has a better chance of paying percentage rent (or simply staying in business).
- If the tenant company/entity has a substantial change in shareholders, this can also render the renewal-option clause dead as this may be interpreted as a lease assignment.

Remember that all of these clauses can be negotiated with the landlord to soften or remove some of these conditions pertaining to your renewal-option clause.

Timing is important; most lease agreements state that the tenant has a specific window of time prior to the lease-agreement expiration within which they can exercise the renewal-option clause. Typically, this is 6, 9, or 12 months (but sometimes stated in a number of days instead) prior to the lease expiration date.

The majority of our clients do not exercise their renewal-option clause when we are negotiating their lease renewal. The reason this is the case is that we negotiate well in advance of the period that the tenant is required to provide notice to formally exercise their renewal-option clause. By doing this it allows us to not only find out the landlord's expectations prior to committing to a renewal term but also allows for the negotiation of free rent, tenant allowance, and/or further renewal options or other inducements as part of the renewal term. If a tenant simply exercises their renewal-option clause, all of these incentives are off the table and just the rent is left to be determined. Your renewal-option clause should be viewed as a safety net to ensure your tenancy if you felt that the landlord did not want to retain you as a tenant rather than your default plant o renew your lease.

With all this being said, how can optometry tenants properly exercise the renewal-option clause, if required?

- Discuss the renewal-option process with the landlord / landlord's property manager first so that you understand what is required of you.
- Know how far in advance to pull the renewal-option trigger. While most lease agreements state a deadline for exercising the renewal-option clause, they may also state that you can't exercise your renewal-option too soon. Typically, there is a 6-month window where this is possible; however, it can range from 6 – 12 months.

- Understand the legal mechanics of exercising the option clause. Landlords aren't required to notify the tenant that their renewal-option window is approaching or closing. The tenant is solely responsible for keeping track of such important dates. Most landlords will accept a letter or an e-mail saying that you're exercising your renewal-option clause. Some other landlords may even accept your verbal representation. The key here is for you to get written confirmation from the landlord or property manager that they recognize and accept your renewal-option letter.

Finally, watch for a separate clause in your lease agreement stating how official notices must be sent and received by both the tenant and the landlord. This often includes a specific mailing address for the landlord (which can be different from where you send your rent check). When we exercise a lease-renewal option for a tenant, we will often do it in several simultaneous ways:

- Mail the letter to the landlord's official place of notice as a registered letter that produces a delivery receipt.
- E-mail or fax the same letter to the landlord or property manager.
- Mail the letter to the property manager by regular mail.
- Call the landlord, property manager or office secretary to ensure delivery – noting their name and title and time of call for follow-up and/or confirmation purposes.

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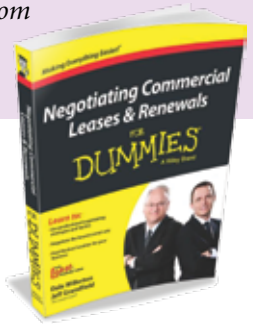

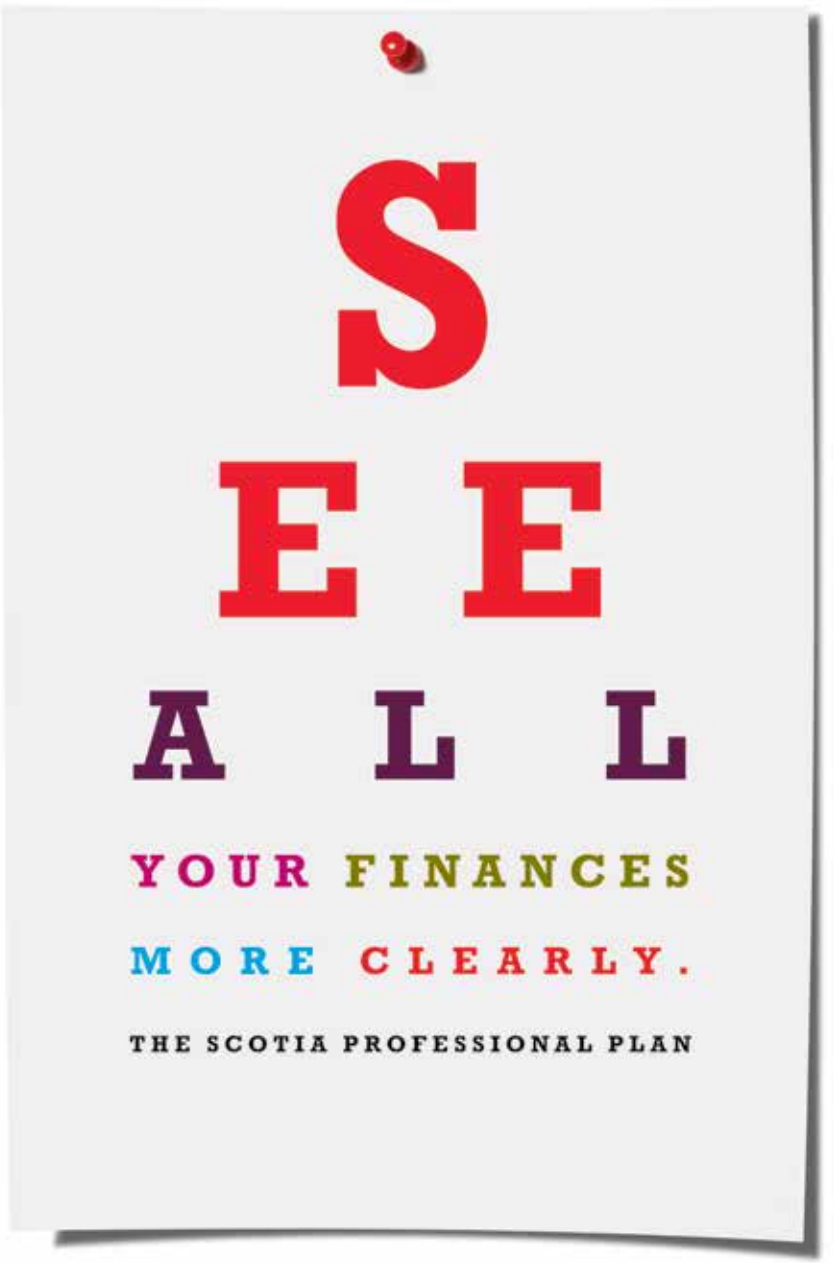

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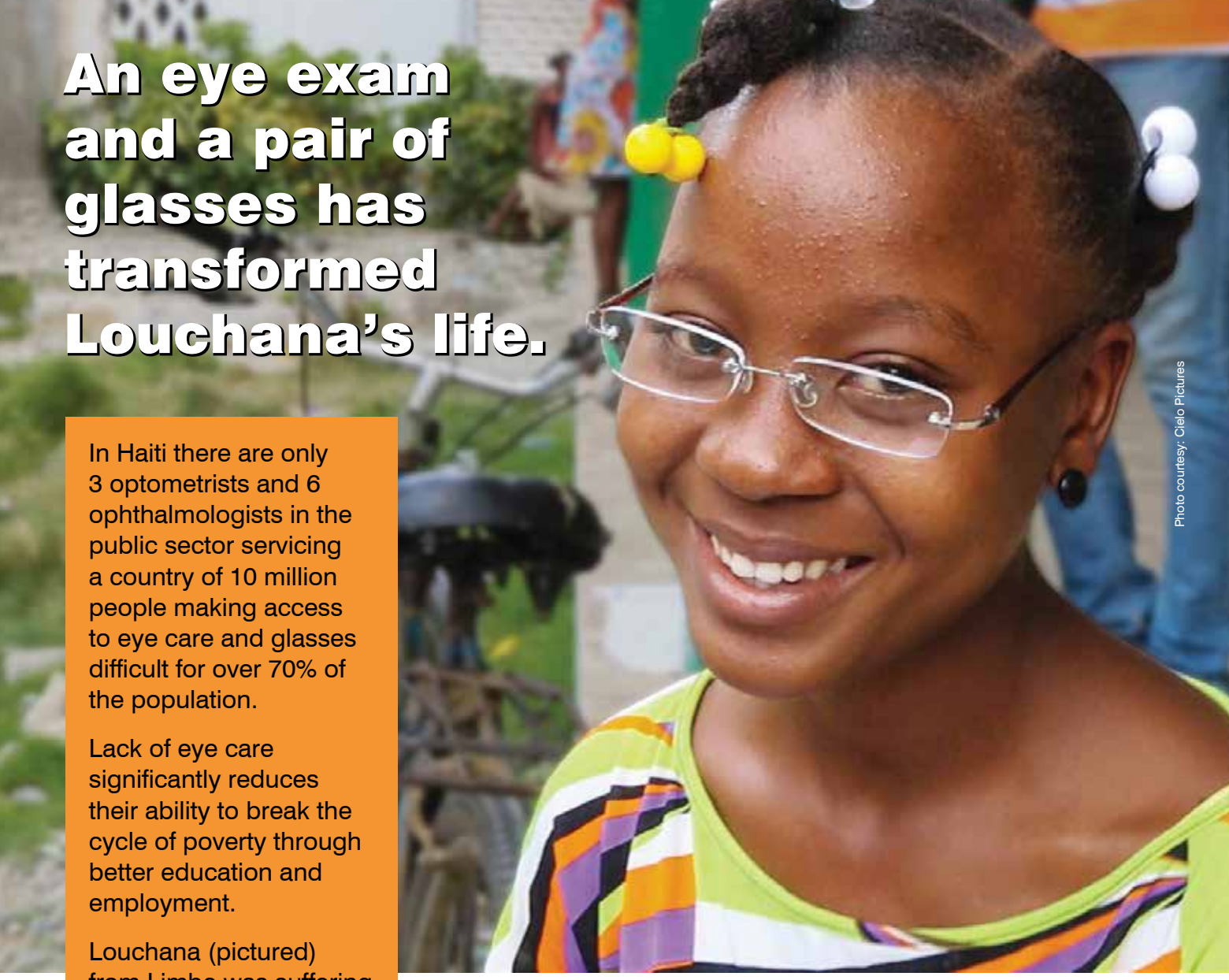

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