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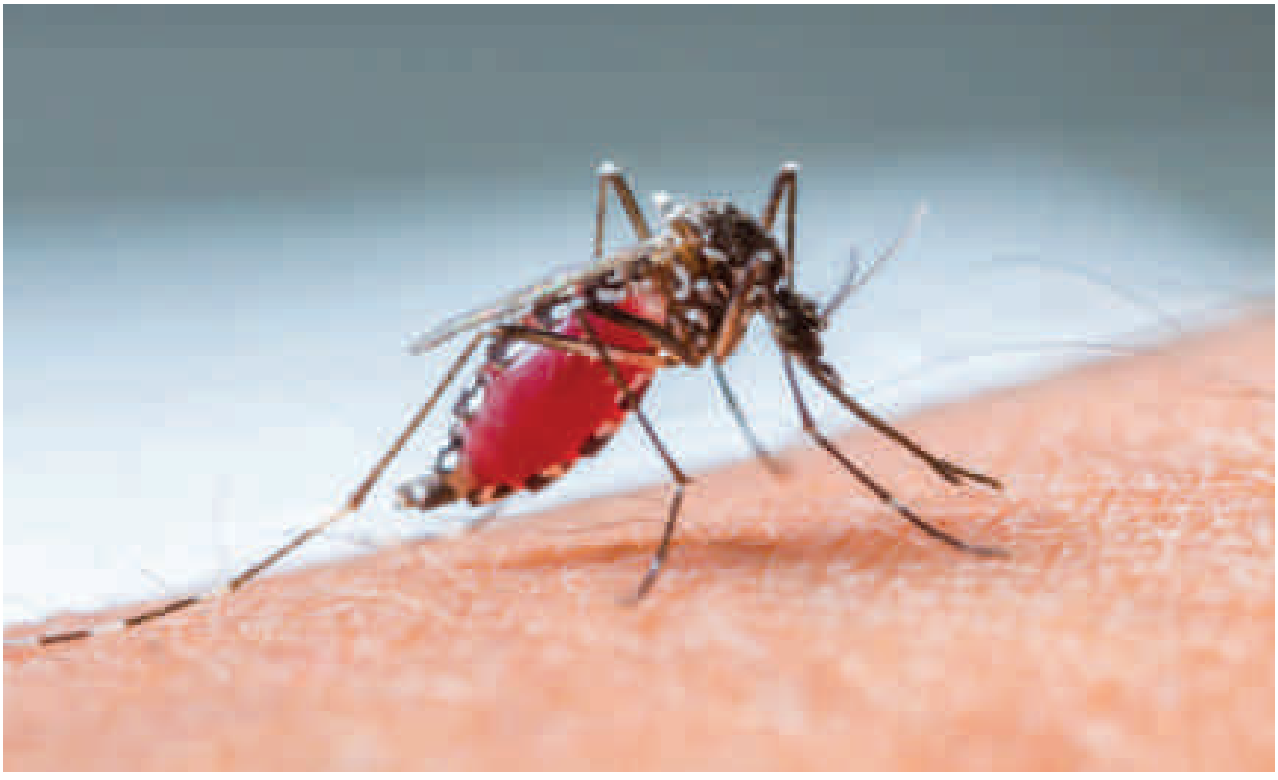
EST. 1939 VOLUME 80 NUMBER 2



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CONTENTS

On the Cover

Optometrists should be familiar with the associated ocular complications in order to effectively diagnose, co-manage, treat, and educate patients who have been infected by mosquito-borne disease.

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

This issue features a joint position statement by the Canadian Association of Optometrists and the Canadian Ophthalmological Society on the effects of electronic screens on children's vision and recommendations for safe use. This is the result of collaboration by the two organizations that I think demonstrates real commitment to the optimal eye health and vision care of Canadians. At 22 months of age, my eldest grandson already uses his mother's iPad and smartphone to play games and watch his favorite cartoons, and these guidelines will be very useful as we guide his exploration of the online world.

The return of warm weather brings with it the prospect of more time outdoors for both our patients and ourselves. Across much of Canada, that also means the return of mosquitos, black flies and the like. Climate change is making our environment more hospitable to mosquitos previously encountered only in the more tropical latitudes, and we see more patients from these parts of the world than ever before. The review of ocular complications of mosquito-borne diseases is therefore quite timely.

Our other feature article discusses the entry-level competency profile for optometry that is the basis for the Optometry Examining Board of Canada's new assessment that replaced the Canadian Standard Assessment in Optometry. Competency-based assessments are the gold standard for professional qualifying examinations and their foundation is the set of competencies that the profession identifies as crucial to safe practice.

This issue is the last to include Dr. Claude Giasson in its masthead. Since 2004, Claude Giasson has served as Academic Editor, encouraging his colleagues at Université de Montréal to contribute articles and managing the review of French-language submissions. He retires from his faculty position at L'Ecole d'Optométrie at the end of June. I want to thank Claude for his friendship and support, and on behalf of all *CJO* readers wish him well in retirement. ●

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B. Ralph Chou, MSc, OD, FAAO
Rédacteur en chef

Ce numéro présente un énoncé de position conjoint de l'Association canadienne des optométristes et de la Société canadienne d'ophtalmologie à propos des effets des écrans électroniques sur la vision de l'enfant et des recommandations pour une utilisation sans risque. Cette position est le fruit de la collaboration entre les deux organisations et, à mon avis, témoigne d'un engagement réel à l'égard de la santé oculaire optimale et des soins de la vue des Canadiens. Mon petit-fils aîné, âgé d'à peine 22 mois, utilise déjà l'iPad et le téléphone intelligent de sa mère pour jouer à des jeux et regarder ses dessins animés préférés. Ces lignes directrices seront très utiles pour guider son exploration du monde en ligne.

Avec le retour des beaux jours, nos patients, tout comme nous-mêmes d'ailleurs, passent plus de temps à l'extérieur. Dans une bonne partie du Canada, cela correspond aussi au retour des moustiques, des mouches noires et autres bestioles. En raison des changements climatiques, notre territoire devient plus accueillant pour les moustiques qui se trouvaient auparavant uniquement en région tropicale. De surcroît, nous voyons plus que jamais des patients de ces régions du monde. La revue des complications oculaires associées aux maladies transmises par les moustiques arrive donc à point nommé.

Un autre article de fond porte sur le profil des compétences des optométristes en début de carrière, à la base de la nouvelle évaluation du Bureau des examinateurs en optométrie du Canada qui a remplacé l'Évaluation canadienne standardisée en optométrie. L'évaluation axée sur les compétences est la norme d'excellence en matière d'examens de qualification professionnelle et elle se fonde sur l'ensemble de compétences que la profession juge essentielles à la pratique sécuritaire.

Dans le présent numéro, le nom du Dr Claude Giasson figure pour la dernière fois au générique parmi les collaborateurs. Depuis 2004, le Dr Giasson est rédacteur universitaire. Il encourage ses collègues de l'Université de Montréal à fournir des articles et gère la révision des articles en français. Il quittera son poste de professeur à l'École d'optométrie à la fin de juin. Je tiens à remercier Claude de son amitié et de son appui, et, au nom de tous les lecteurs de la *RCO*, je lui souhaite une très bonne retraite. ●

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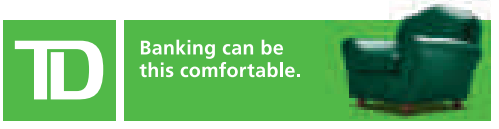

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CANADIAN ASSOCIATION OF OPTOMETRISTS
ASSOCIATION CANADIENNE DES OPTOMÉTRISTES

Canadian Association of Optometrists/Canadian Ophthalmological Society Joint Position Statement: Effects of Electronic Screens on Children's Vision and Recommendations for Safe Use

POLICY ISSUE

The prevalence of electronic screen-related ocular symptoms in adult users is estimated to be as high as 50–90%.[1,2,3] While the corresponding statistic in children is not known, the use of electronic screens by children has become more commonplace (at both home and school),[4] begins earlier in childhood than in the past,[5] and can last for long periods of time.[4,6,7]

The prevalence of electronic-screen symptoms in adults and the resultant guidelines for safe use should not be automatically applied to children. The visual and physical systems of children are different than those of adults, and still developing. In addition, children use screens differently and for different tasks.[4] This policy reviews the current literature on ocular and visual symptoms related to electronic-screen use in children and provides evidence-based guidelines for safe use. The effect of screen-time on other cognitive and developmental milestones is beyond the scope of this statement.

DEFINITIONS

For the purpose of this statement, "screen" refers to the electronic screens of all media: televisions, computers, tablets, smartphones, video games, etc., and "children" refers to individuals less than or equal to 18 years of age.

CLINICAL EVIDENCE

There is scant scientific literature on the effect of electronic screens on children's oculovisual systems, but this lack of evidence should not necessarily be interpreted as an absence of negative effects. Children may ignore discomfort, and fail to complain, if they are enjoying a task,[4] or they may fail to report relevant symptoms, such as dry eye, even though they may report other symptoms, such as blur.[8]

Within the emerging literature on the oculovisual effects of screen use on children, there is some evidence that the use of both desktop and portable computers is associated with musculoskeletal pain and discomfort in children.[9,10,11]

In a 2014 survey of 200 American children between the ages of 10 and 17 years, 80% reported burning, itchy, or tired eyes after using their portable electronic devices.[7] A South Korean study of 715 children (mean age 15 years) found that the longer use of smartphones (more than 2 hours) was associated with not only higher odds of ocular symptoms but also greater chances of multiple symptoms.[12] Additional studies from South Korea found that the daily duration of smartphone use, compared to television and computer use, was a risk factor for dry eye disease in children between the ages of 9 and 11 years;[13,14] the cumulative duration of the use of all video display screens was also found to be a risk factor.[14] Temporary acute acquired comitant esotropia (inward turning of the eye) was noted in 12 South Korean students between the ages of 7 and 12 years who used a smartphone within 30cm from their eyes for more than 4 hours a day for over 4 months.[15] Some research suggests that screens may interfere with children's sleep[16] due to the emission of blue light, which can suppress melatonin production.[17,18]

Most studies on the effects of screen-time in children indicate that the odds of visual symptoms increase after 2–4 hours of use,[12,13] whereas musculoskeletal effects increase after 2–3 hours.[11] No study has offered a specific time limit on electronic-screen use based on these symptoms. However, the Canadian Paediatric Society and the American Academy of Pediatrics suggest screen-time limits based on age.[19,20] While the reasons cited for these guidelines are not related to visual effects, they are compelling and based on the associations of high screen-time use with

increased risks of obesity, worse school performance, worse sleep quality, and risky behaviours in older children, as well as delays in critical cognition, learning, and social skills in younger children.[5,19,20,21]

Despite earlier thinking, screen-time is not a direct cause of the increased prevalence or progression of myopia; this prevalence has instead been linked with children spending fewer hours outdoors,[22] and may potentially be due to decreased exposure to outdoor light.[23]

POLICY POSITION

It is our position that the safe use of electronic screens should encompass the following:

a) Recommended amount of screen-time for children:[19,20,21]

- 0–2 years: None, with the possible exception of live video-chatting[5,24] (e.g., Skype, Facetime) with parental support, due to its potential for social development,[25] though this needs further investigation.

- 2–5 years: No more than 1 hour per day. Programming should be age-appropriate, educational, high-quality, and co-viewed, and should be discussed with the child to provide context and help them apply what they are seeing to their 3-dimensional environment.

- 5–18 years: Ideally no more than 2 hours per day of recreational screen-time. Parents and eyecare providers should be aware that children report total screen-time to be much higher (more than 7 hours per day in some studies).[5–7] This is not unrealistic considering the multitude of device screens children may be exposed to in a day, both at home and at school. Individual screen-time plans for children between the ages of 5–18 years should be considered based on their development and needs.[21]

b) Breaks after no more than 60 minutes of use (after 30 minutes is encouraged).[26] Breaks should include whole-body physical activity. The ideal length of a break has not been identified for either children or adults.

c) Workstation ergonomics: Chair heights should be set such that the child's feet can lay flat on the floor or on a stool underneath the feet to allow for support. Chairs should not have arm rests unless they fit the child perfectly, as should back rests.[26] Desks should be set at the child's elbow height or slightly lower. The desk should be deep enough to allow for forearm support; this is specifically effective in preventing musculoskeletal strain.[26] Displays should be set in front of the child. There is no official recommendation for the angle of screen inclination. For computers, it is recommended that the top of the display or monitor should be placed at the child's eye level, and the child should be allowed to move the screen into a comfortable viewing position as needed. There are no official recommendations regarding a screen's distance from a child; the computer screen should be placed at arm's length, and then moved as necessary.[26] External devices such as keyboards should also be placed in front of the child, with the mouse close to the keyboard and appropriately sized.[21] Workstation lighting should be equal throughout the visual field, so that glare and reflections which impair screen-viewing or cause visual discomfort are minimized.[1,26]

d) The use of screens within one hour before bedtime should be avoided. Screens in the bedroom are not recommended.

e) Outdoor activity should be encouraged over screen-time.

f) Children may or may not complain of electronic screen-associated discomfort. Regular* eye exams, which assess a child's ability to cope with visual demands and offer treatments for deficiencies (e.g., glasses correction; treatment (other than glasses) of other contributing eye conditions, etc.) are recommended. ●

Nov. 5, 2017

** See guidelines regarding the recommended frequency of eye examinations for children at: https://opto.ca/health-library/frequency-of-eye-examinations.*

REFERENCES

1. Gowrisankaran S, Sheedy JE. Computer vision syndrome: A review. *Work* 2015;52:303-14.
2. Bhanderi DJ, Choudharg S, Doshi VG. A community-based study of asthenopia in computer operators. *Indian J Ophthalmol* 2008;56:51.
3. Sa EC, Ferreira Junior M, Rocha LE. Risk factors for computer visual syndrome (CVS) among operators of two call centers in Sao Paulo, Brazil. *Work* 2012;41 Suppl. 1:3568.
4. Straker L, Pollock C, Maslen B. Principles for the wise use of computers by children. *Ergonomics* 2009;52:1386-401.
5. Reid Chassiakos Y, Radesky J, Christakis D, Moreno M, Cross C. AAP Council on Communications and Media. Children and Adolescents and Digital Media. *Pediatrics* 2016;138(5). doi: 10.1542/peds.2016-2593
6. Boak A, Hamilton HA, Adlaf EM, Beitchman JH, Wolfe D, Mann RE. *The mental health and well-being of Ontario students, 1991–2013: Detailed OSDUHS findings* (CAMH Research Document Series No. 38). Toronto, ON: Centre for Addiction and Mental Health; 2014. 4925 / 05-2014 / PR102 pg 7.
7. Screen time: How device use affects children's vision, 2014. American Optometric Association Website. http://www.aoa.org/news/inside-optometry/screen-time-how-device-use-affects-childrens-vision?sso=y&ct=95a17710a0ef64a88cd609684bf5231d1033a8b9e5fc15ca6eb738ec757bd28a8a4bdefac5cdf1b9b215f67f8a05fdb4add16639474c530e3f44767dda43d45c. Accessed November 28, 2016.
8. Hu L, Yan Z, Ye T, Lu F, Xu P, Chen H. Differences in children and adolescents' ability of reporting two CVS-related visual problems. *Ergonomics* 2013;56:1546-57.
9. Harris C, Straker L. Survey of physical ergonomics issues associated with school children's use of laptop computers. *Int J Ind Ergon* 2000;26:337–47.
10. Jacobs K, Baker NA. The association between children's computer use and musculoskeletal discomfort. *Work* 2002;18, 221–6.
11. Hakala PT, Rimpela AH, Saarni LA, Salminen JJ. Frequent computer-related activities increase the risk of neck-shoulder and low back pain in adolescents. *Eur J Public Health* 2006 Oct;16(5):536-41.
12. Kim J, Hwang Y, Kang S et al. Association between exposure to smartphones and ocular health in adolescents. *Ophthalmic Epidemiol* 2016;23:269-76.
13. Moon JH, Kim KW, Moon NJ. Smartphone use is a risk factor for pediatric dry eye disease according to region and age: a case control study. *BMC Ophthalmol* 2016;16:188. doi: 10.1186/s12886-016-0364-4
14. Moon JH, Lee MY, Moon NJ. Association between video display terminal use and dry eye disease in school children. *J Pediatr Ophthalmol Strabismus* 2014;51:87-92.
15. Lee HS, Park SW, Heo H. Acute acquired comitant esotropia related to excessive Smartphone use. *BMC Ophthalmol* 2016;16:37. doi: 10.1186/s12886-016-0213-5.
16. Cheung CHM, Bedford R, Saez De Urabain IR, Karmiloff-Smith A, Smith TJ. Daily touchscreen use in infants and toddlers is associated with reduced sleep and delayed sleep onset. *Sci Rep* **7**, 46104; doi: 10.1038/srep46104 (2017).
17. van der Lely S, Frey S, Garbazza C et al. Blue blocker glasses as a countermeasure for alerting effects of evening light-emitting diode screen exposure in male teenagers. *J Adolesc Health* 2015;56:113-9.
18. Salti R, Tarquini R, Stagi S, et al. Age-dependent association of exposure to television screen with children's urinary melatonin excretion? *Neuroendocrinol Lett* 2006;27(1-2):73–80
19. Digital Health Task Force, Canadian Paediatric Society. Screen time and young children: Promoting health and development in a digital world. Canadian Pediatric Society website. http://www.cps.ca/en/documents/position/screen-time-and-young-children. June 1, 2017. Accessed June 23, 2017.
20. AAP Council on Communications and Media. Media and Young Minds. *Pediatrics* 2016;138(5). doi: 10.1542/peds.2016-2591
21. AAP Council on Communications and Media. Media Use in School-Aged Children and Adolescents. *Pediatrics* 2016;138(5). doi: 10.1542/peds.2016-2592
22. Rose KA, Morgan IG, Ip J et al. Outdoor activity reduces the prevalence of myopia in children. *Ophthalmology* 2008 Aug;115(8):1279-85. doi: 10.1016/j.ophtha.2007.12.019.
23. French, AN, Ashby RS, Morgan IG, Rose KA. Time outdoors and the prevention of myopia. *Exp Eye Res* 2013 Sep;114:58-68. doi:10.1016/j.exer.2013.04.018
24. McClure ER, Chentsova-Dutton YE, Barr RF, Holochwost SJ, Parrott WG. "Facetime doesn't count'': Video chat as an exception to media restrictions for infants and toddlers. *Int J Child Comput Interact* 2015;6:1–6. https://doi.org/10.1016/j.ijcci.2016.02.002
25. McClure ER, Chentsova-Dutton YE, Holochwost SJ, Parrott WG, Barr RF. Look At That! Video Chat and Joint Visual Attention Development Among Babies and Toddlers. *Child Dev* 2017 10.1111/cdev.12833
26. Straker L, Maslen B, Burgess-Limerick R, Johnson P, Dennerlein J. Evidence-based guidelines for the wise use of computers by children: physical development guidelines. *Ergonomics* 2010;53:458-77.

BEPREVE[MC]

(solution ophtalmique de bésilate de bépotastine) à 1,5 % p/v

AIDEZ À TRAITER LA DÉMANGEAISON

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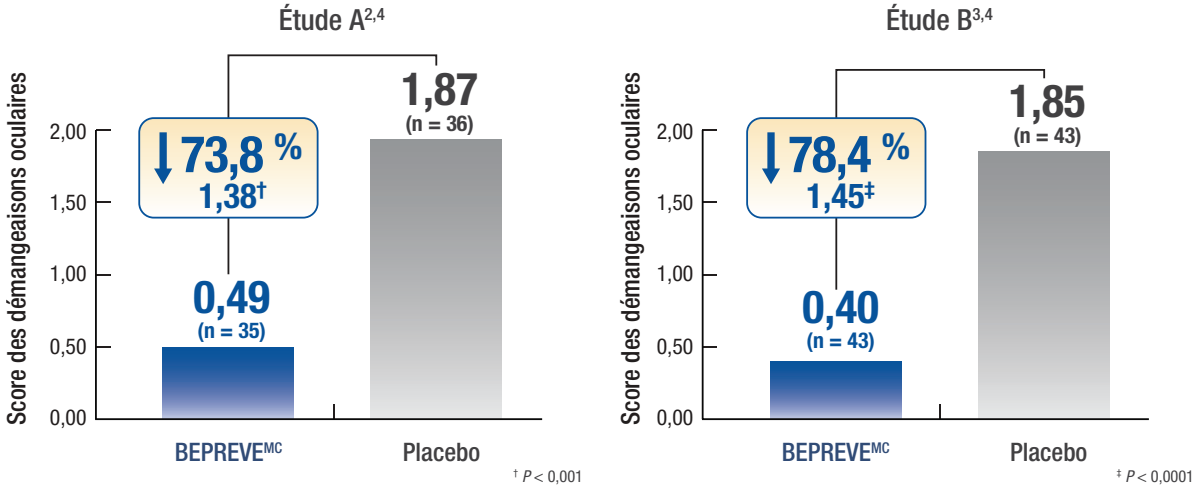
BEPREVE[MC] a démontré une réduction significative de la démangeaison oculaire 3 minutes après PCA[1–4,*]

Scores des démangeaisons oculaires 3 minutes après PCA (moyenne pour les deux yeux)



- À la visite 5 (15 minutes après l'instillation de BEPREVE[MC] à 1,5 % p/v), la différence moyenne du score des démangeaisons 3 minutes après le test de provocation par rapport au placebo était de 1,4 et de 1,5 lors de l'étude A[2,4,§] et de l'étude B[3,4,§], respectivement

Indication et utilisation clinique :

BEPREVE[MC] (solution ophtalmique de bésilate de bépotastine) à 1,5 % p/v est indiqué pour le traitement de la démangeaison associée à la conjonctivite allergique.

- L'innocuité et l'efficacité de BEPREVE[MC] n'ont pas été établies chez les enfants de moins de 3 ans et il ne devrait pas leur être administré
- L'efficacité de BEPREVE[MC] pour les enfants de moins de 10 ans a été établie par extrapolation des essais cliniques menés chez des enfants de plus de 10 ans et des adultes

Mises en garde et précautions pertinentes :

- BEPREVE[MC] est destiné à un usage ophtalmique topique uniquement
- Il faut éviter tout contact de l'embout compte-gouttes du flacon avec les paupières et les surfaces environnantes et il faut garder le flacon hermétiquement fermé entre les utilisations
- BEPREVE[MC] ne doit pas être utilisé pour traiter une irritation liée aux lentilles cornéennes
- BEPREVE[MC] ne doit pas être instillé lors du port de lentilles cornéennes. BEPREVE[MC] contient du chlorure de benzalkonium comme agent de conservation, une substance q peut être absorbée par les lentilles cornéennes souples. Enlever les lentilles cornéenne avant l'instillation; on peut remettre les lentilles cornéennes 10 minutes après l'administration de BEPREVE[MC]
- BEPREVE[MC] ne doit pas être utilisé chez les femmes enceintes sauf si les bienfaits pour la mère l'emportent clairement sur les risques pour le fœtus
- La prudence est de mise lors de l'administration de BEPREVE[MC] à une femme qui allait

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* PCA = provocation conjonctivale à l'aide d'allergènes

§ Les études A et B étaient toutes deux des essais cliniques de PCA de phase III, à répartition aléatoire, à double insu, contrôlés par placebo lors desquels on a assigné soit BEPREVE[MC] soit un placebo aux patients. L'analyse a fait appel au modèle PCA de conjonctivite allergique (c.-à-d. recours à de multiples allergènes saisonniers et apériodiques). Les sujets ont évalué leurs démangeaisons oculaires selon une échelle de 9 (0–4 U, demi-unités permises). Les paramètres primaires étaient les démangeaisons oculaires à l'administration bilatérale d'une dose 15 minutes, 8 heures et 16 heures avant la provocation (mesurées 3, 5 et 7 minutes après la PCA)[1–4].

Références : 1. Monographie de BEPREVE[MC] (solution ophtalmique de bésilate de bépostatine à 1,5 %). Bausch & Lomb Canada Inc.; 22 juillet 2016. **2.** Abelson MB, Torkildsen GL, Williams JI, et al. Time to onset and duration of action of the antihistamine bepotastine besilate ophthalmic solutions 1.0% and 1.5% in allergic conjunctivitis: A phase III, single-center, prospective, randomized, double-masked, placebo-controlled, conjunctival allergen challenge assessment in adults and children. *Clin Ther* 2009;31:1908–21. **3.** Macejko TT, Bergmann MT, Williams JI, et al. Multicenter clinical evaluation of bepotastine besilate ophthalmic solutions 1.0% and 1.5% to treat allergic conjunctivitis. *Am J Ophthalmol* 2010;15:122–7. **4.** Données en dossier, Bausch & Lomb Incorporated, 2008.

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Association canadienne des optométristes/Société canadienne d'ophtalmologie Énoncé de position conjoint : Effets des écrans électroniques sur la vision de l'enfant et recommandations pour une utilisation sans risque

QUESTION DE PRINCIPE

La prévalence de symptômes oculaires liés aux écrans électroniques est estimée à 50 à 90 % chez les utilisateurs adultes d'écrans électroniques.[1,2,3] Étant donné l'insuffisance de la littérature scientifique sur le sujet, les chiffres correspondant à la prévalence chez l'enfant ne sont pas connus. On sait néanmoins que l'utilisation des écrans électroniques est aujourd'hui plus courante chez les enfants (à la maison comme à l'école), [4] qu'elle commence plus tôt[5] et s'effectue sur de plus longues durées.[4,6,7]

Les constatations sur la prévalence des symptômes liés aux écrans électroniques chez l'adulte et les lignes directrices correspondantes ne peuvent s'appliquer automatiquement aux enfants. En effet, les systèmes oculaire et physique de l'enfant diffèrent de ceux de l'adulte et sont en cours de développement. De plus, les enfants utilisent les écrans différemment et pour des tâches diverses.[4] La présente question de principe examine la littérature disponible sur les symptômes oculaires et visuels liés à l'utilisation d'écrans électroniques chez l'enfant et propose des recommandations fondées sur des données probantes pour une utilisation sans risque. Le présent énoncé ne tient pas compte des répercussions du temps passé devant un écran sur les étapes du développement cognitif et autre de l'enfant.

DÉFINITIONS

Aux fins du présent énoncé, le terme « écran » désigne les écrans électroniques de tous types - téléviseurs, ordinateurs, tablettes, téléphones intelligents, jeux vidéo, etc. – et le terme « enfant » désigne les individus âgés de 18 ans et moins.

DONNÉES CLINIQUES

La littérature scientifique examinant les effets des écrans électroniques sur les systèmes oculovisuels de l'enfant est rare, mais le manque de preuves ne doit pas nécessairement être interprété comme une absence d'effets nocifs. Les enfants peuvent ignorer la sensation de gêne quand ils s'amusent[4] et par conséquent ne pas s'en plaindre. Il leur arrive aussi de ne pas signaler des symptômes révélateurs, comme un phénomène de sécheresse oculaire, tout en en indiquant d'autres, comme une vision floue. [8]

Dans la littérature récente concernant les effets oculovisuels de l'utilisation des écrans sur les enfants, certaines données montrent que les ordinateurs portables et de bureau sont associés à des douleurs musculosquelettiques et des sensations de gêne chez les enfants.[9,10,11]

Dans une étude de 2014 portant sur 200 enfants américains âgés de 10 à 17 ans, 80 % des sujets indiquaient des sensations de brûlure, de démangeaison ou de fatigue dans les yeux après l'utilisation d'appareils électroniques portatifs.[7] Une étude sud-coréenne, réalisée sur 715 enfants (15 ans d'âge moyen), a constaté que l'utilisation de téléphones portables pendant des périodes plus longues (supérieures à 2 heures) était associée non seulement à un risque plus élevé de symptômes oculaires, mais aussi à une plus grande probabilité de multiplication des symptômes.[12] D'autres études sud-coréennes ont estimé que la durée quotidienne d'utilisation d'un téléphone intelligent, par rapport à la télévision et l'ordinateur, était un facteur de risque de syndrome de l'œil sec chez les enfants âgés de 9 à 11 ans;[13,14] elles ont également conclu que la durée cumulée d'utilisation de tous les écrans de visualisation constituait un facteur de risque.[14] Des formes temporaires de strabisme convergent concomitant acquis (déviation de l'œil en dedans) ont été constatées chez 12 élèves âgés de 7 à 12 ans en Corée du Sud, qui avaient utilisé un téléphone intelligent à 30 cm de leurs yeux pendant plus de 4 heures par jour pendant plus de 4 mois.[15] Certaines recherches supposent que les écrans peuvent nuire au sommeil de l'enfant en raison des émissions de lumière bleue, qui peuvent inhiber la production de mélatonine.[17,18]

La plupart des études des effets du temps passé devant un écran sur l'enfant indiquent que le risque de symptômes visuels augmente après deux à quatre heures d'utilisation,[12,13] tandis que les effets sur l'appareil musculosquelettique augmentent après deux à trois heures devant un écran.[11] Aucune étude ne définit de durée limite devant un écran électronique à partir des symptômes observés. En revanche, la Société canadienne de pédiatrie et l'American Academy of Pediatrics proposent des limites de temps devant l'écran par âge.[19,20] Les recommandations, convaincantes, ne citent pas les problèmes de vue comme justification, mais s'appuient sur l'association constatée entre une utilisation prolongée des écrans et le risque d'obésité, de mauvais résultats scolaires, de manque de sommeil et de comportements à risque contre d'autres enfants, ainsi que des retards dans les compétences cognitives essentielles, les apprentissages et les aptitudes sociales chez les jeunes enfants.[5,19,20,21]

Contrairement à ce qu'on a pu penser, le temps passé devant un écran n'est pas une cause directe de la prévalence accrue ou de la progression de la myopie. En effet, cette prévalence s'expliquerait plutôt par la diminution du temps passé dehors par les enfants [22] et pourrait être causée par l'exposition moindre à la lumière du jour en extérieur.[23]

ÉNONCÉ DE PRINCIPE

Nous considérons que, pour être sans risque, l'utilisation des écrans électroniques doit suivre les recommandations ci-dessous.

a) Recommandations concernant la durée passée devant un écran par les enfants.[19,20,21]

- De 0 à 2 ans : aucune exposition, éventuellement à l'exception de conversations vidéo en direct[5,24] (par exemple : Skype, Facetime) avec l'aide d'un parent, en raison des conséquences possibles sur le développement des aptitudes sociales,[25] bien que cette question n'ait pas encore été suffisamment étudiée.

- De 2 à 5 ans : pas plus d'une heure par jour. Les émissions doivent convenir à l'âge de l'enfant, être éducatives, de bonne qualité et regardées avec un adulte. Ce dernier doit discuter du contenu avec l'enfant pour lui fournir des éléments de contexte et l'aider à transposer les images vues dans son espace tridimensionnel.

- De 5 à 18 ans : idéalement, moins de deux heures par jour d'écran à des fins récréatives. Les parents et les fournisseurs de soins oculovisuels doivent savoir que la durée totale passée devant un écran rapportée par les enfants est bien plus élevée (plus de 7 heures par jour selon certaines études).[5–7] Ce chiffre n'est pas irréaliste si l'on tient compte des nombreux écrans d'appareils auxquels les enfants peuvent être exposés dans une journée, à la maison comme à l'école. Le temps passé devant l'écran par l'enfant entre 5 et 18 ans doit être déterminé en fonction de son développement et de ses besoins.[21]

b) L'enfant doit faire une pause au plus tard au bout de 60 minutes d'utilisation (une pause toutes les 30 minutes serait préférable).[26] Les pauses doivent comprendre une activité physique engageant l'ensemble du corps. La durée idéale de ces pauses n'a pas été calculée, ni pour les enfants ni pour les adultes.

c) Ergonomie devant le poste de travail : La hauteur du siège doit être réglée de façon à ce que les pieds de l'enfant soient en appui sur le sol ou un tabouret. Les fauteuils ne doivent pas comporter d'appuie-bras, à moins qu'ils soient parfaitement ajustés à la taille de l'enfant. Il en va de même pour les dossiers.[26] Le bureau doit être à la hauteur du coude de l'enfant ou légèrement en dessous. La profondeur du bureau doit permettre à l'enfant de poser les avant-bras dessus. Cette disposition est particulièrement efficace pour la prévention de la fatigue musculosquelettique.[26] L'écran doit se trouver en face de l'enfant. Il n'existe pas de recommandation officielle en matière d'angle d'inclinaison de l'écran. En ce qui concerne les ordinateurs, il est conseillé de placer le haut de l'écran ou du moniteur au niveau des yeux de l'enfant, et de lui permettre de le baisser jusqu'à une position de visionnement confortable au besoin. Il n'existe aucune recommandation officielle concernant la distance de l'enfant par rapport à l'écran. L'écran de l'ordinateur doit être placé à une distance équivalant à la longueur d'un bras, puis être déplacé au besoin.[26] Les périphériques externes, comme les claviers, doivent être aussi placés en face de l'enfant. La souris doit se trouver près du clavier et être de taille adaptée.[21] L'éclairage du poste de travail doit être uniforme sur l'ensemble du champ de vision, de façon à ce que les éblouissements et les reflets empêchant de voir l'écran ou causant un inconfort visuel soient évités.[1,26]

d) Les enfants ne doivent pas utiliser d'écran dans l'heure précédant leur coucher. Il est déconseillé d'installer un écran dans les chambres à coucher.

e) Il est conseillé de privilégier la durée des activités à l'extérieur par rapport au temps passé devant un écran.

f) Les enfants ne se plaignent pas nécessairement de l'inconfort entraîné par l'utilisation d'écrans électroniques. Il est recommandé de procéder régulièrement* à un examen oculovisuel, qui évalue la capacité visuelle de l'enfant à supporter les exigences imposées à la vision et propose le traitement des déficiences diagnostiquées (par exemple : port de verres correcteurs, traitement (sans lunettes) d'autres pathologies oculaires. ●

5 novembre 2017

** Voir la fréquence recommandée pour les examens oculovisuels chez l'enfant à l'adresse : https://opto.ca/fr/health-library/frequence-des-examens-de-la-vue*

RÉFÉRENCES

1. Gowrisankaran S., Sheedy J.E. Computer vision syndrome: A review. *Work*. 2015;52:303-14. (en anglais)
2. Bhanderi D.J., Choudharg S., Doshi V.G. A community based study of asthenopia in computer operators. Indian J. Ophthalmol. 2008;56:51. (en anglais).
3. Sa E.C., Ferreira Junior M., Rocha L.E. Risk factors for computer visual syndrome (CVS) among operators of two call centers in Sao Paulo, Brazil. Work 2012;41 Suppl. 1:3568. (en anglais)
4. Straker L., Pollock C., Maslen B. Principles for the wise use of computers by children. *Ergonomics*. 2009;52:1386-1401. (en anglais)
5. Reid Chassiakos Y., Radesky J., Christakis D., Moreno M., Cross C. AAP Council on Communications and Media. Children and Adolescents and Digital Media. *Pediatrics*. 2016;138(5). doi: 10.1542/Peds.2016-2593. (en anglais)
6. Boak A., Hamilton H.A, Adlaf E.M., Beitchman J.H., Wolfe D., Mann R.E. *The mental health and well-being of Ontario students, 1991–2013: Detailed OSDUHS findings* (CAMH Research Document Series No. 38). Toronto, ON: Centre de toxicomanie et de santé mentale; 2014. 4925/05-2014 /PR102 p. 7. (en anglais, mais contient un résumé détaillé en français)
7. Screen time: How device use affects children's vision, 2014. (en anglais) Site Web de l'American Optometric Association. http://www.aoa.org/news/inside-optometry/screen-time-how-device-use-affects-childrens-vision ?sso=y&ct=95a17710a0ef64a88cd609684bf5231d10-33a8b9e5fc15ca6eb738ec757bd28a8a4bdefac5cdf1b9b215f67f8a05fdb4add16639474c530e3f44767dda43d45c. Consulté le 28 novembre 2016.
8. Hu L., Yan Z., Ye T., Lu F., Xu P., Chen H. Differences in children and adolescents' ability of reporting two CVS-related visual problems. *Ergonomics*. 2013;56:1546-57. (en anglais)
9. Harris C. et Straker L. Survey of physical ergonomics issues associated with school children's use of laptop computers. *Int J Ind Ergon*. 2000; 26:337-347. (en anglais)
10. Jacobs K. et Baker N.A. The association between children's computer use and musculoskeletal discomfort. *Work*. 2002;18, 221–226. (en anglais)
11. Hakala P.T., Rimpela A.H., Saarni L.A., Salminen J.J. Frequent computer-related activities increase the risk of neck-shoulder and low back pain in adolescents. *Eur J Public Health*. Oct. 2006;16(5):536-41.
12. Kim J, Hwang Y, Kang S., et coll. Association between Exposure to Smartphones and Ocular Health in Adolescents. *Ophthalmic Epidemiol*. 2016; 23:269-76. (en anglais)
13. Moon J.H., Kim K.W., Moon N.J. Smartphone use is a risk factor for pediatric dry eye disease according to region and age: a case control study. *BMC Ophthalmol*. 2016; 16:188. doi: 10.1186/S12886-016-0364-4. (en anglais)
14. Moon J.H., Lee M.Y., Moon N.J. Association between video display terminal use and dry eye disease in school children. *J Pediatr Ophthalmol Strabismus*. 2014; 51:87-92. (en anglais)
15. Lee H.S, Park S.W., Heo H. Acute acquired comitant esotropia related to excessive Smartphone use. *BMC Ophthalmol*. 2016; 16:37. doi: 10.1186/S12886-016-0213-5. (en anglais)
16. Cheung C.H.M., et coll. Daily touchscreen use in infants and toddlers is associated with reduced sleep and delayed sleep onset. *Sci. Rep.* 7, 46104; doi: 10.1038/srep46104 (2017). (en anglais)
17. van der Lely S., Frey S., Garbazza C., et coll. Blue blocker glasses as a countermeasure for alerting effects of evening light-emitting diode screen exposure in male teenagers. *J Adolesc Health*. 2015; 56:113-9. (en anglais)
18. Salti R., Tarquini R., Stagi S., et coll. Age-dependent association of exposure to television screen with children's urinary melatonin excretion? *Neuroendocrinol Lett*. 2006; 27(1-2):73–80. (en anglais)
19. Groupe de travail de la Société canadienne de pédiatrie sur la santé numérique. Le temps d'écran et les jeunes enfants : promouvoir la santé et le développement dans un monde numérique Site Web de la Société canadienne de pédiatrie. https://www.cps.ca/fr/documents/position/le-temps-d-ecran-et-les-jeunes-enfants. 1er juin 2017. Consulté le 23 juin 2017.
20. AAP Council on Communications and Media. [Conseil de l'APP sur la communication et les médias]. Media and Young Minds. *Pediatrics*. 2016; 138(5). doi: 10.1542/Peds.2016-2591. (en anglais)
21. AAP Council on Communications and Media. [Conseil de l'APP sur la communication et les médias]. Media Use in School-Aged Children and Adolescents. *Pediatrics*. 2016; 138(5). doi: 10.1542/Peds.2016-2592. (en anglais)
22. Rose K.A., Morgan I.G., Ip J., et coll. Outdoor activity reduces the prevalence of myopia in children. *Ophthalmology*. Août 2008; 115(8):1279-85. doi: 10.1016/J.ophtha.2007.12.019. (en anglais)
23. French A.N., Ashby R.S., Morgan I.G., Rose K.A. Time outdoors and the prevention of myopia, Experimental Eye Research (2013). Doi:10.1016/j.exer.2013.04.018 (en anglais)
24. McClure E.R., Chentsova-Dutton Y.E., Barr R.F., Holochwost S.J., Parrott W.G. "Facetime doesn't count": Video chat as an exception to media restrictions for infants and toddlers. *Int J Child Comput Interact*. 2015; 6:1-6. (en anglais) https://doi.org/10.1016/j.ijcci.2016.02.002
25. McClure E.R., Chentsova-Dutton Y.E., Holochwost S.J., Parrott W.G., Barr R.F. Look At That! Video Chat and Joint Visual Attention Development Among Babies and Toddlers. *Child Dev*. 2017 10.1111/cdev.12833
26. Straker L., Maslen B., Burgess-Limerick R., Johnson P., Dennerlein J. Evidence-based guidelines for the wise use of computers by children: physical development guidelines. *Ergonomics*. 2010; 53:458-77. (en anglais)

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Review: Ocular Complications of Mosquito-Transmitted Diseases

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Abstract

The World Health Organization estimates that 1 billion cases of infectious disease originate from vector transmission, resulting in several million deaths annually. Mosquitos are the primary vector for multiple diseases in humans that cause self-limiting to sight-threatening ocular complications and significant systemic illness. The 2015-2016 outbreak of the mosquito-borne Zika virus in North and South America brought to the forefront how quickly mosquitoes can spread disease between continents, especially among vulnerable patient populations. Optometrists should be familiar with the associated ocular complications in order to effectively diagnose, co-manage, treat, and educate patients who have been infected by mosquito-borne disease. This paper reviews the ocular manifestations of mosquito-transmitted diseases including Zika virus, West Nile virus, Malaria, Dengue fever, Chikungunya, and Dirofilaria.

KEY WORDS:
Mosquito-borne diseases, Ocular dirofilariasis, Zika virus, West Nile virus, Cerebral Malaria, Dengue fever, Chikungunya, Dirofilaria, Ocular manifestations

INTRODUCTION

Mosquitoes are known vectors for certain infectious diseases that can be transmitted from animals to humans or between humans. When feeding on the blood of an infected organism, the mosquito can acquire a virus or a parasite, which can then be injected into another human during a subsequent blood meal. Aided by factors such as the globalization of travel, environmental challenges like climate change, and the urbanization of rural areas, mosquito-transmitted diseases such as Dengue fever, Chikungunya and West Nile virus have been found for the first time in certain countries.[1] The 2016 outbreak of the mosquito-borne Zika virus in North and South America exemplifies how quickly mosquitoes can spread disease between continents, causing significant health risks in vulnerable patient populations, such as pregnant women.[2] With this increase in the prevalence of mosquito-borne disease, it is imperative for healthcare providers to stay informed about the associated clinical signs and complications. This paper reviews published literature on the ocular manifestations of mosquito-transmitted diseases including Zika virus, West Nile virus, malaria, Dengue fever, Chikungunya, and Dirofilaria (summarized in Table 1).

Table 1: *Ocular Manifestations of Mosquito-Transmitted Diseases*

Disease	Transmission	Endemic areas with active transmission	Vaccine available	Ocular manifestations
Zika virus (ZIKV)	Mosquito Vector: *Aedes aegypti* or *Aedes albopictus* mosquitos • Sexual intercourse with an infected individual • Maternal-fetal transmission	Mexico Central America South America New Guinea	No	***Fetal*** Focal pigment mottling of the retina Chorioretinal atrophy Macular atrophy Cataract Asymmetrical eye sizes Intraocular calcifications Optic nerve abnormalities Lens subluxation ***Adults*** Guillain-Barré syndrome, which is associated with various ocular muscle palsies and non-purulent conjunctivitis
West Nile virus (WNV)	Mosquito vector: 64 types of mosquito species carry WNV. The most common species are the *Aedes* and *Culex* mosquitoes. Virus is acquired after a mosquito feeds on an infected bird. • Low risk of maternal-fetal transmission or through blood transfusions.	Europe, Middle East, West Asia, North America, South America, and Australia	No	Retinal hemorrhages Vitritis Perivascular sheathing Vasculitis Disc edema Optic atrophy Vascular occlusion Sixth nerve palsy Uveitis ***Ocular complications associated with meningoencephalitis secondary to WNV*** Acute hemorrhagic conjunctivitis Bilateral subconjunctival hemorrhages Nystagmus ***Fetal*** Chorioretinal involvement
Malaria	Mosquito vector: *Anopheles* mosquito • Blood transfusion, organ transplant, or the shared use of needles or syringes contaminated with blood • Maternal-fetal transmission	Highest transmission is found in Africa south of the Sahara and in parts of Oceania such as Papua New Guinea	Vaccine clinical trials are ongoing Antimalarial drugs are available	***Ocular complications are generally associated with cerebral malaria (CM)*** Retinal whitening in the periphery and macula (sparing the fovea) Peripheral orange or white vessel discoloration Roth's spots Papilledema Cotton wool spots
Dengue fever (DF)	Mosquito vector: *Aedes aegypti* mosquito • Dengue cannot be spread directly from person to person	Tropical countries such as Southeast Asia, India, and the American Tropics	No	Retinal hemorrhages Macular edema Foveolitis Vasculitis Optic neuropathy Subconjunctival hemorrhages Uveitis Angle closure glaucoma
Chikungunya	Mosquito vector: *Aedes aegypti* and *Aedes albopictus* mosquitos • Rarely from mother to newborn around the time of birth • While, in theory, the virus could be spread through a blood transfusion, to date, there are no known reports.	Africa, Asia, Europe, islands in the Caribbean, the Indian and Pacific Oceans	No	Conjunctival injection Photophobia Anterior and posterior inflammation ***Secondary complications of ocular inflammation*** Sixth nerve palsy Central retinal artery occlusion (CRAO) Exudative retinal detachment Glaucoma
Dirofilaria repens (DR)	Mosquito Vector: *Aedes, Anopheles, Mansonia*, or *Culex* mosquitos	Warm climates on various continents, in Europe mainly in Mediterranean countries	No	***Ophthalmic subcutaneous lesions usually causing pain and redness*** Eyelid Periorbital Subconjunctival Subtenons Intraocular

ZIKA VIRUS

The Zika virus (ZIKV) is a flavivirus that is transmitted primarily by *Aedes aegypti* mosquitoes and was first identified in humans in 1952.[2] The 2016 ZIKV epidemic in Brazil likely originated from French Polynesia and subsequently spread from South America to Central and North America. If infected, a person may display symptoms such as fever for a short amount of time, rash, joint pain, or conjunctivitis.[2] In February of 2016, the World Health Organization considered the ZIKV outbreak to be a "Public Health Emergency of International Concern" based on the microcephaly and neurological disorders associated with the disease.[3]

Pregnant women are most susceptible to maternal-fetal transmission when exposed to ZIKV in the first or second trimester. Circumstantial evidence suggests that fetal manifestations of ZIKV infection may be induced by cholestatic liver damage resulting in the leakage of toxic concentrations of vitamin A compounds (Hypervitaminosis A) into the maternal and fetal circulation. Hypervitaminosis A is speculated to cause overall fetal growth arrest, microcephaly, and other congenital anomalies. Due to the general association of microcephaly and ocular complications, comprehensive eye examinations are recommended in microcephalic infants. Unilateral and bilateral retinal pathology has been documented in microcephalic infants, most commonly as focal pigment mottling of the retina and chorioretinal atrophy. Other reported ophthalmic findings have included macular atrophy, iris coloboma with lens subluxation, cataract, asymmetrical eye sizes, intraocular calcifications, and various optic nerve abnormalities.[4] It has also been shown that ZIKV can cause Guillain-Barré syndrome, an autoimmune disorder that can be associated with various ocular muscle palsies and non-purulent conjunctivitis in adults.[5]

ZIKV can be detected by performing real-time reverse transcription-polymerase chain reaction (rRT-PCR) on serum or urine, or IgM testing on serum; however, these methods are not readily available in countries where the condition is prevelant.[2] Since there is no ZIKV vaccine or specific treatment for ZIKV, women living in endemic areas should consider these risks before conceiving and avoid travelling to regions where disease outbreak is evident.[6] ZIKV can also be transmitted through sexual intercourse with an infected partner since the virus remains in semen longer than in any other body fluid; therefore, appropriate precautions must be taken.[2]

WEST NILE VIRUS

A variety of mosquitoes transmit the flavivirus which is responsible for West Nile virus (WNV) from infected birds to humans. The virus first entered the western hemisphere in 1999 and is now prevalent in North America, especially during the summer months. It is estimated that 80% of WNV-infected individuals are asymptomatic; while 20% may exhibit flu-like symptoms, exact statistics vary.[7,8] Patients infected by WNV are at risk of developing devastating neurological disease, which may manifest 3-14 days after infection. Clinical symptoms can range from generalized muscle weakness to high fever, stiff neck, and even convulsions. Adults aged 50 and older and individuals who are immunocompromised have a higher chance of developing neurological complications from WNV.[7]

A multitude of ocular manifestations have been reported, including, but not limited to, retinal hemorrhages, vitritis, perivascular sheathing, vasculitis, disc edema, optic atrophy, vascular occlusion, sixth nerve palsy, and uveitis.[8-10] In less than 1% of cases, an infected individual can develop WNV meningoencephalitis, which has been documented in the literature to be associated with ocular complications such as acute hemorrhagic conjunctivitis, bilateral subconjunctival hemorrhages, and nystagmus.[11] Chorioretinal involvement can also develop in a fetus via intrauterine virus transmission. One such case was documented in a newborn whose mother had contracted WNV two months before delivery.[12] Current management of WNV includes pain control for headaches, anti-emetics, rehydration for associated nausea and vomiting, clinical monitoring for development of elevated intracranial pressure or autonomic dysfunction, and seizure control, if needed.[13]

MALARIA

Malaria is endemic to sub-Saharan Africa, where children are most vulnerable to contracting the disease due to their immature immune systems. It is mainly transmitted by the *Anopheles* mosquito, but can also be passed via a blood transfusion, an organ transplant, or the shared use of contaminated needles or syringes since the parasite resides in the red blood cells of an infected individual. Congenital malaria occurs when the parasite is transmitted before or during delivery from a mother to her child. The first presentation of clinical signs often occurs 10-15 days following infection by a mosquito bite. In the early stages of infection, the diagnosis of malaria may be difficult to make because of the generalized clinical presentation of fever and vomiting.[1]

Several parasites in the *Plasmodium* genus infect humans with malaria, including *P. falciparum, P. vivax, P. ovale*, and *P. malariae*.[14] *P.falciparum* causes cerebral malaria (CM), which has a high rate of mortality and is characterized by coma and long-term neuro-cognitive impairments.[15] Some ocular complications can be noted with CM, since the retinal and cerebral vasculature are direct extensions of one another; therefore, monitoring retinal changes can provide an understanding of the neurological pathogenesis of CM and aid in determining the patient's prognosis and, perhaps, better treatment strategies.[16]

CM retinopathy shows retinal whitening patterns and vessel changes that are unique to the disease. Both are mainly found in the peripheral retina with a white or orange discoloration of the vessels. Other retinal findings include cotton wool spots, papilledema, and Roth's spots.[16,17] Due to the distinctive retinal presentation of the disease, these findings can be useful in confirming the diagnosis of CM. In addition, the severity of retinopathy and papilledema may be an indicator of disease prognosis.[15] If CM develops, the treatment of choice is the water-soluble artemisinin derivative artesunate and adjunctive supportive management of malaria complications.[14,18,19]

Currently, there are no effective malarial vaccines and multi-drug resistance is prevalent; therefore, travelers destined for endemic regions are recommended to begin prophylactic treatment prior to departure and continue treatment for a period of time after returning home. The recommended medications for prophylaxis and their associated treatment time frames vary depending on the country of travel.[14]

DENGUE FEVER

Dengue fever (DF) is a self-limiting condition transmitted by the *Aedes aegypti* mosquito. Female mosquitoes infected with the dengue flavivirus are endemic to tropical countries, such as Southeast Asia, India, and the American tropics. As the name implies, infected individuals suffer from an acute onset of fever along with other general symptoms, such as malaise, sore throat, and headache.[20,21] DF is potentially life-threatening in a small proportion of infected individuals and can cause severe hemorrhages, organ dysfunction, or plasma leakage. Patients with DF may also have a myriad of symptomatic anterior and posterior segment ocular complications resulting in blurred vision and scotomas. Such symptoms may indicate thrombocytopenia and a need for early, aggressive treatment; however, there is no specific therapy for DF itself.[21]

Blurry vision is the most commonly reported dengue-related ocular symptom, followed by scotoma and ocular pain, which can be diffuse or retrobulbar. The ocular complications of this disease are more commonly found within the posterior segment, particularly involving the macula. Manifestations include retinal hemorrhages, macular edema, foveolitis, vasculitis, vascular occlusion and optic neuropathy. Anterior segment complications include subconjunctival hemorrhages, uveitis with and without ciliary congestion, and shallowing of the anterior chamber angle with the risk of acute angle closure. Patients with severe vision loss or bilateral involvement can be treated with systemic steroids, and occasionally immunoglobulins, to minimize inflammatory damage; however, most dengue-related ophthalmic complications resolve without treatment.[20] Since no vaccines or specific medications are available to treat DF, precautions should be taken when traveling to areas where the virus is endemic.[22]

CHIKUNGUNYA

Chikungunya fever is caused by the Chikungunya virus and is most often spread by *Aedes aegypti* and *Aedes albopictus* mosquitoes. After a quiescent period, this virus re-emerged over the last decade in several regions including Africa, North and South America, Asia, Europe, and the Indian and Pacific Oceans.[23] The symptoms associated with this infection include an abrupt onset of severe joint pain, which can be debilitating, fever, chills, headache, muscle ache, and rash. The onset of symptoms typically occurs 4 to 8 days following infection by the mosquito.[7]

Ocular inflammation is a documented complication of Chikungunya fever and commonly presents as granulomatous or non-granulomatous anterior uveitis. Infected individuals may also present with conjunctival injection and photophobia. There have also been reports of keratitis, episcleritis, retinitis with vitritis, neuroretinitis, multifocal choroiditis, panuveitis, and optic neuritis. Secondary complications of ocular inflammation include sixth nerve palsy, central retinal artery occlusion, exudative retinal detachment, and glaucoma.[24] Chikungunya fever-related ocular inflammation responds well to corticosteroid therapy over a period of 6-12 weeks and, if treated early, can resolve with a good visual outcome.[24,25] Management of systemic symptoms includes pain reduction and dehydration prevention.

There is no vaccine to prevent infection by the Chikungunya virus; therefore, to limit the spread of the virus, infected individuals should take precautions against mosquito bites. The virus is present in the blood during the first week of infection and can be transmitted to mosquitoes and other people during that time.[23]

DIROFILARIASIS

Human dirofilariasis is a rare vector-borne zoonotic disease that is commonly caused by *Dirofilaria repens* and *Dirofilaria immitus*. *D. repens* is a subcutaneous parasite of domestic animals in warm and moist climates. The disease is transmitted to humans through the bite of an infected *Aedes*, *Anopheles, Mansonia* or *Culex* mosquito.[26-28] Symptoms of *D. repens* include benign subcutaneous lesions on the face, chest wall, upper arms, thighs, abdominal wall, and male genitalia. Between 30-35% of *D. repens*-related infections occur in the ocular regions.

Most cases of ocular dirofilariasis involve infestations of the periocular tissue. In approximately 60% of the human cases reported, the parasites were located under the conjunctiva within nodules or cysts that grow over time.[29] Lesions may also be found on the eyelid where they have been reported to cause preseptal cellulitis. Symptoms depend on the site of the infection, but typically include pain and redness.[27] The treatment for ocular dirofilariasis is complete excision of the lesion. Definitive diagnosis is confirmed by histopathologic and microscopic examination of the surgically excised worm.[30]

PREVENTION

The number of humans infected by mosquito-transmitted diseases may increase secondary to multiple factors such as the globalization of travel, and social and environmental issues.[1] Early containment of outbreaks is key to reducing the transmission and spread of these diseases. The World Health Organization continues to assist countries through enhanced disease surveillance, the development of new mechanisms to reduce the spread of disease, and education on disease recognition.

The ocular manifestations caused by mosquito-borne diseases can range from self-limiting to vision-threatening. Optometrists play an important role in the clinical co-management of patients infected by mosquito-borne illness, in collaboration with infectious disease specialists. To aid in early diagnosis and minimize morbidity, optometrists should inquire about recent travel to any endemic regions for patients exhibiting systemic symptoms, such as a fever with an associated complaint of blurred vision and/or ocular discomfort.

Unfortunately, no vaccines or drugs are available to treat most of these mosquito-transmitted diseases; therefore, those travelling to high-risk countries should be educated on mosquito bite prevention, including the use of Environmental Protection Agency (EPA)-approved mosquito repellants, mosquito bed nets, and window/door screens, and ensuring that both indoor and outdoor environments do not support standing water where mosquitoes typically lay their eggs.[22,31,32] Furthermore, vulnerable patient populations, such as pregnant women, young children, and the immunocompromised, should avoid travel to areas of disease outbreak. In cases where travel is unavoidable, awareness of the common manifestations of a mosquito-transmitted disease is imperative so that infected individuals will seek immediate medical attention if they experience any correlating symptoms.[1,2,7] ●

REFERENCES

1. World Health Organization. Vector-borne diseases. 2016. accessed 28 Jan 2017 <http://www.who.int/mediacentre/factsheets/fs387/en/>.
2. Centers for Disease Control and Prevention. 2016. accessed 28 Jan 2017 <https://www.cdc.gov/zika/about/index.html>.
3. World Health Organization. WHO statement on the first meeting of the International Health Regulations (2005) (IHR 2005) Emergency Committee on Zika virus and observed increase in neurological disorders and neonatal malformations. n.d. accessed 26 Mar 2017 <http://www.who.int/mediacentre/news/statements/2016/1st-emergency-committee-zika/en/>.
4. Mawson AR. Pathogenesis of Zika virus-associated embryopathy. *BioRes Open Access* 2016; 5(1): 171–6.
5. Cao-Lormeau V-M, Blake A, Mons S, et al. Guillain-Barré Syndrome outbreak associated with Zika virus infection in French Polynesia: a case-control study. *Lancet* 2016; 387(10027): 1531-9.
6. Jampol LM, Goldstein DA. Zika virus infection and the eye. *JAMA Ophthalmol* 2016; 134(5): 535.
7. World Health Organization. Mosquito-borne diseases. n.d. accessed 26 Mar 2017 <http://www.who.int/neglected_diseases/vector_ecology/mosquito-borne-diseases/en/>.
8. Chan C, Limstrom S, Tarasewicz D, Lin, S. Ocular features of West Nile virus infection in North America: A study of 14 eyes. *Ophthalmology* 2006; 113(9): 1539-46.
9. Kuchtey RW. Uveitis associated with West Nile virus infection. *Arch Ophthalmol* 2003; 121(11): 1648.
10. Bains HS, Jampol LM, Caughron MC, Parnell JR. Vitritis and chorioretinitis in a patient With West Nile virus infection." *Arch Ophthalmol* 2003; 121(2): 205-7.
11. Malhotra K, Ramanathan RS, Synowiec A, Rana S. Rare ocular manifestation in a case of West Nile virus meningoencephalitis. *Ann Indian Acad Neurol* 2014; 17(1): 95–6. *PMC*. accessed 29 Jan 2017.
12. Alpert SG, Fergerson J, Noël LP. Intrauterine West Nile virus: ocular and systemic findings. *Am J Ophthalmol* 2003; 136(4): 733-5.
13. Sejvar JJ. Clinical manifestations and outcomes of West Nile virus infection. *Viruses* 2014; 6(2): 606–23. *PMC*. accessed 29 Jan 2017.
14. Centers for Disease Control and Prevention. Frequently Asked Questions (FAQs). 2016 accessed 28 Jan 2017 <https://www.cdc.gov/malaria/about/faqs.html>.
15. Idro R, Marsh K, John CC, Newton CR. Cerebral malaria; mechanisms of brain injury and strategies for improved neuro-cognitive outcome. *Pediatr Res* 2010; 6(4): 267–74. *PMC*. accessed 29 Jan 2017.
16. Maude RJ, Dondorp AM, Abu Sayeed A, Day NP, White NJ, Beare NA. The eye in cerebral malaria: what can it teach us? *Trans R Soc Trop Med Hyg* 2009; 103(7): 661–4. *PMC*. accessed 29 Jan 2017.
17. Essuman VA, Ntim-Amponsah CT, Astrup BS, et al. Retinopathy in severe malaria in Ghanaian children - overlap between fundus changes in cerebral and non-cerebral malaria. *Malaria J* 2010; 9: 232. *PMC*. accessed 29 Jan 2017.
18. Wah ST, Hananantachai H, Kerdpin U, Plabplueng C, Prachayasittikul V, Nuchnoi P. Molecular basis of human cerebral malaria development. *Trop Med Health* 2016; 44: 33. *PMC*. accessed 29 Jan 2017.
19. Çizmeci EA, Kelebek Girgin N, Ceylan I, Tuncel T, Alver O, Akalin EH. Cerebral malaria treated with artemisinin in the intensive care unit: a case report. *Iran J Parasitol* 2016; 11(1): 116–20.
20. Yip VC, Sanjay S, Koh YT. Ophthalmic complications of dengue fever: a systematic review. *Ophthalmol Ther* 2012; 1(1): 2. *PMC*. accessed 29 Jan 2017.
21. Nagaraj KB, Jayadev C, Yajmaan S, Prakash S. An unusual ocular emergency in severe dengue. *Middle East Afr J Ophthalmol* 2014; 21(4): 347–9. *PMC*. accessed 29 Jan 2017.
22. Centers for Disease Control and Prevention. How to reduce your risk of dengue infection. 2012. accessed 28 Jan 2017. <https://www.cdc.gov/dengue/prevention/index.html>.
23. Centers for Disease Control and Prevention, Chikungunya Virus. 2015. accessed 28 Jan 2017. <https://www.cdc.gov/chikungunya/>.
24. G, Mahesh et al. A case of bilateral presumed chikungunya neuroretinitis. *Indian J Ophthalmol* 2009; 57(2): 148–50. *PMC*. accessed 29 Jan 2017.
25. Scripsema NK, Sharifi E, Samson CM, Kedhar S, Rosen RB. Chikungunya-associated uveitis and exudative retinal detachment. *Retin Cases Brief Rep* 2015; 9(4): 352-6.
26. Cielecka D, Zarnowska-Prymek H, Masny A, Salamatin R, Wesolowska M, Golab E. Human dirofilariosis in Poland: the first cases of autochthonous infections with *Dirofilaria repens*. *Ann Agric Environ Med* 2012;19:445–50.
27. Nagpal S, Kulkarni V. Periorbital dirofilariasis: a rare case from western India. *J Clin Diagn Res* 2016; 10(3): OD12–14. *PMC*. accessed 29 Jan 2017.
28. Centers for Disease Control and Prevention. Dirofilariasis. 2016. accessed 20 Mar 2017 <https://www.cdc.gov/dpdx/dirofilariasis/index.html>.
29. Mirahmadi H, Maleki A, Hasanzadeh R, Ahoo MB, Mobedi I, Rostami A. Ocular dirofilariasis by Dirofilaria immitis in a child in Iran: A case report and review of the literature. *Parasitol Int* 2017; 66(1): 978-81.
30. Sassi SH, Abid L, Dhouib R, et al. Conjunctival dirofilariasis due to *Dirofilaria* Repens. A new Tunisian case. J Fr Ophtalmol. 2006;29:e5.
31. Benelli G, Jeffries CL, Walker T. Biological control of mosquito vectors: past, present, and future. Eds. Cuthbertson AGS, Riddick EW. *Insects* 2016; 7(4): 52. *PMC*. accessed 29 Jan 2017
32. Murray NE, Quam MB, Wilder-Smith A. Epidemiology of dengue: past, present and future prospects. *Clin Epidemiol* 2013; 5: 299-309.

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Updating the Competency Profile and Examination Blueprint for Entry-Level Optometry in Canada

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Abstract

The Optometry Examining Board of Canada (formerly Canadian Examiners in Optometry) is a not-for-profit corporation that administers the entry-to-practice examination for optometrists in Canada in service to its members, the 10 provincial optometry regulators.

The described work resulted in an updated entry-level competency profile for optometry, together with an examination blueprint based upon indicators derived from the competencies. The project took place over the period May 2014 – September 2015 and involved the following steps:

- Establishment of project teams
- Clarification of conceptual framework
- Development of proposed competencies
- Validation of competencies
- Development of indicators for each competency, consistent with the assessment methodologies used in the entry-to-practice examination
- Construction of an updated examination blueprint

SUGGESTED KEY WORDS
Assessment, competence, competency-based standards, entry-to-practice (ETP), examination blueprint, objective structured clinical examination (OSCE), optometrist, registration (licensure) examination

INTRODUCTION

The Optometry Examining Board of Canada (OEBC; formerly Canadian Examiners in Optometry, CEO) was established in 1995 through collaboration among Canadian provincial optometry regulatory bodies. OEBC is a not-for-profit corporation with a mandate to develop and administer a national entry-to-practice (ETP) examination for optometrists. The examination has been offered since 1995, the first examinations having been developed with input from members of the profession following a review of existing entry-level examinations and education in optometry. Success in the examination is required for registration as an optometrist in most provinces within Canada.

Since the mid-1990s, competency-based ETP examinations have become the gold standard in Canada. This expectation was formalized on a national level with the introduction by the Government of Canada of the *Agreement on Internal Trade* in 1994[1] which noted:

"Any measure adopted or maintained by a regulatory body or government relating to occupational licensing ... should relate principally to competence;" and

"Competencies can be acquired through different combinations of training and experience"

The use of practice-based competencies as requirements for registration has two important advantages: it ensures that ETP requirements are in the public interest, and it fosters accountability among practitioners.

Ideally the blueprint[ii] of an ETP examination is derived from an ETP competency profile, and the curriculum of education programs that serve as pre-registration requirements is directly related to the same profile.

In 2001, OEBC formed a Competence Committee that worked over a span of four years to develop *Competency-Based Performance Standards* (2005).[2,3] The work was grounded on the World Health Organization's survey identifying common competencies across the health professions, and similar efforts of the National Association of Pharmacy Regulatory Authorities and the Australian Office of Education.

The 2005 *Standards* were based on four competency roles: provide comprehensive eye and vision care; collaborate; manage; and educate. They also identified "general attributes of professional competencies."

In August 2015, OEBC published updated competency-based requirements for entry to the profession, entitled National Competency Profile for Entry-Level Optometry.[4] The 2015 profile is based on an explicit conceptual framework that describes the relationship between the competencies and professional competence, and includes a definition of *entry-level proficiency*. OEBC followed up with the creation of a new examination blueprint based upon the 2015 profile, which led to the implementation of a new ETP examination in May 2017. This report describes the development and structure of the 2015 competency profile and the resulting examination blueprint.

THE PROJECT

In May 2014, the Board of Directors of OEBC approved a project to develop an updated national competency profile and examination blueprint. The project was announced through letters to members and stakeholders, including OEBC volunteers.

The project began that same month, with the identification of key personnel. A consultant in competency-based standards was engaged to lead competency development and validation, and indicator development. OEBC's psychometric consultant was charged with leading development of the examination blueprints.

Content expertise for competency and indicator development was provided by a 4-person subject matter expert team working under the guidance of the consultant. Team members were selected from volunteers, based on pre-established criteria. Three team members were experienced optometrists in general practice and one was a senior optometry educator with a Canadian university program. All members had extensive familiarity with entry-level optometry practice and some had previously participated in OEBC's examination development process. None were currently serving in any capacity with the OEBC or any other assessments of entry-level competence in optometry.

Development of the competencies and indicators took place from July 2014 – May 2015. The bulk of the work was completed within approximately 75 hours of team meeting time, comprised of both in-person and online sessions, supplemented by individual study and one-on-one discussions.

Status reports were provided to OEBC by the consultant throughout the project. The new competency profile was approved by OEBC and published on its website in August 2015.

Subject matter expertise for blueprint development and new examination design was provided by a 6-person team working under the guidance of the psychometric consultant. The team consisted of experienced optometrists who had worked for several years supporting OEBC's examination.

Blueprint development and examination design took place over the period June – September 2015. The bulk of the team's work was completed in 3 in-person meetings and 3 teleconferences totalling approximately 40 hours of meeting time. The new blueprints were approved by OEBC and published on its website.[5]

CONCEPTUAL FRAMEWORK

Competence and Competencies

The term *competence* is generally understood to refer to effective performance. Competence is a concept widely referred to in the professional literature, and was defined by Kane in 1992 as "the degree to which an individual can use the knowledge, skills and judgements associated with the profession to perform effectively within the domain of professional encounters defining the scope of professional practice."[6] In 2002, Epstein and Hundert noted that "competence is developmental, impermanent and context-specific."[7] More recently (2015) the Royal Society of Physicians and Surgeons of Canada observed "[physician] competence is both conditional on, and constrained by, ... practice context, is dynamic and continually changes over time."[8]

We use *competence* to mean *effective workplace performance in the context and in the moment of practice*.

Other terms related to competence (for example "competency", "a competency", "competencies", "competent") are also in common usage although their meanings are not standardized. Occupational competency profiles (lists of competencies required for effective performance) have been developed and published by many professions, but no common framework or set of definitions has been established.

It is often stated that McClelland originated the occupational competency movement in 1973 when he suggested that successful workplace performance depends more upon a worker's specific knowledge, abilities and attributes than upon his or her intelligence.[9] Concepts of competence have since become a driving force in development of specifications for the workplace and for education. In 1992 the Office of Personnel Management of the United States Government defined a competency as "a measurable pattern of knowledge, skills, abilities, behaviors, and other characteristics that an individual needs to perform work roles or occupational functions successfully".[10] There have since been many variations on this understanding of competencies, including some which have considered competencies to be the knowledge, skills and attributes required to perform in the workplace, while others have considered competencies to be the workplace outcomes that result from the application of knowledge, skills and attributes.

More recent attention has focused on competencies as *abilities*. Kaslow and co-workers (2007) noted that "it is essential that competencies be conceptualized as generic, wholistic *(sic)* and developmental abilities."[11] The Royal Society of Physicians and Surgeons of Canada's CanMEDS 2015 defines a competency as "an observable ability of a health professional, integrating multiple components such as knowledge, skills, values and attitudes."[12]

We think of *competencies* as the micro-level abilities that enable competent (macro-level) performance in the practice context. In brief, we say that *competencies enable competence.*

We define a competency as *the ability to perform a specific workplace task with a prescribed level of proficiency.*

As noted above, competence is developmental, impermanent and context-specific. The competency sets that enable competence continually evolve over the span of a professional's career, as the result of ongoing informal and formal learning. The evolution of occupational abilities over time was recognized by Dreyfus and Dreyfus in 1986[13] and the Dreyfus developmental model has since been applied to professions including nursing[14] and medicine[15], as well as optometry.[16]

Entry-Level Proficiency

Since one of the principal uses of an ETP competency profile is the assessment of ETP competence, competencies must specify not just the workplace tasks that can be performed but also the level of performance expected and any related contextual constraints. These factors are sometimes referred to as *standards and conditions* for task performance. In our work, we use the term *level of proficiency* to refer to standards and conditions applicable to competencies.

At ETP, we expect a practitioner to demonstrate in all tasks, as a minimum, *entry-level proficiency,* which we characterize as follows:

Entry-level proficiency involves addressing common patient presentations, and critical patient presentations, independently, within an appropriate time frame, and achieving outcomes consistent with the generally-accepted standards of the profession; this includes the ability to recognize complex situations that are beyond the capacity of the entry-level optometrist, and addressing them by seeking advice or consultation, by reviewing research literature, and / or by referral to a more experienced optometrist or a more appropriate health care professional.

Assessment of Competence

A variety of methodologies are used in attempts to assess competence in regulated professions.[17] In Canadian healthcare, the most common ETP assessment methods are written testing (typically multiple choice questions, MCQ) and performance-based testing through simulation (objective structured clinical examination, OSCE). OEBC's examination uses both written and performance-based assessments.

Since competencies are abilities to perform in the workplace (i.e., practice), ideally, assessment should take place in a practice setting. However, for reasons of practicality and standardization, most ETP assessments are administered prior to registration and take place not in practice but in specifically constructed assessment vehicles (such as case-based written examinations and OSCE stations).

In recognition of this distinction, we use the term "indicator" to refer to *a behaviour that is observable within a specific assessment methodology and which provides an indication that the candidate possesses a competency.*

Consistent with the conceptual framework we describe above, the project proceeded stepwise as follows:

- Step 1: Development and validation of competencies (each described as a practice ability)
- Step 2: Identification of potential indicator(s) for each competency (each described as an observable derived from a competency and consistent with the constraints of OEBC's assessment methodologies)
- Step 3: Development of the examination blueprint derived from the validated competencies and their indicators

DEVELOPMENT OF PROPOSED COMPETENCIES

To enhance the readability of the competency profile and its utility for broad audiences both within and outside of the profession, a simple functional-based structural framework was identified (Table 1), consisting of nine areas of optometry practice. Functional frameworks are commonly (but not universally) used for the organization of competencies. They have the advantages of being readily understandable to diverse users of the competency profile, and, from the perspective of the team developing the competencies, facilitating comprehensive and balanced coverage of all areas of practice.

It was further agreed that each competency statement would describe a single, stand-alone practice task, to facilitate indicator and test item development. It is important to recognize that, in optometry practice, tasks are not undertaken in isolation; the competencies in the profile must be seen as an integrated set of abilities, with each informing and qualifying the others.

An initial draft of competencies was developed by drawing content from OEBC's 2005 *Competency-Based Performance Standards,* organizing it within the 9 practice areas, and adjusting consistent with the "one task per

statement" rule described above. The team then studied a variety of published materials describing standards for optometry practice and education, both in North America and internationally. These materials were used both to confirm that the content of the emerging competency profile was in general equivalent to established international standards, and to suggest entry-level expectations that may be missing from the initial draft.

Principal reference documents are listed in Table 2.

Table 1: *Nine Areas of Optometry Practice*

A1	Communication
A2	Professionalism
A3	Patient-Centered Care
A4	Assessment
A5	Diagnosis and Planning
A6	Patient Management
A7	Collaborative Practice
A8	Scholarship
A9	Practice Management

Table 2: *Principal Reference Documents*

WCO Competency Model (2013)	WCO Headquarters, 243 North Lindbergh Blvd., St Louis, MO 63141-7881, USA; http://www.worldoptometry.org
Accreditation Manual: Professional Optometric Degree Programs (2013)	Accreditation Council on Optometric Education, 243 North Lindbergh Blvd., St. Louis, MO 63141 USA; www.theacoe.org
Universal and Therapeutic Competency Standards (2008)	Optometrists Association Australia; http://www.optometry.org.au
Optometry Core Curriculum, Core Competencies and Learning Outcomes (2010)	General Optical Council, 10 Old Bailey, London EC4M 7NG, UK; www.optical.org
Draft CanMEDS 2015 Physician Competency Framework – Series I (2014)	Royal College of Physicians and Surgeons of Canada, 774 Echo Drive, Ottawa, ON K1S 5N8, Canada; www.royalcollege.ca
Examination Content Outline (2014)	National Board of Examiners in Optometry, 200 South College Street, #2010, Charlotte, NC 28202, USA; www.optometry.org

Following a review for comprehensiveness and balance of content across all practice areas, and to ensure consistent language and style, the initial product consisted of 101 proposed competency statements. The competencies were translated into French by a registered professional translator working with a bilingual optometrist.

PRACTICE-BASED VALIDATION OF COMPETENCIES

A bilingual (English-French) online survey was used to obtain feedback on the proposed competencies from practicing optometrists across Canada. Survey invitations were sent to all registrants by provincial regulatory bodies. To maximize the number of responses, respondents were offered continuing education credits by their respective regulator (Quebec excluded) for completing the survey.

Demographic questions in the survey identified the primary province of practice and the nature, extent and currency of practice experience.

Survey completers were asked to rate their response to three questions about each competency:

- *In the context of providing safe, effective and ethical patient care in your optometric practice, how important is the performance of this [competency]?* (Rate on a scale of very important / important / somewhat important / not important (or not relevant in my practice)). We refer to this as the "importance rating".
- *How frequently do you personally perform this [competency]?* (Rate on a scale of very frequently / frequently / occasionally / rarely / never). We refer to this as the "frequency rating".
- *In your opinion should proficiency in this [competency] be an expectation of optometrists at the point of entry-to-practice?* (Rate on a scale of yes / no / not sure). We refer to this as the "ETP rating".

In addition to the rating questions, respondents were invited to suggest competencies that they considered to be realistic expectations of optometrists at entry-to-practice but were missing from the list.

OEBC sent a link to access the survey to the provincial optometry regulators who invited all their registrants to respond. The survey was open for four weeks in January 2015 and received 1,185 complete responses (representing 23% of O.D.s nationally). The sample size produced a margin of error for numerical conclusions drawn from the survey of better than +/- 3% at 95% confidence.

The number of responses by province is provided in Table 3.

Table 3: *Survey Responses by Province*

Province	Approximate O.D. population (2015)	Survey responses	% O.D.s responding
BC	680	167	25
AB	645	115	18
SK	156	55	35
MB	148	41	28
ON	1,939	508	26
QC	1,353	200	15
NB	118	52	44
NS	118	34	29
PE	20	8	40
NL	61	5	8
Canada	5,238	1,185	23

Importance and frequency response data for each competency were ranked as High, Medium or Low based upon the proportion of respondents who selected the two highest ratings ("very important" / "important"; "very frequent" / "frequent", respectively). The following ranking criteria were used:

- If more than two-thirds of the respondents selected one of the 2 highest ratings, then rank = High
- If between one-third and two-thirds of the respondents selected one of the 2 highest ratings, then rank = Medium
- If less than one-third of the respondents selected one of the 2 highest ratings, rank = Low

Response data for the question as to whether the competency should be an ETP expectation was ranked as High, Medium or Low based upon the proportion of respondents who selected "yes", after first eliminating "not sure" ratings. The following criteria were used:

- If more than two-thirds of the respondents selected "yes," then rank = High
- If between one-third and two-thirds of the respondents selected "yes," then rank = Medium
- If less than one-third of the respondents selected "yes," then rank = Low

An analysis of survey data was undertaken to determine whether there were significant geographical variations in the responses. Table 4 breaks down the survey participation geographically. Provincial ratings were grouped into five regions to address the issue of small provincial sample sizes. The regional grouping provides a more robust basis for conducting data analysis and facilitates the interpretation of analysis results.

Table 4: *Survey Responses by Region*

Province(s)	Region	Frequency	Percent
BC	British Columbia	167	14
AB, SK, MB	Prairie	211	18
ON	Ontario	508	43
QC	Quebec	200	17
NB, NS, PE, NL	Atlantic	99	8
	Canada	1,185	100

We conducted analysis of variance (ANOVA) tests between regions with respect to both the importance ratings and the frequency ratings within each of the nine practice areas. Overall, there was a high degree of consistency across the regions. The practice area with the largest variance was A9 (Practice Management), with 8% variability for both importance and frequency. The area with the smallest variance was A8 (Scholarship) with less than 1% variability for both importance and frequency.

We concluded was that since we draw only broad, qualitative conclusions from survey data (by ranking the level of support for each competency as High, Medium or Low in each rating category), there was no value to be gained by proceeding in our analysis on other than a Canada-wide basis.

In summary, for over 101 proposed competences included in the survey, the rankings were as follows:

- 95 competencies were ranked High for importance (94%)
- 92 competencies were ranked High as an ETP expectation (91%)
- 73 competencies were ranked High for *all* of importance, frequency and ETP expectation (72%)[iii]

Each competency statement that received a Medium or Low ranking for any one of importance, frequency or ETP expectation was discussed by the team with the objective of deciding whether it should be retained unchanged in the profile, retained in a modified form, or removed. On this basis, two competencies were eliminated:

Provide patient with information on relevant social support services.

Use community health care resources and delivery systems to improve care.

In addition, discussions resulted in several wording clarifications and refinements.

The open question that invited respondents to suggest additional ETP competencies drew 138 comments (representing 12% of respondents). Many comments referred to competencies that were already included in the profile, with respondents emphasizing their importance and sometimes mentioning that they had been insufficiently emphasized in their own education, while other comments referred to optometry education and regulation in general. All open responses were discussed thoroughly by the team, and several resulted in wording adjustments to competency statements. No competencies were added.

At the conclusion of the survey analysis and review, there were 99 competencies remaining in the profile. Of these, 94% had been ranked High for importance and 92% were High for ETP expectation (the remainder were ranked Medium). Together with the high degree of consistency in ratings received from across the country, this constitutes a very high degree of validation for the competencies relative to entry-level optometry practice.

DEVELOPMENT OF INDICATORS

The competency development team proceeded to analyze each of the 99 validated competencies to identify related behaviours that would be potentially observable within the constraints of the two assessment methodologies, MCQ and OSCE. This level of analysis resulted in some further minor adjustments to the competencies themselves: several were viewed as overlapping and were combined, others were re-worded and used as indicators.

The product at the completion of this phase of work was a validated national competency profile with a matrix of 92 competencies and over 300 related indicators. The profile was presented in a workshop in April 2015 to representatives of OEBC's 10 members, Canadian optometry schools, and the Canadian Association of Optometrists.

CONSTRUCTION OF THE EXAMINATION BLUEPRINT

Following approval of the competency profile by the Board of Directors of OEBC in May 2015, the blueprint team commenced its work.

Kane and colleagues[18] have provided an approach to determine the relative contributions of specific practice activities to patient care and outcomes. Their method combines frequency and importance ratings for competencies to obtain an overall index reflecting the contribution that each competency makes to ensuring safe and effective entry-level practice. This approach is commonly used to guide the development of examination blueprints from survey data, and was utilized in our work.

The results of an initial analysis of survey responses using Kane's methodology are reported in Table 5. The nine practice areas together reflect a total of 92 competencies, with the strongest being Assessment.

Blueprint team members reviewed the practice areas and their weightings, the competencies and the indicators, and established the feasibility of their representation in one or both of the assessment methodologies, MCQ and OSCE. Time and setting requirements were considered, with the objective of establishing a fair and defensible examination addressing the fundamental mandate of protecting the public. The team worked by consensus.

Table 6 represents the results of this analysis and the final weightings for the examinations across the 9 practice areas. The new examination is structured to include all practice areas together with 55 competencies and their corresponding performance indicators. Consistent with the initial survey results, A4 Assessment is a dominant focus in the examination.

Within the written examination, there are 62 cases, each with four multiple-choice questions, reflecting all 9 practice areas. Within the OSCE, there are 16 stations covering six practice areas (Collaborative Practice, Scholarship and Practice Management are not included).

The final blueprint for the written and practical examinations was published on the OEBC website in May 2016.

Table 5: *Kane's Weightings for Practice Areas Based on Survey Data*

Practice Area	Weighting	No. of Items
A4 Assessment	16.2	14
A2 Professionalism	16.2	13
A9 Practice management	16.0	16
A6 Patient management	11.5	11
A3 Patient centered care	9.9	9
A5 Diagnosis & planning	8.8	7
A8 Scholarship	8.7	9
A1 Communication	6.5	6
A7 Collaborative practice	6.4	7
Total	100.0	92

Table 6: *Final Weighting and Competency Elements for the Examination*

Practice Area	Number of Competencies	Weighting (%)
A4 Assessment	12	22.8
A6 Patient Management	10	17.7
A3 Patient Centered Care	8	14.6
A5 Diagnosis & Planning	7	13.8
A1 Communication	5	8.9
A2 Professionalism	4	8.0
A7 Collaborative Practice	4	6.1
A9 Practice Management	3	5.2
A8 Scholarship	2	2.9
Total	55	100.0

IMPLEMENTATION OF THE NEW EXAMINATION

Following the Board of Directors' approval of the blueprint in October 2015, OEBC began work to update the design and content of the examination. The examination continues to use written and performance-based formats and is offered in English and French.

The format of the written examination is unchanged; the content has been updated to align with the new blueprint. The format of the practical examination has changed from solely skills-based assessment to OSCE, which integrates clinical knowledge, optometric skills, professional judgement and communication; the content has been updated to align with the new blueprint.

Development of the OSCE format required establishing a case-writing team to develop examination content, and integrating OSCE case score-setting into the examination development process. In May 2016, OEBC announced the new ETP examination beginning in May 2017. ●

Acknowledgements

The authors wish to thank OEBC for its commitment to developing an updated national competency profile and examination blueprint for entry-to-practice optometry in Canada.

In keeping with OEBC's philosophy to involve practicing optometrists in the development of examination standards, the work of the following optometrists who served as members of the project teams is gratefully acknowledged.

J. Arnel, O.D.; J. Barbour O.D.; K. Hawkes, O.D.; C. Ho, O.D.; P. Hrynchak, O.D.; T. McNab, O.D.; L. Myshak, O.D.; P. Padfield, O.D.; G. Raby, O.D.; P. Rose O.D.

Finally the authors wish to thank the 1,185 optometrists from across Canada who took the time to respond thoughtfully to the competency validation survey and thereby ensured currency in the entry-to-practice requirements for the profession.

ENDNOTES

i Correspondence should be sent to Tami Hynes, tami.hynes@oebc.ca

ii An examination blueprint specifies the structure and content of an examination and relates the content to a foundational document such as a competency profile. The blueprint provides for a transparent examination process and allows for the examining entity to construct examination forms which, over time, are consistent in validity and reliability.

iii With respect to frequency, it should be noted that ratings of less than High are to be expected for many important competencies, for example: Provide first aid

REFERENCES

1. Government of Canada. *Agreement on Internal Trade, Labour Mobility Chapter*. 1994
2. Canadian Examiners in Optometry. *Competency-Based Performance Standards for the Canadian Assessment of Competency in Optometry*. 2005
3. Winslade T, Winslade N, Chou R, et al. *Canadian Journal of Optometry*. 2007; Vol 69, No 4: 145-149, No 5: 183-187
4. Canadian Examiners in Optometry. *National Competency Profile for Entry-Level Optometry*. May 2015. Retrieved May 26 2017 from http://www.oebc.ca/clientuploads/National%20Competency%20Profile/CEO-ECO%20National%20Competency%20Profile%20in%20Optometry_English.pdf
5. Canadian Examiners in Optometry. *OEBC Exam Blueprint - Written & OSCE*. May 2016. Retrieved May 26 2017 from http://www.oebc.ca/clientuploads/New%20Exam%202017/Blueprint%20Written%20+%20OSCE%20ENG%20(website).pdf
6. Kane MT. The Assessment of Professional Competence, Evaluation & The Health Professions. Sage Publications Inc. 1992; Vol 15, No 2: 163-182
7. Epstein RM, Hundert EM. Defining and Assessing Professional Competence. JAMA. 2002; 287: 226–235
8. Royal Society of Physicians and Surgeons of Canada. *CanMEDS: Better standards, better physicians, better care*. 2015; retrieved September 16 2016 from http://www.royalcollege.ca/rcsite/canmeds/canmeds-framework-e
9. McClelland D. Testing for competence rather than for intelligence. *American Psychologist*. 1973; 28: 1-14
10. United States Government Office of Personnel Management. Retrieved September 16 2016 from https://www.opm.gov/policy-data-oversight/assessment-and-selection/competencies/
11. Kaslow NJ, Bebeau MJ, Lichtenberg JW, et al. Guiding principles and recommendations for the assessment of competence. *Professional Psychology: Research and Practice*. 2007; Vol 38, No 5, 443
12. Frank JR, Snell L, Sherbino J, editors. *CanMEDS 2015 Physician Competency Framework*. 2015. Royal College of Physicians and Surgeons of Canada
13. Dreyfus HL, Dreyfus SE. *Mind over machine: The power of human intuition and expertise in the era of the computer*. 1986. New York: The Free Press
14. Benner P. *From novice to expert: Excellence and power in clinical nursing practice*. 1984; Menlo Park: Addison-Wesley
15. Carraccio CL, Benson BJ, Nixon LJ, et al. From the educational bench to the clinical bedside: translating the Dreyfus developmental model to the learning of clinical skills. *Acad Med*. 2008; Vol 83, No 8, 761-767
16. Faucher C. Development of professional expertise in optometry. *Optometry*. 2011; 82: 218-223
17. Austin Z, Gregory P, Young L. *Professional quality assurance and competency assessment – a scoping review*. 2016; College of Physiotherapists of Ontario
18. Kane MT, Kingsbury C, Colton D, Estes C. Combining Data on Criticality and Frequency in Developing Test Plans for Licensure and Certification Examinations. *Journal of Educational Measurement*. Vol. 26, No. 1 (Spring, 1989), 17-27

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The Future – Disruptive Optometry

Change is the only constant. How our profession embraces, and indeed leads, disruption will be the key to our collective successful future. The pace of disruption, both in our world and in our industry, is accelerating, forcing independent optometrists to examine their practices with a view to meeting changing patient needs and embracing technology, while also ensuring patient safety. This opportunity allows the profession of optometry to get ahead of the curve and lead change, rather than be a victim of it. The Canadian Association of Optometrists invited four leaders in the industry to provide their perspectives on disruptive optometry and how optometrists can be the disruptor, rather than the disrupted.

In recent years, there have been disruptions in several industries, including urban transportation (ride sharing), travel (vacation rentals) and financial services (online banking), that have enjoyed massive success. As a result, there are increasing numbers of entrepreneurs working tirelessly to create a technology and/or concept that will be the next big "game changer" in an established industry. These disrupters usually originate from outside the industry, and for good reason. Being an outsider gives them the objectivity of distance from the limitations of tradition, convention and occasionally legislation, along with the invaluable perspective of the un-biased consumer. These insights allow for disruptors to identify gaps within the conventional models of the industry where customers are not currently being serviced. The gaps become opportunities to solve problems for the consumer in a new and innovative way.

Optometry, like any other profession, has its gaps, where the consumer is not getting exactly what they want but rather is experiencing the status quo. In our view, we need to get ahead of disruptions by regularly 'disrupting' ourselves with a mindset of openness and continual self-reflection. The challenge is to ask the right questions, no matter how difficult they might be, because the questions you ask yourself will shape what your practice will become in the future.

At IRIS, we asked ourselves what our patients wanted that was missing in our model of eye care. The answer? An increasing demand for information, transparency, and a more personalized experience. Using this information as a foundation, we pushed ourselves to develop a strategy and tool, using tablet-based technology to enhance the eye exam and eyewear sales experience. The tool and the strategy both serve to differentiate our group in the market and close the gap with consumers.

After implementation of new tools and technology, it is especially important to measure their impact. In our case we use frequent observation, detailed analytic measurement of results, and patient feedback to guide us. The results that you measure can help you to ask more questions and make further improvements. This cycle of self-reflection and adjustment is critical to success and one that is consistently employed by disruptive entrepreneurs who change our world.

With this knowledge, I firmly believe that if we as individual practitioners, groups and a profession develop a habit of continuing to question our own conventions, we may just resist that next big disruption on the horizon.

Dr. Daryan Angle
Vice President Business Development, IRIS, The Visual Group

Why are online companies targeting eye care and the optical business? Why does independent optometry feel under attack from disruptive technology, online refraction, virtual online fitting or remote online diagnostics? The reality is that optometry is no more a target for disruption than the rest of the health care system, which has traditionally been slow to adapt to technology and change. The system's reaction to new technology has often been to dismiss it or seek legislative protection. Slow-moving industries or companies are the low-hanging fruit for technology disruptors. So how can optometry get ahead of disruptors, embrace technology and create sustainable growth in the future?

1. Disruptive technology is good – Many studies have shown that new technology forces businesses to innovate and differentiate. The first disruptors in an industry often have not thought of the long-term, legal or safety implications of their products or services. Disruptors in optometry have forced many offices

to think about how they create a patient experience, demonstrate quality, create an efficient eye exam process, and even what it means to be an eye care professional. The future of optometry should be focused on serving patients better, rather than on government protection from market disruption.

2. Embrace change – Regardless of how secure your business is, you can't prevent disruption. If your reaction to disruption is to create differentiated value with consumers and patients, you will always be able to compete with disruptors. Start by incorporating learning as part of your organizational culture and provide opportunities for your staff and associates to learn and grow. Create processes and a structure that encourage sharing and learning. Any office or organization can develop a learning or disruptive mindset, but it needs a champion. Change begins with fearless leaders demonstrating the rewards and value of change to office staff and patients.

3. Listen to your patients – Patient surveys and research consistently show a demonstrated preference for comprehensive eye care delivered by local optometrists. Some of the most disruptive technologies in eye care have focused on simplifying the eye care process. By making the eye care experience simple, comprehensive and personal, optometrists can effectively maintain their status as "the" primary eye care expert with patients, while opening up opportunities in other specialty areas.

An optometrist eye care expert using the latest technology represents the ultimate disruptor in eye care!

Grant Larsen
CEO Eye Recommend

Disruption is not a new word for any industry and companies that have been identified as disruptive are often rewarded for it. Amazon is an obvious example, but we have also seen this in our industry with Clearly and Warby Parker. Disruptors take a "tired" or "old-fashioned" industry and use technology and new delivery models to deliver products and services that align with current and future consumer expectations.

Technology itself can also be a significant disruptor. The best example of this is streaming technology. For example, Blockbuster Entertainment, an American-

References: 1. Xiidra® Product Monograph. Shire Pharma Canada ULC, Decemb 2017. **2.** Holland EJ, *et al*. Lifitegrast for the treatment of dry eye disease: results of a phase iii, randomized, double-masked, placebo-controlled trial (OPUS-3). *Ophthalmology* 2017;124:53–60. **3.** Tauber J, *et al*. Lifitegrast ophthalmic solutio 5.0% versus placebo for treatment of dry eye disease: results of the randomized phase III OPUS-2 study. *Ophthalmology* 2015;122:2423–2431.

Xiidra is the first and only molecule in its class.‡
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Study Design

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Demonstrated Statistically Significant Symptom Improvement

*** In 2 of 4 clinical trials, Xiidra improved eye dryness in 12, 6, and as early as 2 weeks[1]**

In OPUS-3 (Study 4; N = 711), a significant difference in mean change from baseline to Day 84 in EDS favouring Xiidra (–37.7) over vehicle (–30.5) was observed ($p = 0.0007$). Significant improvement in mean change from baseline of EDS was seen in the Xiidra group over vehicle for key secondary endpoints at Day 14 (–22.7 vs. –14.9, $p < 0.0001$) and Day 42 (–33.0 vs. –23.7, $p < 0.0001$).[1,2]

In OPUS-2 (Study 3; N = 718), a statistically significant difference in mean change from baseline to Day 84 in EDS (co-primary symptoms endpoint) favouring Xiidra (–35.30) over vehicle (–22.75) was observed ($p < 0.0001$). A post hoc analysis of mean change from baseline in EDS for secondary endpoints showed a treatment effect as early as Day 14 for Xiidra over vehicle (–19.7 vs. –13.1) and at Day 42 (–28.3 vs. –18.2).[1,3]

In OPUS-2, Xiidra treatment did not result in a statistically significant difference for the co-primary sign endpoint (ICSS).[1,3]

Over 2,400 patients with Dry Eye Disease took part in 5 different clinical trials with Xiidra[1,‡]

‡ Comparative clinical significance has not been established.

based provider of home movie and video game rentals, declined the opportunity to buy Netflix (reportedly for $60M) because corporate executives doubted the future of streaming video. We all know how that ended. In our industry, we have new telemedicine platforms, online refraction and dispensing, smartphone auto-refraction, kiosk medicine and home delivery eye care which, combined, could have an impact on the way we practice our profession.

In my opinion, one of the biggest disruptors will be the consolidation of independent clinics. The logic for consolidation requires understanding the motivation of those pursuing it. Consolidators possess the financial capacity and scalability to create brands that compete with independent doctors. They can build the technology to disrupt unlike anything available to an independent doctor. This is not a bad thing, but financially motivated consolidation has not been good for optometry in other markets, and it can happen remarkably fast.

What solutions can individual doctors offer to combat all of this potential disruption? We have all heard that the combination of a positive patient relationship and excellent customer service will ensure a thriving independent optometric practice. I agree that the power of the relationship we have with our patients is critical to a successful practice. I would caution however, that consumer expectations are changing. The traditional model of going for an eye exam and choosing glasses is not very convenient for the consumer. Practices that create a brand that means something to the consumer, offer innovative products, enable technology to improve and deliver a great experience will truly thrive and ultimately emerge as the long-term winners in our industry

Independent doctors will continue to be challenged in their practices, but they can choose to redefine the patient experience. Self-disruption using new technologies in refraction, binocular vision testing, and delegation of services provides opportunities for doctors to differentiate themselves and re-define the traditional experience. How we communicate has also changed, and it is incumbent on us to find a way to communicate with consumers in a manner and with a frequency that is meaningful to them. For example, Beacon technology (targeted marketing using geolocation) represents a brand-new frontier in the retail space and an intriguing way of enabling communication with patients in the mobile environment. We have all seen the future and it IS mobile!

We owe it to ourselves to invest in disruption, rather than become victims of it. We need to think differently and reflect on how we are perceived by the patient. Optometric leaders need to find ways to embrace, support and where possible, provide technological innovation not only to compete with today's disruption, but also the inevitable and ongoing change of tomorrow. Disruption in our industry is real and tangible, and doctors should approach it as both an opportunity and threat, and should act quickly to incorporate or mitigate disruption in their own practices.

Dr. Alan Ulsifer
Chair & CEO, FYI Doctors

We are living in a fast-paced technological world that is challenging all industries, including optometry. Disruptors confront optometrists daily and will continue to do so. There's a revolution happening outside the exam room. Now, more than ever, the patient is driving change. The use of tablets, computers, smartphones, and ubiquitous net access to information has led patients to adopt new ways of communicating and shopping. Patient choice is evolving and clinics need to adapt accordingly to stay relevant and attractive to their existing and potential patient base.

EMBRACE CHANGE WITH THE RIGHT PRACTICE MANAGEMENT SOFTWARE

The ability of a clinic and its staff to adapt to change is positively correlated to a practice's success. Practices that favor the status quo will one day be outmatched by counterparts that choose to adjust to the changing optometric landscape.

Technology has revolutionized the way consumers engage with products, services and health professionals. A platform like Twitter has even changed how some heads of state communicate! For the optometric industry, today's empowered patient expects optometrists to understand their needs, their history and their communication preferences. And since patients are now doing practically everything using their smartphones, there is a growing likelihood that, unless your services are realigned to reflect this new reality, some patients will decide to switch optometrists to find the convenience they expect.

The key is to have a product management software (PMS) that drives evolution in your clinic. Your PMS needs to have the ability to make and track communication within the patient file by email or text message to maximize engagement. Because your PMS is the central repository of all your patients' information, it is crucial that all contact with your patient reside in their file, which should be easily accessible to their care team.

Big data helps to improve patient care. Data is knowledge and knowledge is power. The right PMS will allow you to track your own key performance indicators (KPIs) to identify trends and opportunities for improvement within your practice. Another indispensable tool is the ability to easily issue a patient experience survey that allows you to assess your patients' satisfaction over time. In this way, clinic data analysis becomes a comprehensive examination of the health of your practice. You don't know what you'll find until you have the right tools and expertise to look!

Practice management systems such as Optosys (OSI's proprietary software) incorporate some specific technologies that align with the new optometric landscape, including:

- Online appointment booking module: Not all patients have time during your business hours to phone in, wait on hold, and negotiate with a live person to book an exam at your convenience. Patients want the flexibility to book appointments online, chose the optometrist they wish to see and select the time slots that work best for them. With 24/7 access to scheduling, exam booking becomes easier and more attractive for many patients browsing online or working shifts who you otherwise would struggle to reach.

- Automated Recalling: What once took up an enormous amount of staff time, with varying degrees of success, can now be fully automated by the Optosys communication module. By connecting with their platform of choice (text or email), Optosys will inform your patients that it's time to book an eye exam or remind them that their exam is coming up, thus minimizing "lates" and "no shows".

- Direct-to-Lab eOrders: To improve staff efficiency, electronic lab orders can be sent directly from the patient file to the lab. This reduces transcription errors that can negatively impact delivery times and a patient's level of satisfaction with your services.

- eCommerce functionalities: An eBoutique can be created to display inventory online. We know that today's consumers want to view things online before going to a store. This module allows you to tap into that consumer demographic and reach new consumers who would not otherwise visit your practice.

OPTIMISM FOR THE FUTURE

For years, you have been urged to have the latest and most advanced equipment in your pre-test and exam room. Optometrists now have the opportunity to do the same for all aspects of their clinic's operations. Independent practices can remain highly competitive for years to come if they embrace all technologies that can help them improve patient care and clinic performance.

Patrice Lacoste
CEO, Optometric Services Inc. (OSI)

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CANADIAN ASSOCIATION OF OPTOMETRISTS
ASSOCIATION CANADIENNE DES OPTOMÉTRISTES

L'avenir – L'optométrie perturbatrice

Le changement est la seule constante. La façon dont notre profession embrasse les perturbations sera la clé de notre avenir collectif. Le rythme des perturbations, tant dans notre monde que dans notre industrie, s'accélère, forçant les optométristes indépendants à examiner leurs pratiques en vue de répondre aux besoins changeants des clients et d'adopter la technologie, tout en assurant la sécurité des patients. Cette possibilité permet à la profession de l'optométrie de prendre les devants et de diriger le changement, plutôt que d'en être victime. L'Association canadienne des optométristes a invité quatre chefs de file de l'industrie à donner leur point de vue sur l'optométrie perturbatrice et sur la façon dont les optométristes peuvent être l'auteur des perturbations plutôt que leur victime.

Au cours des dernières années, il y a eu des perturbations dans plusieurs secteurs, notamment le transport urbain (covoiturage), les voyages (locations de vacances) et les services financiers (services bancaires en ligne), lesquelles ont connu un succès retentissant. Par conséquent, il y a de plus en plus d'entrepreneurs qui travaillent sans relâche à créer une technologie ou un concept qui sera le prochain grand « changement » dans une industrie établie. Ces perturbateurs proviennent habituellement de l'extérieur de l'industrie, et pour une bonne raison. Le fait d'être un étranger leur donne l'objectivité que confère l'éloignement des limites de la tradition, des conventions et, à l'occasion, de la législation, ainsi que la perspective inestimable du consommateur sans parti pris. Ces renseignements permettent aux perturbateurs de cerner les lacunes dans les modèles traditionnels de l'industrie où la clientèle n'est pas servie pour l'instant. Les lacunes deviennent l'occasion de résoudre les problèmes du consommateur d'une façon nouvelle et novatrice.

Comme toute autre profession, l'optométrie a ses failles où le consommateur n'obtient pas exactement ce qu'il veut, mais vit plutôt le statu quo. À notre avis, nous devons anticiper sur les perturbations en nous « perturbant » régulièrement nous-mêmes dans un esprit d'ouverture et de constante réflexion sur soi. Le défi consiste à poser les bonnes questions, si difficiles soient-elles, parce que les questions que vous vous poserez vous-même façonneront ce que deviendra votre pratique à l'avenir.

Chez IRIS, nous nous sommes demandé ce que nos patients voulaient et qui manquait dans notre modèle de soins oculovisuels. La réponse? Une demande croissante d'information, de la transparence et une expérience plus personnalisée. En nous appuyant sur cette information, nous nous sommes efforcés d'élaborer une stratégie et un outil à l'aide de la technologie des tablettes, le but étant d'améliorer l'examen de la vue et la vente d'articles de lunetterie. L'outil et la stratégie servent à différencier notre groupe sur le marché et à combler l'écart avec les consommateurs.

Après la mise en œuvre de nouveaux outils et de nouvelles technologies, il est particulièrement important de mesurer leur impact. Dans notre cas, nous utilisons l'observation fréquente, la mesure analytique détaillée des résultats et la rétroaction des patients pour nous guider. Les résultats que vous mesurez peuvent vous aider à poser plus de questions et à apporter d'autres améliorations. Ce cycle d'autoréflexion et d'adaptation est essentiel à la réussite et il est constamment adopté par des entrepreneurs perturbateurs qui changent notre monde.

Avec ces connaissances, je crois fermement que si nous, les praticiens, les groupes et la profession, avons l'habitude de continuer à remettre en question nos propres conventions, nous pourrons résister à la prochaine grande perturbation qui se profile à l'horizon.

Dr Daryan Angle
Vice-président au développement des affaires, IRIS, Le Groupe Visuel

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Pourquoi des entreprises en ligne ciblent-elles les soins oculovisuels et l'optique? Pourquoi l'optométrie indépendante se sent-elle attaquée par la technologie perturbatrice, la réfraction en ligne, l'ajustement virtuel en ligne ou les diagnostics en ligne à distance? En réalité, l'optométrie n'est pas plus une cible de perturbation que le reste du système de santé, qui a toujours été lent à s'adapter à la technologie et au changement. La réaction du système à la nouvelle technologie a souvent été de la rejeter ou de demander une protection au législateur. Les industries ou les entreprises qui évoluent lentement sont la proie la plus facile pour les perturbateurs technologiques.

Alors, comment l'optométrie peut-elle devancer les perturbateurs, adopter la technologie et créer une croissance durable pour l'avenir?

1. La technologie perturbatrice est une bonne chose – De nombreuses études ont démontré que les nouvelles technologies obligent les entreprises à innover et à se distinguer. Les premiers perturbateurs d'une industrie n'ont souvent pas pensé aux répercussions à long terme, juridiques ou sécuritaires de leurs produits et services. Les perturbateurs en optométrie ont forcé de nombreux cabinets à réfléchir à la façon dont ils créent une expérience pour les patients, démontrent la qualité, instaurent un processus efficace d'examen de la vue, et même à ce que signifie être un professionnel des soins oculovisuels. L'avenir de l'optométrie devrait être axé sur un meilleur service aux patients plutôt que sur une protection du gouvernement contre la perturbation du marché.

2. Acceptez le changement – Peu importe le degré de sécurité de votre entreprise, vous ne pouvez pas empêcher les perturbations. Si votre réaction à la perturbation consiste à créer une valeur différenciée avec les consommateurs et les patients, vous serez toujours en mesure de concurrencer les perturbateurs. Commencez par intégrer l'apprentissage dans votre culture organisationnelle et offrez à votre personnel et à vos associés des occasions de formation et de croissance. Créez des processus et une structure qui encouragent le partage et l'apprentissage. N'importe quel bureau ou organisme peut se donner une mentalité d'apprentissage ou de perturbation, mais il aura besoin d'un champion. Le changement commence par des leaders intrépides qui démontrent les avantages et la valeur du changement pour le personnel des cabinets et les patients.

3. Écoutez vos patients – Les sondages et les recherches auprès des patients font invariablement voir une préférence pour des soins oculovisuels complets fournis par des optométristes locaux. Certaines des technologies les plus perturbatrices de ces soins ont mis l'accent sur la simplification du processus d'intervention dans ce domaine. En rendant l'expérience des soins oculovisuels simple, complète et personnelle, les optométristes peuvent maintenir efficacement leur état d'expert en soins oculovisuels primaires auprès des patients, tout en suscitant des possibilités dans d'autres domaines spécialisés.

Un optométriste spécialiste des soins oculovisuels qui utilise la plus récente technologie représente l'ultime perturbateur des soins oculovisuels!

Grant Larsen
Chef de la direction, Eye Recommend

La perturbation n'est pas un mot nouveau pour une industrie et les entreprises qui ont été reconnues comme perturbatrices en ont souvent été récompensées. Amazon est un exemple évident, mais nous l'avons aussi vu dans notre industrie avec Clearly et Warby Parker. Les perturbateurs prennent une industrie « fatiguée » ou « désuète » et utilisent la technologie et les nouveaux modèles de prestation pour offrir des produits et des services qui répondent aux attentes actuelles et futures des consommateurs.

La technologie peut être en soi un important perturbateur. Le meilleur exemple en est la technologie de la diffusion en continu. Ainsi, Blockbuster Entertainment, fournisseur américain en location de films et de jeux vidéo à domicile, a refusé d'acheter Netflix (apparemment pour 60 M$) parce que ses dirigeants doutaient de l'avenir de la vidéodiffusion. Nous savons tous comment cela s'est terminé. Dans notre industrie, nous avons de nouvelles plates-formes de télémédecine, la réfraction et l'ordonnance en ligne, l'autodiagnostic de réfraction par téléphone intelligent, la médecine en borne interaction et les soins oculovisuels à domicile, qui pourraient collectivement avoir une incidence sur la façon dont nous exerçons notre profession.

À mon avis, l'un des plus gros perturbateurs sera le regroupement des cliniques indépendantes. La logique sous-jacente exige de comprendre la motivation de ceux qui la poursuivent. Ils possèdent la capacité financière et l'extensibilité nécessaires pour créer des marques qui font concurrence aux praticiens indépendants. Ils peuvent mettre au point la technologie nécessaire pour perturber les activités, ce qui n'est pas le cas pour un praticien indépendant. Ce n'est pas une mauvaise chose, mais les regroupements par motivation financière ont desservi l'optométrie sur d'autres marchés, et tout peut survenir si vite.

Quelles solutions les praticiens peuvent-ils proposer pour lutter contre toutes ces perturbations éventuelles? Nous avons tous entendu que la combinaison d'une relation positive avec le patient et d'un excellent service à la clientèle assurera la prospérité de la pratique optométrique indépendante. Je conviens que le pouvoir de la relation que nous entretenons avec nos patients est essentiel à notre réussite. Je tiens cependant à souligner que les attentes des consommateurs évoluent. Le modèle traditionnel d'examen de la vue et de choix de lunettes n'est pas très commode pour le consommateur. Les pratiques qui créent une marque signifiant quelque chose pour le consommateur, qui offrent des produits novateurs, qui permettent à la technologie d'améliorer les choses et d'offrir une belle expérience seront vraiment florissantes et finiront par devenir les gagnants à long terme dans notre industrie.

Les optométristes indépendants continueront d'être mis au défi dans leur pratique, mais ils peuvent choisir de redéfinir l'expérience du patient. L'utilisation de nouvelles technologies en réfraction, les tests de vision binoculaire et la délégation de services permettent aux optométristes comme perturbateurs volontaires de se différencier et de redéfinir l'expérience traditionnelle. Notre façon de communiquer a également changé, et il nous incombe de trouver une façon de communiquer avec les consommateurs d'une manière et avec une fréquence qui leur soient significatives. Ainsi, la technologie « Beacon » (marketing ciblé utilisant la géolocalisation) représente une toute nouvelle frontière dans l'espace de vente au détail et une façon intrigante de faciliter la communication avec les patients dans l'environnement mobile. Nous avons tous entrevu l'avenir et il est mobile!

Nous nous devons d'investir dans les perturbations plutôt que d'en être victimes. Nous devons penser différemment et réfléchir à la façon dont nous sommes perçus par le patient. Les dirigeants de l'optométrie doivent trouver des façons d'accepter, de soutenir et, dans la mesure du possible, d'offrir l'innovation technologique non seulement pour concurrencer les perturbations d'aujourd'hui, mais aussi le changement inévitable et incessant de demain. Les perturbations dans notre industrie sont réelles et palpables, et les optométristes devraient les considérer comme une occasion et une menace, et agir rapidement pour intégrer ou atténuer les perturbations dans leur propre pratique.

Dr Alan Ulsifer
Président et chef de la direction, FYidoctors

Nous vivons dans un monde technologique qui évolue rapidement et qui représente un défi pour toutes les industries, y compris l'optométrie. Les perturbateurs confrontent les optométristes quotidiennement et continueront de le faire. Il y a une révolution à l'extérieur de la salle d'examen. Plus que jamais, le patient est le moteur du changement. L'utilisation de tablettes, d'ordinateurs et de téléphones intelligents et un accès Internet omniprésent à l'information ont amené les patients à adopter de nouvelles façons de communiquer et d'acheter. Le choix des patients évolue et les cliniques doivent s'y adapter si elles entendent demeurer utiles et attrayantes pour leur clientèle actuelle et future.

ADOPTER LE CHANGEMENT AVEC LE BON LOGICIEL DE GESTION DE PRATIQUE

La capacité d'une clinique et de son personnel à s'adapter au changement est liée positivement au succès de la pratique. Les cabinets qui favorisent le statu quo seront un jour surpassés par les cabinets qui choisissent de s'adapter à la transformation du paysage optométrique.

La technologie a révolutionné la façon dont les consommateurs interagissent avec les produits, les services et les professionnels de la santé. Une plateforme comme Twitter a même changé la façon dont certains chefs d'État communiquent! Pour l'industrie optométrique, les patients d'aujourd'hui qui ont les moyens de se prendre en main s'attendent à ce que les optométristes comprennent leurs besoins, leurs antécédents et leurs préférences en matière de communication. Et comme les patients font maintenant pratiquement tout en utilisant leur téléphone intelligent, il est de plus en plus probable que, à moins que vos services ne se réalignent sur cette nouvelle réalité, certains patients décideront de changer d'optométriste pour trouver la commodité à laquelle ils s'attendent.

La clé est d'avoir un logiciel de gestion de produits (du type PMS) qui oriente l'évolution dans votre clinique. Votre PMS doit pouvoir établir et suivre la communication dans le dossier du patient par courriel ou message texte pour optimiser l'engagement. Comme votre logiciel est le dépôt central de tous les renseignements sur vos patients, il est essentiel que tous les contacts avec un patient figurent dans son dossier et que celuici soit facilement accessible à son équipe de soins.

Les mégadonnées aident à améliorer les soins aux patients. Les données, c'est le savoir, et savoir, c'est pouvoir. Le bon PMS vous permettra de suivre vos propres indicateurs de rendement clés (IRC) pour cerner les tendances et les perspectives d'amélioration dans votre pratique. Un autre outil indispensable est la capacité de lancer facilement un sondage sur l'expérience des patients par lequel évaluer leur satisfaction au fil du temps. Ainsi, l'analyse des données cliniques devient un examen exhaustif de la santé de votre cabinet. Vous ne savez pas ce que vous trouverez tant que vous n'aurez pas les bons outils et les bonnes compétences pour ce faire!

Des systèmes de gestion de pratique comme Optosys (logiciel exclusif de l'OSI) adoptent certaines technologies qui s'harmonisent avec le nouveau paysage optométrique comme les suivante :

- Module de réservation de consultation en ligne : Les patients n'ont pas tous le temps, pendant vos heures d'ouverture, de téléphoner, de se mettre en attente et de négocier directement pour réserver un examen à leur convenance. Les patients veulent la possibilité de prendre des rendez-vous en ligne, de choisir l'optométriste qu'ils désirent et de retenir le créneau horaire qui leur convient le mieux. Grâce à un accès 24 heures sur 24, 7 jours sur 7, la réservation d'examens devient plus facile et plus attrayante pour de nombreux patients qui naviguent en ligne ou qui travaillent par quarts et que vous auriez normalement de la difficulté à joindre.

- Rappel automatisé : Le module de communication Optosys permet maintenant d'automatiser entièrement ce qui a déjà énormément accaparé le temps du personnel avec plus ou moins de succès. En se connectant par Optosys à la plateforme de leur choix (texte ou courriel), les optométristes informeront leurs patients qu'il est temps de réserver un examen de la vue ou leur rappelleront que leur examen s'en vient, ce qui réduira au minimum les « retards » et les « absences ».

- Commandes électroniques directes au laboratoire : Pour une plus grande efficacité du personnel, les commandes de laboratoire électroniques peuvent être envoyées directement du dossier du patient au laboratoire. Cela réduit les erreurs de transcription qui peuvent avoir une incidence négative sur les délais d'exécution et le degré de satisfaction du patient à l'égard de vos services.

- Fonctions du commerce électronique : Une boutique électronique peut être créée en vue d'afficher la marchandise en ligne. Nous savons que les consommateurs d'aujourd'hui veulent voir les choses en ligne avant d'aller dans un magasin. Ce module vous permet de tirer parti de la démographie du bassin des consommateurs et de rejoindre de nouveaux clients qui autrement n'iraient pas à votre cabinet.

OPTIMISME POUR L'AVENIR

Depuis des années, on vous demande instamment d'avoir l'équipement le plus récent et le plus perfectionné dans vos salles de préexamen et d'examen. Les optométristes ont maintenant l'occasion de faire de même pour tous les aspects des activités de leur clinique. Les cabinets indépendants pourront demeurer très concurrentiels des années durant s'ils adoptent toutes les technologies susceptibles de les aider à améliorer les soins aux patients et le rendement de la clinique.

Patrice Lacoste
Chef de la direction, Services optométriques Inc. (SOI)

BEPREVE™

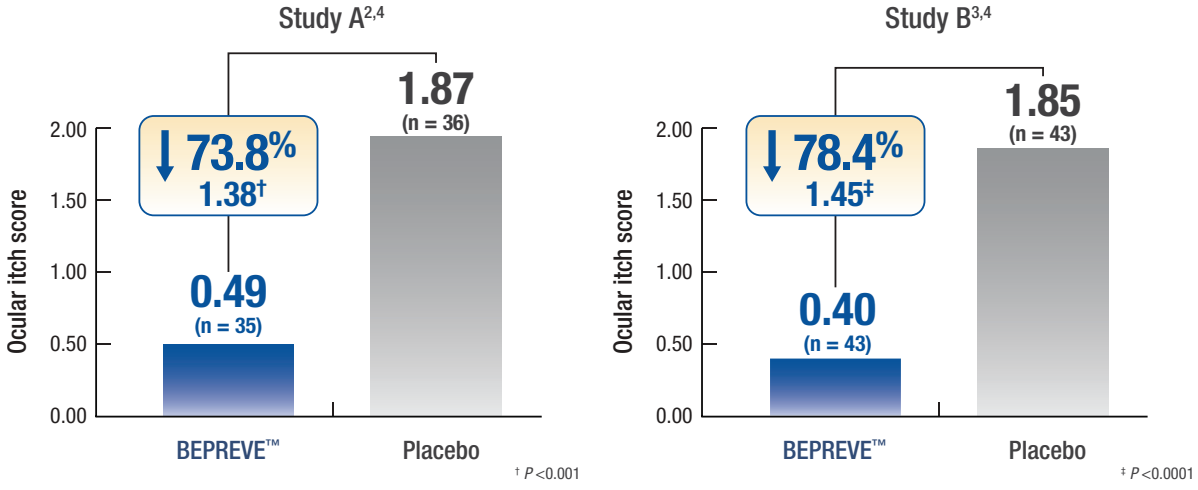
(bepotastine besilate ophthalmic solution) 1.5% w/v

HELP TREAT THE ITCH

ASSOCIATED WITH ALLERGIC CONJUNCTIVITIS[1]

BEPREVE™ demonstrated significant reduction in ocular itching at 3 minutes post CAC[1–4,*]

Ocular itch scores at 3 minutes post CAC (both eyes averaged)



- At Visit 5 (15 minutes after instillation of BEPREVE™ 1.5% w/v), the mean difference in ocular itch score 3 minutes post CAC, compared to placebo, was 1.4 and 1.5 in Study A[2,4,§] and Study B[3,4,§], respectively

Indication and clinical use:

BEPREVE™ (bepotastine besilate ophthalmic solution) 1.5% w/v is indicated for the treatment of itching associated with allergic conjunctivitis.

- The safety and efficacy of BEPREVE™ has not been established in pediatric patients under 3 years of age and should not be used in this population
- Efficacy of BEPREVE™ in pediatric patients with age <10 was extrapolated from clinical trials conducted in pediatric patients with age >10 and in adults

Relevant warnings and precautions:

- BEPREVE™ is for topical ophthalmic use only
- Do not touch the eyelids or surrounding areas with the dropper tip of bottle and keep bottle tightly closed when not in use
- BEPREVE™ should not be used to treat contact lens–related irritation
- BEPREVE™ should not be instilled while wearing contact lenses. BEPREVE™ contains benzalkonium chloride as a preservative, which may be absorbed by soft contact lenses. Remove contact lenses prior to instillation; lenses may be reinserte 10 minutes after the administration of BEPREVE™
- BEPREVE™ should not be used in pregnant women unless the benefit to the moth clearly outweighs the risk to the fetus
- Caution should be exercised when BEPREVE™ is administered to lactating women

For more information:

Please consult the Product Monograph at **http://www.bausch.ca/Portals/59/Files/Monograph/Pharma/bepreve-pm-en.pdf** for important information relating to advers reactions, drug interactions, and dosing information that has not been discussed in this piece. The Product Monograph is also available by calling 1-888-459-5000.

* CAC = conjunctival allergen challenge

§ Both Studies A and B were phase III, double-masked, randomized, placebo-controlled CAC clinical trials in which patients were assigned to BEPREVE™ or placebo. Analysis used CAC model of allergic conjunctivitis (i.e., using multiple allergens, both seasonal and perennial). Ocular itching was graded by subjects using a 9-point scale (0–4 U, half units allowed). Primary endpoints included ocular itching with dose applied bilaterally 15 minutes, 8 hours, and 16 hours prior to challenge (measured 3, 5, and 7 minutes post CAC).[1–4]

References: 1. BEPREVE™ (bepotastine besilate ophthalmic solution 1.5%) Product Monograph. Bausch & Lomb Canada Inc.; July 22, 2016. **2.** Abelson MB, Torkildsen GL, Williams JI, et al. Time to onset and duration of action of the antihistamine bepotastine besilate ophthalmic solutions 1.0% and 1.5% in allergic conjunctivitis: A phase III, single-center, prospective, randomized, double-masked, placebo-controlled, conjunctival allergen challenge assessment in adults and children. *Clin Ther* 2009;31:1908–21. **3.** Macejko TT, Bergmann MT, Williams JI, et al. Multicenter clinical evaluation of bepotastine besilate ophthalmic solutions 1.0% and 1.5% to treat allergic conjunctivitis. *Am J Ophthalmol* 2010;15:122–7. **4.** Data on file, Bausch & Lomb Incorporated, 2008.

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Innovations and Emerging Therapies in Glaucoma

Chris Wroten, O.D., Dipl. ABO, *is a graduate of Southern College of Optometry (SCO) and a partner and Chief Operating Officer for the Bond-Wroten Eye Clinics. Dr. Wroten has participated in clinical research, authored clinical case reports and eyecare articles, lectured as a continuing education speaker, and presented educational posters and workshops at regional and national optometric conferences. In addition to primary eye care, his special areas of interest lie in the treatment and management of ocular disease and contact lenses.*

It's unclear when the progressive optic neuropathy that is glaucoma was first discovered, but it has been described in medical writings since ancient times. Hippocrates wrote of a blindness in the elderly that he called "glaykoseis." Much later, the English ophthalmologist Richard Banister first discovered a correlation with high intraocular pressure (IOP). The invention of the ophthalmoscope by Hermann von Helmholtz in the mid-1800's allowed the in vivo visualization of glaucomatous changes to the optic nerve for the first time, and in 1862 Franciscus Donders coined the term "Glaukoma simplex" to describe blindness resulting from elevated IOP. Shortly thereafter, the invention of the tonometer, the development of perimetry, and the use of cocaine as an anesthetic all further advanced the diagnosis of glaucoma.[1]

The first therapies for glaucoma were actually surgical procedures; Friedrich von Graefe performed the first iridectomy in 1856. Since then, trabeculectomy, trabeculoplasty, and drainage tube implants, among other procedures, as well as micro-invasive glaucoma surgeries (MIGS) most recently, have also been developed as effective treatment options. Perhaps somewhat surprisingly, pharmaceutical treatment of glaucoma did not begin until 1875 with the discovery of pilocarpine, and then advanced rather slowly over the next 120 years with the development of topical beta blockers, alpha agonists, and carbonic anhydrase inhibitors. The launch of topical prostaglandin analogs around the turn of the 21st century marked another milestone in glaucoma treatment by simultaneously reducing the dosage frequency and improving the ocular hypotensive effect.[1]

Yet the prevalence of glaucoma, which is often described as "the sneak thief of sight," continues to increase. In fact, by the year 2020, the worldwide prevalence of glaucoma in people 40-80 years of age is projected to be 76 million, with a further increase to 112 million by 2040, and this will disproportionately impact populations in Africa and Asia (Fig. 1).[2]

Globally, it is estimated that 4.5 million patients are blind due to glaucoma,[2] making it the second-leading cause of blindness worldwide according to the World Health Organization. Despite expanded patient education, new diagnostic technologies, improved understanding of its pathophysiology, greater choices in pharmaceutical therapies, and improvements in surgical options and outcomes, the number of cases of blindness from glaucoma is expected to increase to 11.2 million by 2020.[3] Furthermore, even in developed countries, it's estimated that up to 50% of affected patients are not even aware they have glaucoma due to its insidious nature, and this percentage is as high as 90% in underdeveloped countries.[4] Given these staggering numbers, research continues in the hope of one day discovering a cure for this disease, while pharmaceutical and therapeutic options continue to evolve and improve. As doctors of optometry, we have played a crucial role in saving the sight of countless patients with glaucoma in recent decades. Let's take a brief look at some emerging treatments for glaucoma that may further enhance quality of life and reduce morbidity for our patients with this disease.

PHARMACEUTICAL AGENTS

While it had previously been over two decades since the introduction of a truly novel class of glaucoma medication, in December 2017, two new glaucoma agents with unique mechanisms of action were approved for use by the United States Food and Drug Administration. The first was latanoprostene bunod (Vyzulta™, Bausch + Lomb, Rochester, NY), a once-daily topical medication that breaks down into latanoprost acid, a well-established prostaglandin analog that remodels the ciliary muscle's extracellular matrix to enhance uveoscleral outflow of aqueous, and also a novel donor of nitric oxide, which further acts directly on the trabecular meshwork to relax smooth muscle and further enhance aqueous outflow (Fig. 2).[5,6]

Figure 1: *The worldwide prevalence of glaucoma among people aged 40-80 years is projected to reach 112 million by 2040.2*

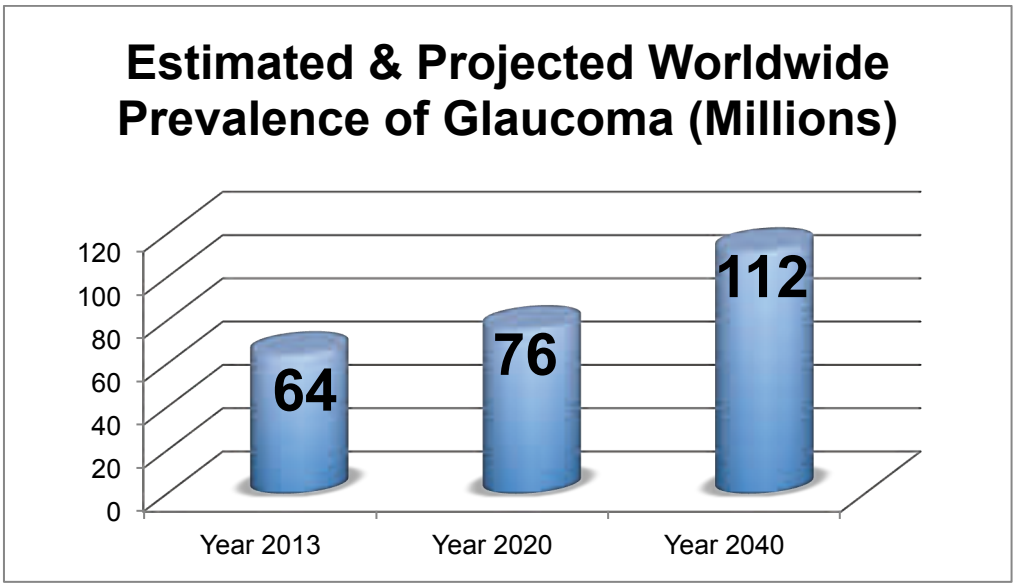
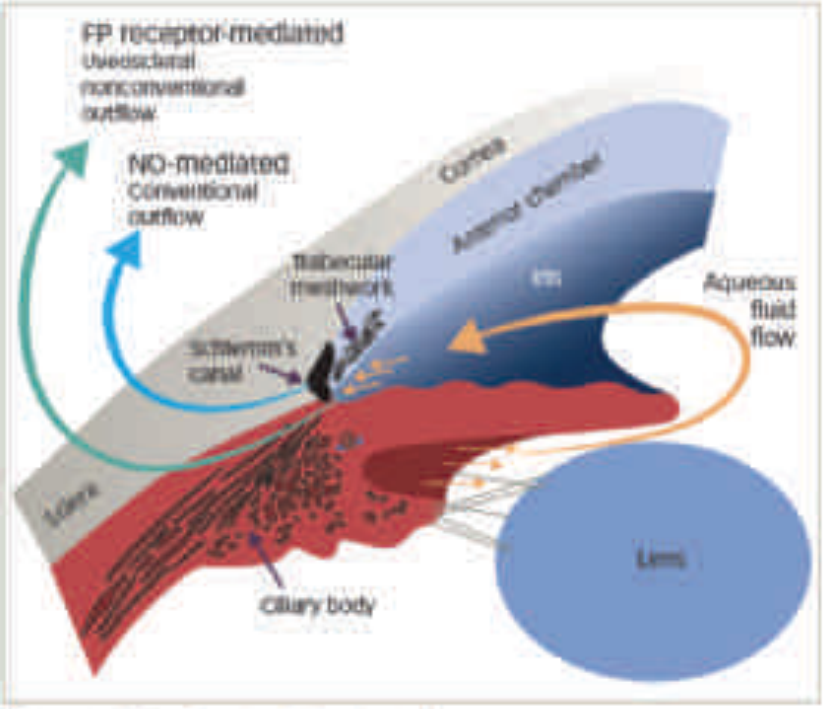
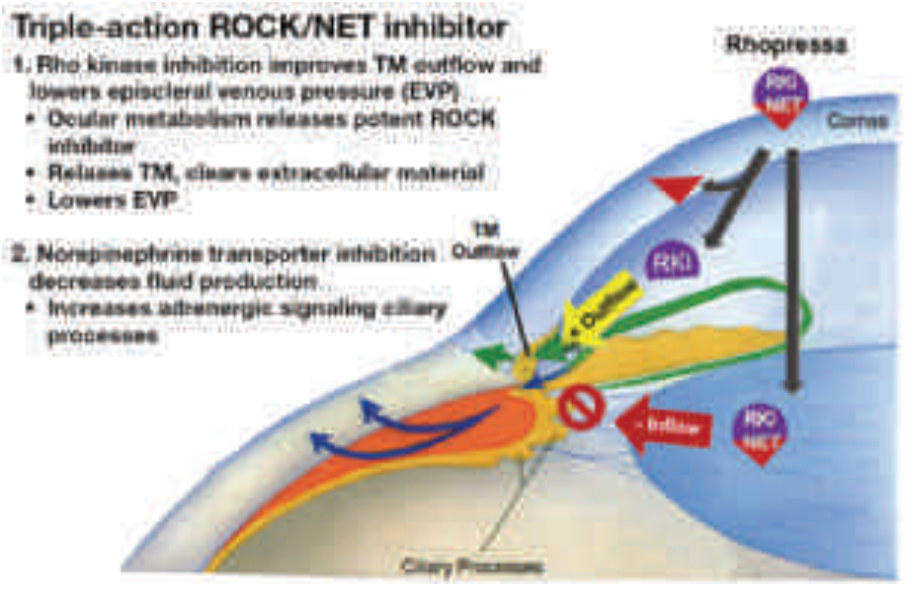


Figure 2: *The dual mechanism of action of latanoprostene bunod (Vyzulta™) includes the traditional prostaglandin analog effect of enhanced uveoscleral outflow via latanoprost acid, as well as its effect as a donor of nitric oxide acting directly on the trabecular meshwork and Schlemm's canal to further facilitate aqueous outflow. (See Ref. 6)*



The second newly approved pharmaceutical for glaucoma, netarsudil (Rhopressa™, Aerie Pharmaceuticals, Durham, NC), represents an entirely new class of medications called Rho-kinase (ROCK) inhibitors. ROCK inhibitors relax smooth muscle in the trabecular meshwork to increase aqueous outflow, while also lowering episcleral venous pressure and further facilitating outflow, both of which are unique mechanisms of action that are not shared with any other currently available glaucoma medications. Netarsudil also includes a Nor-epinephrine Transport (NET) inhibitor that suppresses aqueous production, to give a triple mechanism of action (Fig. 3).[7]

Figure 3: *The triple mechanism of action of netarsudil (Rhopressa™) includes relaxation of the trabecular meshwork (TM) tissue, inhibition of aqueous production, and lowering of the episcleral venous pressure (EVP). (Source: Aerie Pharmaceuticals)*



Combined formulations of ROCK- and NET-inhibitors, paired with a prostaglandin analog to also enhance uveoscleral outflow, thus offering a quadruple mechanism of action, are in development and may be commercially available within the next year.

Research aimed at improving the delivery of existing ocular hypotensive pharmaceutical agents continues, and various companies have reported early success in trials for glaucoma drug-eluting contact lenses, conjunctival fornix-based inserts, punctal plugs, and intracanalicular inserts.[8-10] Formulations of currently available pharmaceutical agents for glaucoma in injectable form for use in and around the eye are also being investigated, as well as the 3-D printing of existing pharmaceuticals and their nano-sized counterparts to exponentially enhance efficacy and reduce dosage frequency while simultaneously reducing drug concentrations.

Another completely novel molecule that shows potential for use in glaucoma is aminoguanidine, which was originally developed for treating diabetic nephropathy. It is an inhibitor of nitric oxide synthase, an enzyme present in elevated levels in the optic nerves of patients with glaucoma. In an early study on lab rats with chronic, moderately elevated IOP, whose drinking water was laced with this medication, animals treated with aminoguanidine lost 10% of their retinal ganglion cells, while an untreated group lost 36% of their retinal ganglion cells.[11] The key takeaway here was that aminoguanidine had no effect on IOP whatsoever, yet still seemed to offer some form of neuroprotection. To date, there have been no human clinical trials, and there is some debate within the research community regarding the role that nitric oxide synthase may or may not play in glaucoma.

These compounds represent just a small sampling of what's in the research and development pipeline, as we continue to hold out hope for more affordable and more effective glaucoma medications.

THERAPEUTIC PROCEDURES

Therapeutic procedures for glaucoma also continue to be investigated, including an intraocular lens implant that could continuously monitor a "pseudo"-intraocular pressure, similar to the Triggerfish™ Contact Lens. Additionally, a low-power, low-frequency, ultrasound device to treat glaucoma is being developed by two different companies. One of these devices, the Therapeutic Ultrasound for Glaucoma (TUG™ by Eye Sonix, Long Beach, CA, Fig. 4), is designed to trigger an inflammatory reaction in the anterior chamber and trabecular meshwork to enhance aqueous outflow, and an early trial reported a 20% reduction in IOP lasting for at least one year in 74% of patients with an elevated pre-treatment IOP.[12]

Figure 4: *The Therapeutic Ultrasound for Glaucoma (TUG™ by Eye Sonix) is one of at least two ultrasound technologies being developed for glaucoma that are non-incisional procedures to enhance aqueous outflow. (Source: Eye Sonix)*

Figure 5: *The Balance Goggles™ being developed by Berdahl would apply a small vacuum over the eyes of patients with glaucoma to normalize their IOP-ICP pressure differential. (Source: Equinox)*

Lastly, Berdahl hypothesized that glaucoma is the result of an imbalance between a patient's intracranial pressure (ICP) and their IOP, and that when IOP is significantly greater than ICP, glaucomatous damage occurs as a result of this pressure differential and its effect on the optic nerve's metabolism.[13] He is developing Balance Goggles™ (Equinox, Sioux Falls, SD), which are similar to swim goggles with a small vacuum device attached, which a patient with glaucoma would wear at night to draw a small vacuum above the eyes and normalize the IOP-ICP pressure differential (Fig. 5). Human clinical trials of this novel concept are now underway, and it potentially represents the first treatment for glaucoma that is non-surgical and does not involve pharmaceuticals.

This is obviously just a small sampling of current innovations in the treatment of glaucoma. As the pipeline of new and emerging eye care treatments and technologies continues to expand for glaucoma and elsewhere within our profession, our job remains to responsibly vet each innovation, advocate to protect patients from those that don't meet established standards of care, and embrace and appropriately implement the new technologies and treatments that do to enhance our patients' quality of life and expand the scope of care we provide. As we strive to achieve these goals, and until a cure for glaucoma is discovered, hopefully the "sneak thief of sight" will continue to be caught red-handed and arrested more often than ever before. ●

REFERENCES

1. Grewe, R. The history of glaucoma. *Klin Monbl Augenheilkd* 1986 Feb; 188(2): 167-9.
2. Tham YC, Li X, Wong TY, Quigley HA, Aung T, Cheng CY. Global prevalence of glaucoma and projections of glaucoma burden through 2040: A systematic review and meta-analysis. *Ophthalmology* 2014 Nov; 121(11): 2081-90.
3. Quigley HA, Broman AT. The number of people with glaucoma worldwide in 2010 and 2020. *Br J Ophthalmol* 2006 Mar; 90:262-7.
4. Sommer A, Tielsch JM, Katz J, et al. Relationship between intraocular pressure and primary open angle glaucoma among white and black Americans. The Baltimore Eye Survey. *Arch Ophthalmol* 1991 Aug; 109(8): 1090-5.
5. Weinreb RN, Liebmann JM, Martin KR, Kaufman PL, Vittitow JL. Latanoprostene bunod 0.024% in subjects with open-angle glaucoma or ocular hypertension: pooled phase 3 study findings. *J Glaucoma* 2018 Jan;27(1):7-15.
6. Weinreb RN, Realini T, Varma R. Latanoprostene bunod, a dual-acting nitric oxide donating prostaglandin analog for lowering of intraocular pressure. *US Ophthalmic Rev* 2016;9(2):80-7.
7. Ren R, Li G, Le TD, Kopczynski C, Stamer WD, Gong H. Netarsudil increases outflow facility in human eyes through multiple mechanisms. *Invest Ophthalmol Vis Sci*. 2016 Nov 1;57(14):6197-209.
8. Lusthaus JA, Goldberg I. Emerging drugs to treat glaucoma: targeting prostaglandin F and E receptors. *Expert Opin Emerg Drugs* 2016;21(1):117-28.
9. Hui A, Willcox M. in vivo studies evaluating the use of contact lenses for drug delivery. *Optom Vis Sci* 2016 Apr;93(4):367-76.
10. Chen H. Recent developments in ocular drug delivery. *J Drug Target* 2015;23(7-8):597-604.
11. Neufeld AH, Sawada A, Becker B. Inhibition of nitric-oxide synthase 2 by aminoguanidine provides neuroprotection of retinal ganglion cells in a rat model of chronic glaucoma. *Proc Natl Acad Sci USA* 1999; 96 (17): 9944-8.
12. Schwartz D, Samples J, Korosteleva O. Therapeutic ultrasound for glaucoma: clinical use of a low-frequency low-power ultrasound device for lowering intraocular pressure. *J Ther Ultrasound* 2014; 2: 15.
13. Berdahl J. The eye in space. *US Ophthalmic Rev* 2016; Sep 26, 2016; 9(2):76–7.

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Nouveautés et thérapies émergentes pour le glaucome

Chris Wroten, D.O., dipl. ABO, *est diplômé du Southern College of Optometry et associé et chef de l'exploitation des Bond-Wroten Eye Clinics. Le Dr Wroten a participé à des recherches cliniques, rédigé des rapports d'observations cliniques et des articles sur les soins oculovisuels, donné des conférences en tant que conférencier de formation continue et présenté des affiches et des ateliers éducatifs dans le cadre de conférences optométriques régionales et nationales. Outre les soins oculovisuels primaires, ses domaines d'intérêt particuliers sont le traitement et la prise en charge des maladies oculaires et les lentilles cornéennes.*

On ne sait au juste quand la neuropathie optique progressive qu'est le glaucome a été découverte, mais elle est décrite dans la documentation médicale depuis les temps anciens. Hippocrate a évoqué la cécité des personnes âgées qu'il a appelée « glaykoseis ». Bien plus tard, un ophtalmologue anglais, Richard Banister, a été le premier à constater un rapport de corrélation avec une pression intraoculaire (PIO) élevée. L'invention de l'ophtalmoscope par Hermann von Helmholtz au milieu des années 1800 a permis une première visualisation in vivo des changements glaucomateux du nerf optique et, en 1862, Franciscus Donders a inventé le terme « Glaukoma simplex » pour décrire la cécité résultant d'une PIO élevée. Peu après, l'invention du tonomètre, le développement de la périmétrie et l'utilisation de la cocaïne comme anesthésique ont fait progresser le diagnostic du glaucome.[1]

Les premières thérapies contre le glaucome étaient en fait des interventions chirurgicales; Friedrich von Graefe a réalisé la première iridectomie en 1856. Depuis, la trabéculectomie, la trabéculoplastie et l'implantation de tubes de drainage, ainsi que les interventions chirurgicales microinvasives plus récentes contre le glaucome (MIGS), ont vu le jour comme moyens de traitement efficaces. Chose peut-être un peu surprenante, le traitement pharmaceutique du glaucome n'a commencé qu'en 1875 avec la découverte de la pilocarpine, puis a progressé plutôt lentement au cours des 120 années suivantes avec la mise au point de bêta-bloquants topiques, d'agonistes alpha et d'inhibiteurs de l'anhydrase carbonique. Le lancement des analogues topiques de la prostaglandine vers le tournant du XXIe siècle a marqué une autre étape dans le traitement du glaucome en réduisant la fréquence des doses et en améliorant en même temps l'effet hypotensif oculaire.[1]

Pourtant, la prévalence du glaucome, souvent décrit comme « le voleur furtif de la vue », continue de s'accroître. En fait, d'ici l'an 2020, la prévalence mondiale du glaucome chez les personnes âgées de 40 à 80 ans devrait atteindre 76 millions selon les prévisions, avec une nouvelle augmentation à 112 millions d'ici 2040, ce qui aura un impact disproportionné sur les populations d'Afrique et d'Asie (figure 1).[2]

À l'échelle mondiale, on estime que 4,5 millions de patients sont atteints de cécité glaucomateuse,[2] ce qui en fait la deuxième cause de cécité dans le monde selon l'Organisation mondiale de la Santé. Malgré une éducation accrue des patients, de nouvelles technologies de diagnostic, une meilleure compréhension de la pathophysiologie du glaucome, un plus grand choix de thérapies pharmaceutiques et une amélioration des options et des résultats chirurgicaux, le nombre de cas de cécité due au glaucome devrait monter à 11,2 millions d'ici 2020.[3] Ajoutons qu'il est estimé que, même dans les pays développés, jusqu'à la moitié de ses victimes n'en sont même pas conscientes à cause de son caractère insidieux; ce pourcentage pourrait atteindre les 90 % dans les pays sous-développés.[4] Vu ces chiffres effarants, on poursuit la recherche dans l'espoir de découvrir un jour un remède à cette maladie, tandis que les options pharmaceutiques et thérapeutiques continuent d'évoluer et de s'améliorer. En tant que docteurs en optométrie, nous avons joué un rôle primordial en sauvant la vue d'innombrables patients atteints de glaucome au cours des dernières décennies. Examinons brièvement quelques nouveaux traitements du glaucome qui pourraient encore améliorer la qualité de vie et réduire la morbidité chez nos patients atteints de cette maladie.

AGENTS PHARMACEUTIQUES

Il s'était écoulé plus de deux décennies depuis l'avènement d'une catégorie vraiment nouvelle de médicaments contre le glaucome et, en décembre 2017, deux nouveaux agents antiglaucome dotés de mécanismes d'action uniques ont été homologués par la Food and Drug Administration aux États-Unis. Le premier est le bunod de latanoprostène (Vyzulta[MC], Bausch & Lomb, Rochester, NY), médicament topique qui est administré une fois par jour et qui se décompose en acide de latanoprost, analogue bien établi de la prostaglandine qui remodèle la matrice extracellulaire du muscle ciliaire pour améliorer l'écoulement uvéoscléral aqueux, et en un nouveau donneur d'oxyde nitrique qui agit directement sur le trabéculum pour détendre le muscle lisse et encore favoriser l'écoulement de l'humeur aqueuse (figure 2).[5,6]

Figure 1 : *On prévoit que la prévalence mondiale du glaucome chez les gens âgés de 40 à 80 ans devrait atteindre les 112 millions d'ici 2040.*[2]

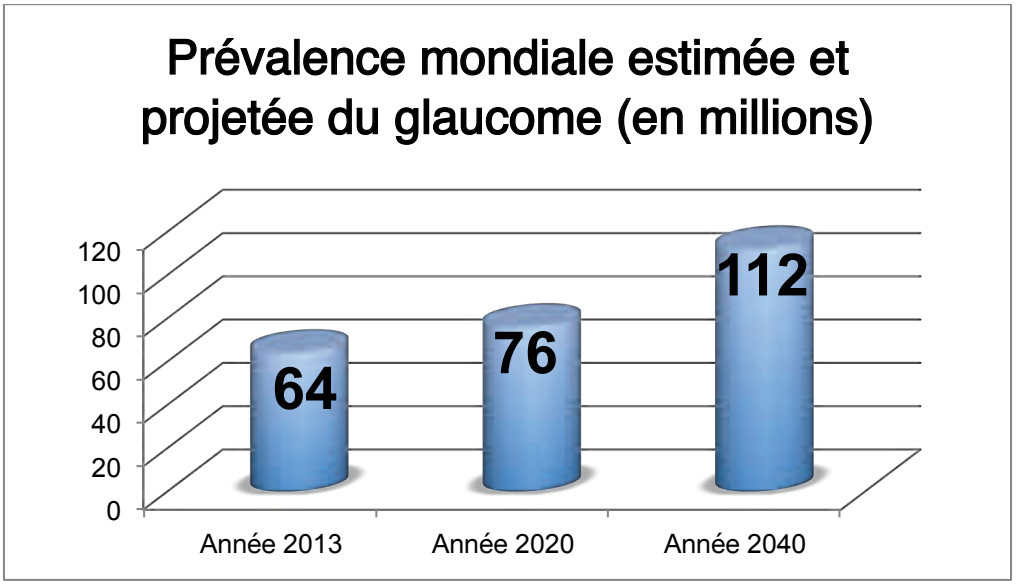
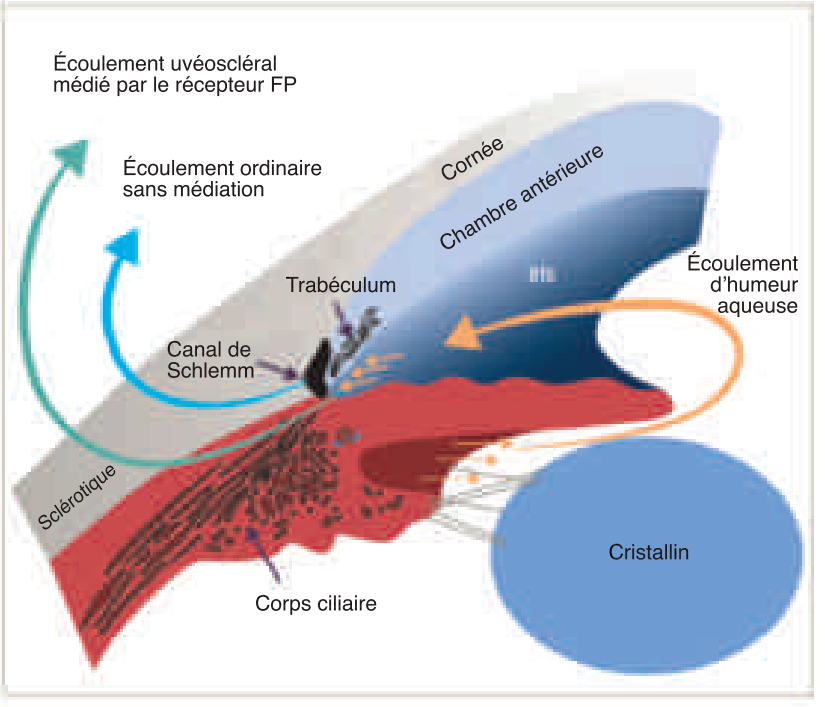


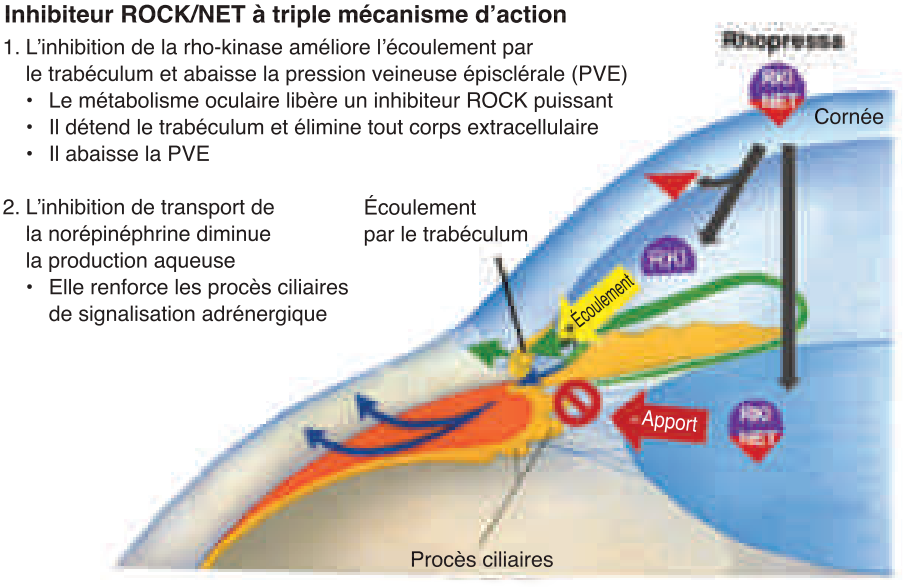
Figure 2 : *Le double mécanisme d'action du bunod de latanoprostène (VyzultaMC) comprend l'effet classique de l'analogue de la prostaglandine sur l'écoulement uvéoscléral par l'acide de latanoprost et l'effet d'un donneur d'oxyde nitrique agissant directement sur le trabéculum et le canal de Schlemm pour encore faciliter l'écoulement de l'humeur aqueuse. (Voir réf. 6)*



FP = récepteur F de la prostaglandine; ON = oxyde nitrique

Le second médicament nouvellement homologué contre le glaucome, le netarsudil (Rhopressa[MC], Aerie Pharmaceuticals, Durham, NC), représente une toute nouvelle catégorie de médicaments appelés inhibiteurs de la rho-kinase (ROCK). Les inhibiteurs ROCK relâchent le muscle lisse dans le trabéculum pour augmenter l'écoulement d'humeur aqueuse, tout en réduisant la pression veineuse épisclérale et en facilitant encore l'écoulement. Ce sont là deux mécanismes d'action uniques qui n'ont rien en commun avec les autres médicaments actuellement disponibles contre le glaucome. Le netarsudil comprend un inhibiteur de transport de la norépinéphrine (NET) qui supprime la production aqueuse pour ainsi constituer un troisième mécanisme d'action (fig. 3).[7]

Figure 3 : *Le triple mécanisme d'action du netarsudil (RhopressaMC) comprend la détente du trabéculum, l'inhibition de la production aqueuse et l'abaissement de la pression veineuse épisclérale (PVE). (Source : Aerie Pharmaceuticals)*



Des préparations en combinaison d'inhibiteurs ROCK et NET, jointes à un analogue de la prostaglandine à des fins d'accroissement de l'écoulement uvéoscléral, créeront un quadruple mécanisme d'action que l'on est en train de mettre au point et qui pourrait être disponible dans le commerce dans la prochaine année.

Les recherches se poursuivent en vue d'améliorer l'administration des agents pharmaceutiques hypotensifs existants de l'œil et diverses entreprises signalent de premiers succès dans des essais portant sur les lentilles cornéennes à élution médicamenteuse contre le glaucome, les insertions à base de fornix de la paupière, les bouchons lacrymaux et les inserts intracanaliculaires. On étudie aussi des préparations d'agents pharmaceutiques actuellement disponibles sous une forme injectable à l'intérieur et autour de l'œil contre le glaucome, ainsi que l'impression tridimensionnelle de produits pharmaceutiques existants et de leurs équivalents nanométriques pour une amélioration considérable de l'efficacité et une réduction de la fréquence posologique et, en même temps, des concentrations médicamenteuses.

Une autre molécule entièrement nouvelle qui offre un potentiel d'utilisation contre le glaucome est l'aminoguanidine créée à l'origine pour le traitement de la néphropathie diabétique. Il s'agit d'un inhibiteur de la synthétase de l'oxyde nitrique, enzyme présente en forte concentration dans le nerf optique des patients atteints de glaucome. Dans une première étude sur des rats de laboratoire souffrant d'une PIO chronique modérément élevée et auxquels on a donné de l'eau potable avec ce médicament, les sujets traités à l'aminoguanidine ont perdu 10 % des cellules de leurs ganglions rétiniens, alors que le groupe témoin non traité en perdait 36 %.[11] Ce qu'il faut retenir avant tout, c'est que l'aminoguanidine n'avait aucun effet sur la PIO, mais semblait tout de même assurer une certaine forme de neuroprotection. Jusqu'à présent, il n'y a pas eu d'essais cliniques sur des êtres humains, et un débat s'est engagé au sein de la communauté de recherche sur le rôle que peut jouer ou non la synthétase de l'oxyde nitrique dans le glaucome.

Les composés que nous avons évoqués ne donnent qu'une modeste idée de ce qu'on peut trouver dans la filière de la recherche et du développement dans ce qui demeure une recherche pleine d'espoir sur des médicaments plus abordables et plus efficaces contre le glaucome.

PROCÉDURES THÉRAPEUTIQUES

Les procédures de thérapie antiglaucome continuent d'être étudiées. On examine notamment un implant intraoculaire du cristallin qui pourrait assurer un monitoring continu d'une pression intraoculaire « pseudo » comme la lentille cornéenne Triggerfish[MC]. De plus, deux entreprises sont en voie de mettre au point un appareil à ultrasons de faible puissance et à basse fréquence contre le glaucome. L'un d'eux, appelé « Therapeutic Ultrasound for Glaucoma » (TUG[MC] qui vient d'Eye Sonix à Long Beach en Californie; figure 4), vise à provoquer une réaction inflammatoire dans la chambre antérieure et le trabéculum pour améliorer l'écoulement d'humeur aqueuse. Dans un premier essai, on a constaté une diminution de 20 % de la PIO pendant au moins un an chez 74 % des patients ayant une PIO élevée avant traitement.[12]

Figure 4 : *Le « Therapeutic Ultrasound for Glaucoma » (TUG[MC] de Eye Sonix) est l'une des deux technologies antiglaucome aux ultrasons qui ne procède pas par incision pour stimuler l'écoulement de l'humeur aqueuse. (source : Eye Sonix)*

Figure 5 : *Les lunettes Balance Goggles[MC] mises au point par Berdahl créeraient un petit vide devant les yeux des patients atteints de glaucome pour régler la différence de pression PIO-PIC. (source : Equinox)*

Enfin, Berdahl a émis l'hypothèse que le glaucome est le résultat d'un déséquilibre entre la pression intracrânienne (PIC) d'un patient et sa PIO et que, lorsque la seconde est beaucoup plus grande que la première, une altération glaucomateuse résulte de cette différence de pression et de son effet sur le métabolisme du nerf optique.[13] Berdahl est à mettre au point des lunettes spéciales appelées « Balance Goggles[MC] » (Equinox, Sioux Falls, SD), qui sont semblables aux lunettes de natation munies d'un petit dispositif à vide qu'un patient atteint de glaucome porterait la nuit pour créer un petit vide devant ses yeux et ainsi agir sur la différence de pression PIO-PIC (figure 5). Des essais cliniques de ce nouveau concept chez les humains sont en cours, et il pourrait s'agir du premier traitement du glaucome qui n'est pas chirurgical ni ne fait appel aux produits pharmaceutiques.

Bien sûr, nous ne donnons ici qu'une petite idée du courant d'innovation dans le traitement du glaucome. À mesure que s'étend la filière oculovisuelle des traitements et des technologies dans la prise en charge de cette affection et ailleurs dans notre profession, notre tâche demeure d'examiner chaque nouveauté en toute responsabilité, de défendre les patients contre celles qui ne répondent pas aux normes de soins établies et d'adopter et appliquer comme il se doit les technologies et traitements qui améliorent la qualité de vie de nos patients et accroissent la portée de nos soins. On peut espérer que, dans nos efforts en ce sens et tant qu'une cure du glaucome ne sera pas découverte, le « voleur furtif de la vue » continuera à être pris en flagrant délit et arrêté plus souvent que jamais. ●

RÉFÉRENCES

1. Grewe, R. The history of glaucoma. *Klin Monbl Augenheilkd;* février 1986; 188(2) : 167-169.
2. Tham YC, Li X, Wong TY, Quigley HA, Aung T, Cheng CY. Global prevalence of glaucoma and projections of glaucoma burden through 2040: A systematic review and meta-analysis. *Ophthalmology*: novembre 2014; 121(11): 2081-90.
3. Quigley HA, Broman AT. The number of people with glaucoma worldwide in 2010 and 2020. *Br J Ophthalmol*: mars 2006; 90:262-7.
4. Sommer A, Tielsch JM, Katz J, et coll. Relationship between intraocular pressure and primary open angle glaucoma among white and black Americans. The Baltimore Eye Survey. *Arch Ophthalmol*: août 1991; 109(8): 1090-5.
5. Weinreb RN, Liebmann JM, Martin KR, Kaufman PL, Vittitow JL. Latanoprostene bunod 0.024% in subjects with open-angle glaucoma or ocular hypertension: pooled phase 3 study findings. *J Glaucoma*: janvier 2018; 27(1):7-15.
6. Weinreb RN, Realini T, Varma R. Latanoprostene bunod, a dual-acting nitric oxide donating prostaglandin analog for lowering of intraocular pressure. *US Ophthalmic Rev*: 2016;9(2):80-7.
7. Ren R, Li G, Le TD, Kopczynski C, Stamer WD, Gong H. Netarsudil increases outflow facility in human eyes through multiple mechanisms. *Invest Ophthalmol Vis Sci*.: 1er novembre 2016;57(14):6197-209.
8. Lusthaus JA, Goldberg I. Emerging drugs to treat glaucoma: targeting prostaglandin F and E receptors. *Expert Opin Emerg Drugs*: 2016; 21(1):117-28.
9. Hui A, Willcox M. in vivo studies evaluating the use of contact lenses for drug delivery. *Optom Vis Sci*: avril 2016; 93(4):367-76.
10. Chen H. Recent developments in ocular drug delivery. *J Drug Target*: 2015; 23(78):597-604.
11. Neufeld AH, Sawada A, Becker B. Inhibition of nitric-oxide synthase 2 by aminoguanidine provides neuroprotection of retinal ganglion cells in a rat model of chronic glaucoma. *Proc Natl Acad Sci USA:* 1999; 96 (17): 9944-8.
12. Schwartz D, Samples J, Korosteleva O. Therapeutic ultrasound for glaucoma: clinical use of a low-frequency low-power ultrasound device for lowering intraocular pressure. *J Ther Ultrasound*: 2014; 2: 15.
13. Berdahl J. The eye in space. *US Ophthalmic Rev*: 26 septembre 2016; 9(2):76–7.

Top Legal Risks and Regulatory Trends Facing Canadian Optometrists

This article was prepared and written by the BMS Group Healthcare Professionals Insurance Alliance legal team at Gowling WLG (Canada) LLP (Gowlings), one of the largest and most highly-recognized legal firms in medical defence and professional liability in Canada. This article is meant to be a general overview of the claims and trends that are applicable to the optometry profession. Should you have any specific concerns or questions about an incident or aspect of your practice, please contact the CAO, your regulator or the pro bono legal advice hotline. ***This article is not legal advice and should not be considered as such. In the event of an actual or potential professional liability claim, CAO members who participate in the Professional Liability Insurance program are eligible for 30-minute pro bono and inclusive legal claims defence services from Gowlings.***

Doctors of Optometry are subject to many of the same legal risks and trends facing most regulated health professionals in Canada. These legal exposures range in scale from College investigations into an optometrist's billing practices to seven-figure lawsuits alleging that an optometrist failed to appropriately diagnose and refer a patient for further investigation and treatment. This article uses information gained through calls made by insured optometrists to the Canadian Association of Optometrist (CAO)'s Insurance Program pro bono legal services hotline along with over 15 years of program claims data to provide an overview of common legal risks and regulatory trends affecting the profession.

The good news is that there is a low chance that you as an optometrist will require legal assistance regarding your professional practice. However, in the event that you do require such legal assistance, it is most likely because you have been named in a complaint made to your provincial regulatory body rather than because of any kind of civil or criminal action. Complaints to regulators comprise the majority of matters that are handled by legal counsel for optometrists participating in the CAO Insurance Program, and this is consistent with what we see across many other regulated health professions in Canada.

COLLEGE COMPLAINTS:

While navigating a complaint and/or investigation from your regulator may seem fairly straightforward, you need to be aware of the significant powers that provincial regulators have that can impact your ability to practice. For this reason, you should always communicate with your insurance broker or insurer before responding to an inquiry from your regulator. Your insurance representative will examine your policy, identify your coverage and assist you with the next steps, including coordinating your legal defence if required.

Optometry regulators often respond to complaints involving billing practices. These include misunderstandings regarding the appropriate amount to be charged, billing for services not covered by provincial health plans, and poor record-keeping practices that lead to the conclusion that a member is billing for services that were not provided. Inaccurate or false billing creates a negative perception of the profession and, as a result, regardless of whether the inaccuracy is intentional or not, ethical concerns abound, and the regulatory penalties can be severe. As a result, inaccurate, false, or misleading billing can lead to disciplinary sanctions, civil liability, and even criminal liability for fraud.

In a 2018 decision from the College of Optometrists of Ontario, an optometrist was found to have billed for services not provided to two patients. Following an investigation and Disciplinary Hearing, the College imposed a 14-week suspension of the member's license to practice and ordered the optometrist to pay the College's costs in the amount of $5,000. As a condition of registration, the member was also required to complete and pass a course on Ethics and Boundaries.

In British Columbia, an optometrist who billed the Medical Services Plan (MSP) for patients who did not have any billable conditions and for services that were billed and paid privately by the patients was recently suspended for 18 months. The College allowed the final nine months of the suspension to be stayed, provided the member successfully completed courses on professional ethics and record-keeping prior to returning to practice. Further, the College mandated that the optometrist return to practice under direct supervision for a period of one year, and that the member cooperate with six random site-based audits by a College-appointed inspector. As provincial regulators continue to focus on this issue, we believe penalties imposed by discipline panels will continue to be significant.

Generally, the conduct that can give rise to these disciplinary measures is the result of a misapprehension or limited consideration of the relevant and applicable standards rather than intentional fraud. Accordingly, the simplest way to avoid billing-related claims is to:

- review all of the relevant guidelines, standards and regulations;
- undertake frequent reviews of billing systems and software with staff; and
- participate in continuing education that focuses on the interpretation and understanding of guidelines.

It is also important to remember that billing is a reflection of the entire scope of service that you, as an optometrist, provide. To invoice in accordance with your professional standards, you must also understand and apply all of the guidelines including those not directly related to billing, such as record-keeping, informed consent and delegation.

EMERGING RISKS:

Two additional emerging risks facing optometrists include the use of social media and sexual abuse/unprofessional behavior.

SOCIAL MEDIA

The number of regulated professionals who use social media continues to increase, particularly in health care. While social media offers an unprecedented marketing platform for regulated professionals and serves as a convenient and cost-effective way to share ideas and industry trends with other professionals and clients/patients, its use is not without risk. Regulatory bodies are increasingly challenged by registrants using social media in ways that may reflect poorly on the profession, and health care professionals are being disciplined for a variety of issues, including: (i) disclosing confidential information; (ii) making disparaging remarks and allegations, often regarding members of the same profession; and (iii) posting content that contradicts a regulatory body's policies or is unprofessional. We expect that provincial optometry regulators will take the same approach as other regulators across Canada.

Best practice for professionals using social media is to be professional, courteous and respectful in all online activities. The high standard of behavior expected of a professional on social media also extends to your use of personal media.

SEXUAL ABUSE/UNPROFESSIONAL BEHAVIOR

We anticipate that there will be a rise in complaints related to sexual abuse and/or unprofessional behavior in the coming years, as provincial regulators become more vigilant with investigations into these activities. This is due in part to a perception that provincial regulators were not taking cases of sexual abuse/inappropriate behavior as seriously as they should have and in part as a response to the current climate. As patients become more comfortable raising concerns about how they have been (or feel they have been) treated by their health care professionals, we anticipate that number of these types of complaints will continue to rise.

As an example of how serious the consequences can be for making inappropriate comments to a patient, in the past year, the College of Optometrists of Ontario suspended a member for five weeks (and imposed other penalties on the member) for making inappropriate sexual comments to a patient during the course of an appointment. The Ontario regulator is also in the process of determining penalties to be imposed on an optometrist who was recently found guilty of sexually abusing three patients who were also his employees. The member faces the possibility of having his license suspended for four months. As well as completing an ethics course, he may also be required to pay $30,000 to the College for investigation and legal costs and $43,000 towards the therapy and counselling for the employees he abused.

As a regulated health professional, you must ensure that your interactions with patients remain professional and courteous at all times, whether face-to-face or online. Comments that you may have considered harmless in the past are no longer acceptable. Patients are more able and willing to voice their concerns and hold you to account if they feel you have acted inappropriately. ●

Helpful contacts for optometrists participating in the CAO member insurance program:

Report a professional liability insurance claim or College complaint – Contact BMS Canada Risk Services Ltd. (BMS Group) at 1-844-517-1371 or cao.insurance@bmsgroup.com

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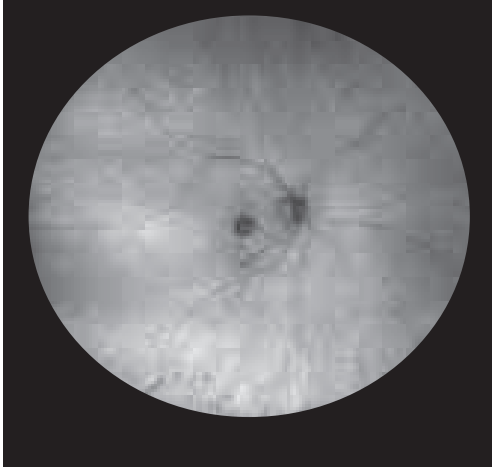

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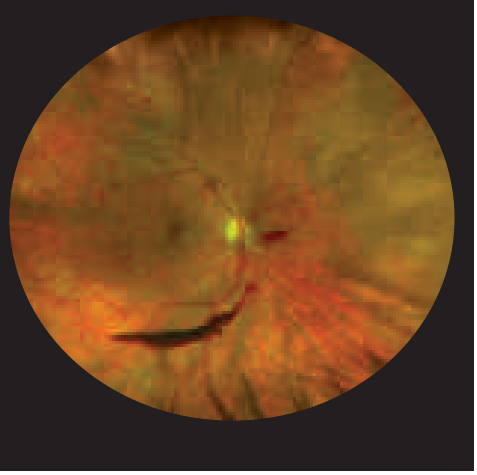

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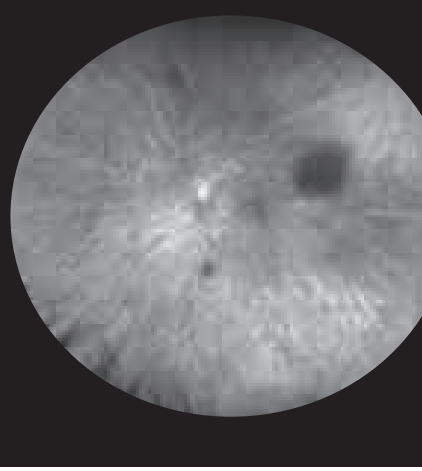

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