International comparisons on refraction services with the sight test model in the UK

Executive summary

1. We carried out a literature review of articles that had been drawn to our attention during our call for evidence on the Opticians Act and consultation on associated policies ('call for evidence') and undertook our own search for literature and sight loss statistics related to international comparisons on refraction services with the sight test model in the UK. Overall, the review highlighted: the lack of research available to consider dispensing opticians refracting or the risks of different people carrying out different elements of the sight test; differences in professional roles across countries (including the role of ophthalmologists in Europe in carrying out the sight test); an interesting risk-based model in parts of Canada but where experience has been mixed; and international comparison sight loss statistics being inconclusive.

Introduction

2. Following our initial review of the responses to the call for evidence, we issued an invitation to tender for desk-based research into international comparison on refraction services with the sight test model in the UK. We were particularly interested to learn more from countries where the refraction[1] and eye health checks[2] are not carried out by the same person, with a view to comparing their avoidable sight loss rates with those in the UK.

3. We did not receive any bids in response to the invitation to tender and have therefore carried out this work in-house.

4. As mentioned in our response to the call for evidence, we were warned about drawing international comparison as many 'optometrists' in European countries operate at the level of a dispensing optician in the UK, and those countries have approximately double the amount of ophthalmologists than we do.

[1] Refraction as part of the sight test refers to a check of the patient's visual acuity i.e. how well they can see, and whether any corrective measures such as spectacles or contact lenses are required. Different forms of refraction include objective refraction (when the refractive error of an eye is determined without input by the patient), subjective refraction (a clinical examination to determine the combination of lenses that will provide the best corrected visual acuity) and over-refraction (checking the fit of a contact lens). We are concerned with the first two types of refraction only.
[2] Examinations of the eye for the purpose of detecting injury, disease or abnormality in the eye.

27 February 2023

5. As a first step, we reviewed some of the articles that we were made aware of during the call for evidence where these related to systems in other countries.

6. We also carried out a literature search (using PubMed and other databases) for articles relating to refraction in the context of the eye examination or eye care system, and specifically searched for refraction articles in Canada, as we were made aware that there is at least one territory/province in Canada where refracting is carried out by someone other than an optometrist or medical practitioner.

7. We also reviewed sight loss statistics for any countries where we had found information from the literature search.

8. The information we found from articles and websites is summarised in the next section.

Analysis

Comparative analysis of primary eye care in three European countries

9. A study from Thomas et al (2011)[3] involved a detailed comparative analysis of the primary eye care systems in the UK, France and Germany. These countries were chosen because they have "similar population and economic conditions". The main findings were as follows (although it should be noted that this study took place in 2011 and the situation may have changed since then):

    - in France, ophthalmologists provided almost all eye care, while the UK uses optometrists as the primary eye care providers, and Germany has a mixed model with both optometrists and ophthalmologists providing primary eye care;

    - in France:

        - eye care is provided by a combination of ophthalmologists, opticians and orthoptists, although "services are almost exclusively provided by ophthalmologists";

        - most ophthalmologists (around 60%) work in private practice; they typically carry out activities including refractions, prescriptions, eye examinations, diagnosis and treatment of ocular diseases, surgeries, and treatment of low vision. They are not allowed to sell optical appliances commercially. Treatment of ocular disease is exclusively the remit of ophthalmologists;

[3] Thomas, D., Weegan, L., Walendzik, A., Wasem, J. and Jahn, R. (2011), *Comparative Analysis of Delivery of Primary Eye Care in Three European Countries*, IBES Diskussionsbeitrag

- orthoptists have a similar scope of practice to those in the UK and usually work under the supervision of an ophthalmologist (they cannot be accessed directly by patients). They have been allowed to refract since 2007, as well as to examine and assess visual function and ocular pathology;

- opticians fit and supply optical appliances and are allowed to provide prescription spectacles to anyone aged 16 or over without a medical prescription. They have been capable of performing refraction since 2007 for “the renewal of corrective glasses within a period of less than three years since the initial medical prescription”, which means that they can change the medical prescription having performed a refraction. It is not clear how much refraction is performed by opticians. They can also fit contact lenses but this is considered controversial despite being legal and an initial consultation with an ophthalmologist is recommended;

- opticians can study to be optometrists and the demand for these services is increasing, but the position is not formally recognised within the eye care system (hence there are no official statistics on the number in the population) and they play a minor role. Between 80-90 per cent of all eye examinations are performed by ophthalmologists and any eye examinations performed by an optician-optometrist cannot be claimed back using the state health insurance scheme;

- in Germany:

  - eye care is mainly provided by ophthalmologists and opticians, with the ophthalmologist playing the main role;

  - ophthalmologists mainly work in doctors’ practices or in medical service centres, offering the full range of ophthalmic services. Some ophthalmologists exclusively provide primary eye care services such as eye examinations (including refractions), and diagnosis and assessment of ocular pathologies, while others perform only surgeries, and others perform a mixture of services. Commercial sales of optical appliances by ophthalmologists are not permitted by law;

  - being an optician is considered a ‘craft’ rather than a healthcare profession. Training for opticians varies and there are three main routes which lead to opticians essentially being equivalent to either a dispensing optician (selling, manufacturing and supplying optical appliances, and performing sight tests for drivers’ licences), a refracting optician (performing objective and subjective refraction) or an optometrist (refracting, fitting contact lenses, screening for eye health abnormalities, referring to an ophthalmologist as appropriate

for diagnosis and treatment including in cases of sudden reduction of visual acuity). Opticians were found to produce around 73% of all prescriptions for corrective glasses in 2008;

- at the time of the article, the title optometrist was not protected[4] or officially acknowledged although more than 80% of the population had ever seen an optometrist for a sight test or eye examination (reimbursement for which cannot be claimed under the state health insurance scheme). However, 95% of the population had ever seen an ophthalmologist and a quarter of the population see an ophthalmologist every year;

- ophthalmologists do not acknowledge the optometric profession; and

- the UK system is described as ophthalmologists having a "strong influence" and being "built on a strong position of optometrists who provide almost all sight tests and eye examinations in primary care", with dispensing opticians being the main other part of the primary eye care system. GPs are also mentioned as gatekeepers to secondary care, as well as the role of ophthalmic medical practitioners. It was noted that optometrists have an "extended range of competencies in comparison to their German counterparts".

10. When making comparisons, the study found that:

- access to primary eye care in the UK and Germany is good, with no general waiting times, whereas in France there is at least a three-month (12 months in some cases) waiting list for consultations with ophthalmologists;

- when analysing statistics for practitioners providing primary eye care, "the French system shows a significantly smaller number of primary eye care providers than Germany and the UK", with an oversupply of opticians in France and the UK having a lot less dispensing opticians than Germany; and

- there were no considerable differences between quality of services in the three countries.

11. Overall it was concluded that none of the systems showed significant advantages over the other, with all three capable of providing high quality eye care, easy access and at similar cost. However, "the extension of opticians' competencies towards optometric services may be an appropriate solution to

[4] We note from the ECOO Blue Book (2020) that the titles 'Optometrist BSc' and 'Optometrist (HWK)' are listed as professional titles, although it is not clear whether the title is protected.

meet the increasing demand for primary eye care in the French and German system".

Italian optometric examination

12. A study by Cheloni et al (2021)[5] describes the Italian optometric system, which involves optometrists refracting and prescribing optical appliances, with ophthalmologists being responsible for detecting ocular disease, although there is no formal guidance for when optometrists should refer patients. The purpose of the study was to identify when referral was warranted and the authors provided a list of suggestions of findings from an examination that would justify referral to an ophthalmologist. It was estimated that up to 19% of patients might have asymptomatic conditions that could go undetected in the optometrist's examination and advised that optometrists should closely collaborate with ophthalmologists to safeguard patients' ocular health. The authors noted that "some of the conditions that are likely to remain unnoticed by Italian optometrists are also the ones most likely to result in sight loss (e.g. diabetic retinopathy, optic neuropathies and glaucoma)" and therefore recommended referral where a patient is not attending the optimal frequency of medical eye examinations.

13. Interestingly the authors also comment that most research within the primary care optometry arena is conducted in high-income countries such as the UK, US, Canada and Australia, where primary eye care is led by optometrists. They note that patients in those countries are therefore likely to present with different characteristics compared to those seen in Italy and advise caution about the generalisability of studies between countries.

Refracting in Canada

14. **Alberta.** Information from the website of the College of Opticians of Alberta (COA)[6] suggests that opticians in the province of Alberta are equivalent to dispensing opticians in the UK, and registered opticians can "perform refractions and identify the need for corrective lenses" if they receive additional training and register it as an area of advanced practice. The *Standards of Practice*[7] contain a section on refraction which opticians can carry out if they receive a designation from the COA. Equipment listed in the standards makes it clear that refraction can be carried out through automated or non-automated means. Opticians are required to use their professional judgement to refer on to

[5] Cheloni, R., Swystun, A. G., Frisani, M., & Davey, C. J. (2021), Referral in a routine Italian optometric examination: towards an evidence-based model*, Scandinavian Journal of Optometry and Visual Science*, 14(1), 1–11

[6] About Opticians - College of Opticians (albertaopticians.ca)

[7] https://albertaopticians.ca/wp-content/uploads/2022/01/GE-Legislation-Standards-of-Practice-College-of-Opticians-of-Alberta-20201215.pdf

another regulated healthcare professional. Prescriptions must be “signed by a lawful prescriber”.

15. An article published in the Canadian Journal of Optometry[8] explained that in 2018 the COA (then named the Alberta College and Association of Opticians) had requested a widening of opticians’ scope of practice to include prescribing of optical appliances and looked at “whether designated refracting opticians in Alberta have adequate training and knowledge to safely and independently perform a refraction and prescribe an optical appliance”.

16. The authors from the Alberta College of Optometrists compiled a list of skills required to independently perform refraction and prescribe an optical appliance, evaluated these against optical science programmes and compared the coverage of these skills are part of the national examinations for optometry and opticians. The skills they considered relevant to safely refract and prescribe included assessment of the status of ocular health, systemic health and binocular. The authors noted the subjectivity of determining which skills might be required.

17. The article found that the optical science programmes for refracting opticians equipped opticians to perform only a “simple refraction”, which “may be sufficient to permit refracting opticians to assess refractive status as but one component of a comprehensive eye exam performed by an optometrist or ophthalmologist”. However, their overall conclusion was that “refracting opticians in Alberta do not possess adequate training and knowledge to safely and independently perform a refraction and prescribe an optical appliance. Granting opticians the legislative authority to independently refract and prescribe may result in a public health issue, as there may be an increase in the number of undiagnosed or undetected eye and systemic diseases”. One of their main concerns was that separating the refraction from the eye examination might increase the risk of eye or systemic disease going undiagnosed or undetected because opticians do not have the skills to assess ocular health or binocular vision status, potentially resulting in more avoidable sight loss. They recommended developing an examination to specifically assess refracting opticians within their current scope of practice, given that opticians in Alberta already have the right to independently perform refractions if trained and approved to do so.

18. We contacted the Alberta College of Optometrists, the regulatory and licensing body for optometrists in Alberta. They confirmed that the Government has not authorised any further changes that would allow opticians to prescribe corrective lenses for the purpose of dispensing. We also enquired as to

[8] Anderson, A. and Hensel, G. (2021), Assessing the Skills of Alberta’s Refracting Opticians: Can Opticians Safely and Independently Refract and Prescribe Optical Appliances? *Canadian Journal of Optometry / Revue Canadienne D’Optometrie*, Vol. 83, No. 1

whether any of the recommendations in the abovementioned article had been taken forward. They pointed us to two further articles.

19. One article looked at how to reduce or remove the risks of sight tests in Alberta[9]. 'Sight test' in this context means a refraction only appointment carried out by an optician (the authors refer to automated refraction). The sight test is conducted independently of an eye examination and does not assess binocular vision or eye health status. The study examined the cases of two individuals living in Alberta who experienced vision loss:

    - the first individual was a 59-year-old female who had been seeing an optician for a sight test for several years and their prescriptions (signed by an off-site ophthalmologist, which appeared to be outwith the standards of practice for their profession) had been getting stronger but their vision had not been improving. The patient went to see an optometrist after four years and was diagnosed with glaucoma, leading to permanent vision loss despite emergency surgery from an ophthalmologist due to late diagnosis; and

    - the second individual was a three-year-old child who had seen an optician but the parent was not aware of the difference between a sight test and an eye examination. Years later the child was found to have amblyopia and suffered permanent vision loss in one eye despite follow up treatment, which was considered likely to be due to late diagnosis.

20. The authors of the study note that there are no restrictions in Alberta about who may have a sight test, unlike those in Ontario and British Columbia (see below). They also studied the legislation in the United States of America (USA), New Zealand and the UK due to similarities in regulation and standards of living. The USA was found to prohibit or exclude sight testing by opticians in the 22 states where the practice is regulated. Dispensing opticians in New Zealand were also prohibited from performing sight tests. In the UK case, section 24 of the Opticians Act 1989 and our statement on testing of sight prohibiting delegation of components of a sight test were quoted.

21. The study concluded that "the most common and potentially best approach to reduce the risks of sight tests in Alberta is to completely prohibit them. When it comes to protecting and preserving eye health, regular, comprehensive eye examinations are the gold standard as they prevent vision loss by screening for asymptomatic diseases". If they are not to be prohibited, the authors suggested two alternative approaches to reduce the risks: a) developing restrictions on who can have sight tests based on age, medical history or current vision

[9] Anderson, A. and Hensel, G. (2021), Approaches to Reduce or Eliminate the Risks of Sight Tests in Alberta: A Jurisdictional Review*, Canadian Journal of Optometry / Revue Canadienne D'Optometrie*, Vol. 83, No. 3

conditions; or b) incorporating collaboration of opticians with prescribers into standards of practice, requiring patients to have had an eye examination by an optometrist or ophthalmologist in the last year.

22. The second article[10] looked at whether there was a need for optician-performed refractions based on the geography of Alberta and concluded that "with the current availability of optometrists and ophthalmologists in Alberta, there is no public need for opticians to be authorized to independently refract and prescribe eyeglasses".

23. **British Columbia.** Since 2010, opticians in British Columbia have been able to perform independent automated refraction (referred to as a 'sight test' which does not include an eye health examination), provided they have received additional training and certification by the College of Opticians of British Columbia (COBC)[11]. A refracting toolkit[12] is available and explains that:

    - independent automated refraction can only be carried out in healthy adults between the ages of 19-64, provided they have had at least one eye health examination since they turned 19 or since turning 40 if applicable. Anyone who currently has or has a past history of certain conditions (for example, glaucoma, retinal detachment, macular degeneration, diabetes) would not be considered a healthy adult and therefore cannot have an independent automated refraction;

    - after the refraction has taken place, the optician will prepare an assessment record (not a prescription which can only be issued by an optometrist or medical professional) which can be used by any optician to dispense an optical appliance; and

    - an assessment record cannot be provided (and a recommendation must be made for an eye health examination), where certain conditions are met. For example, refraction results indicate prism correction may be required, refractive error exceeds +/-6 dioptres, there has been a change of more than +/-2 dioptres since the last prescription, and visual acuity cannot be corrected beyond a certain point.

24. The COBC's *Standards of Practice* contain a section on independent automated refraction[13] which requires opticians to have access to appropriate equipment, complete client notice forms to obtain informed consent, and

[10] Anderson, A. and Hensel, G. (2021), Evaluating the Adequacy of the Geographic Distribution of Eye Care Professionals in Alberta: Is There a Need for Optician-Performed Refractions? *Canadian Journal of Optometry / Revue Canadienne D'Optometrie*, Vol. 83, No. 2
[11] What is an optician? - COLLEGE OF OPTICIANS OF BRITISH COLUMBIA (cobc.ca)
[12] https://cobc.ca/wp-content/uploads/2022/09/Automated-Refracting-Toolkit-1.pdf
[13] COBC_StandardsofPractice_Standard9.pdf

recommend the client sees a health professional if any issues are raised regarding visual or general health.

25. **Ontario.** It was interesting to note the situation in Ontario published on the website of the College of Opticians of Ontario (COO)[14] where it appears that in 2007 standards were introduced that allowed opticians to refract subject to an application to the COO – the refraction package involved education and continuing education, and required opticians to work together with those authorised to prescribe in order to refract. In 2009, the Minister of Health and Long-Term Care wrote to the COO requesting them to suspend any new approvals of refracting opticians due to concerns about the potential for opticians to alter or generate a prescription, which was not in accordance with the Opticianry Act 1991. No information about what has happened since then could be found on the website. The *Professional Standards of Practice and Practice Guidelines for Opticians in the Province of Ontario*[15] include a section on refraction and require/allow opticians to:

    - dispense when they have a prescription from an "authorized prescriber" and that "the patient has seen an authorized prescriber for a full oculo visual assessment within the last 365 days";
    - dispense eye wear based on the results of their refraction, provided they inform the prescriber within 30 days;
    - refer a patient where there are any concerns about their visual or general health;
    - keep records of all patients that they see and provide these to the COO on a quarterly basis; and
    - use their best efforts (alongside prescribers) to ensure that patients receive periodic eye examinations in line with national guidelines.

Importance of eye care

26. During the call for evidence on the Opticians Act and through our review of other articles, we have identified numerous articles summarising the role that routine eye examinations play in identifying eye disease in asymptomatic patients, timely treatment to avoid sight loss and avoid pressures on hospital eye services. We also noted a position paper from the World Council of Optometry[16] arguing that "refraction should not be offered as a 'stand-alone' service even in areas where there are high levels of sight loss through

[14] Refraction - The College of Opticians of Ontario - COO (coptont.org)
[15] By-Laws, Standards and Guidelines - The College of Opticians of Ontario - COO
[16] World Council of Optometry Position Paper (undated), *The Sight Test: Refraction and Examinations of the Eye for the Purpose of Detecting Injury, Disease or Abnormality: The Public Health Case* Stand-Alone-Refraction.pdf (worldcouncilofoptometry.info)

refractive error". We have not analysed all of these articles as they do not address the core issue of an international comparison on refraction services with the sight test model in the UK.

27. One article that drew our attention was from the Lancet Global Health Commission[17]. Although not specific to the UK, one of the key messages was that "the eye health workforce is unable to meet population needs in many countries; major expansion in service capacity is required through increased numbers, sharing tasks, strengthened training, enabling work environments, and effective leadership". The global problem of uncorrected refractive error being responsible for a high proportion of avoidable sight loss was mentioned throughout. The article concluded: "The eye health sector has traditionally focused on treatment and rehabilitation, and underused health promotion and prevention strategies to lessen the impact of eye disease and reduce inequality."

Comparison of sight loss statistics

28. We have identified sight loss statistics for those countries who have been mentioned during the analysis to see if there are any obvious differences. However, we would urge extreme caution with this data, as difference in rates may not be specifically because the primary eye care system is set up in a particular way – it could be to do with many different factors including overall investment in health by governments, numbers of healthcare professionals involved in the system, socioeconomic factors such as wealth, geography of the country, waiting times for treatment etc. There might also be concerns about reliability of the data collected in those countries.

29. We looked at the Global Burden of Disease website[18] to find comparisons between the UK, France, Germany, Italy and Canada (as well as the European Union (EU) and Organisation for Economic Co-operation and Development (OECD)), as these were the countries where we had found some useful articles for comparison purposes (see annex 1). However, the statistics for Canada are not broken down by territory/province and therefore it is difficult to make assumptions about whether the rates in Canada are at all related to opticians being able to refract for the purposes of sight testing.

30. We found a study on vision loss in Canada[19] which segmented the statistics by territory/province, but unfortunately this only dealt with total numbers and did not break this down 'per hundred thousand of the population'. However, the

[17] Burton, M. J. et al. (2021), The Lancet Global Health Commission on Global Eye Health: vision beyond 2020, *Lancet Glob Health* 2021*;* 9: e489-551 (The Lancet Global Health Commission on Global Eye Health: vision beyond 2020 - The Lancet Global Health)

[18] Global Burden of Disease (GBD 2019) | Institute for Health Metrics and Evaluation (healthdata.org)

[19] Deloitte Access Economics (2021), *The cost of vision loss and blindness in Canada. Canadian Council of the Blind* Stop Vision Loss - Fighting Blindness Canada (FBC)

report did find the highest prevalence[20] of vision loss was in New Brunswick, Nova Scotia, and Newfoundland and Labrador. While Ontario, Quebec and British Columbia had the highest numbers of people with vision loss, this was considered to be in line with "the relative size of the population in each province/territory", although exact figures were not given. There is no suggestion from these vision loss statistics that the three provinces/territories that allow refracting by opticians are outliers in comparison to other areas. The report made no reference to sight tests or refraction by opticians.

Discussion

31. We could not find any articles that looked at the role of dispensing opticians (or other similar healthcare professionals) working together with optometrists or ophthalmologists to refract as part of the sight test, or any articles about the risks of two people (even if both optometrists or ophthalmologists) carrying out different elements of the sight test.

32. The study comparing the UK, French and German primary eye care systems appeared to recommend the UK model to deal with increasing demand in France and Germany. However, it was unclear how much refraction by opticians or optician-optometrists actually took place in those countries separate to the eye health checks, as ophthalmologists mainly appeared to be responsible for eye examinations including refraction. It is therefore difficult to draw any significant conclusions from this study relating to separation of refraction and eye health checks.

33. The study on the Italian system also pointed to the risks of refraction being conducted separately to eye health checks (particularly as prescriptions are also issued by opticians), with the concern being that a significant proportion of eye health conditions are being missed by refraction-only appointments.

34. A possible implication that could be drawn from the Lancet Global Health Commission is that health prevention strategies (such as primary care that provides access to full eye health examinations) will reduce eye diseases and inequalities.

35. The articles detailing the situation in Canada pointed to risks with separating the refraction from the eye health checks, even where a prescription could not be issued by the optician. In some territories/provinces, restrictions had been put in place as to who was able to see to an optician for refraction and a requirement for when they last had an eye health check. One of the territories/provinces had rowed back on an initial decision to allow opticians to refract due to concerns from their ministry responsible for health.

[20] Prevalence was described in the report as "estimated by applying the prevalence rate at the national level to the province/territory population level".

36. It was difficult to make comparisons when looking at sight loss statistics for the reasons outlined in paragraph 28.

Conclusions

37. Overall, the review highlighted: the lack of research available to consider dispensing opticians refracting or the risks of different people carrying out different elements of the sight test; differences in professional roles across countries (including the role of ophthalmologists in Europe in carrying out the sight test); an interesting risk-based model in parts of Canada but where experience has been mixed; and the Global Burden of Disease sight loss statistics being inconclusive.

Annex 1 – Table showing prevalence rates[21] of sight loss and eye conditions

Condition	UK	England	Scotland	Wales	Northern Ireland	France	Germany	Italy	EU	OECD	Canada
Age-related macular degeneration (AMD)	190	190	196	207	140	163	202	356	207	117	53
Cataract	849	854	847	869	687	812	895	1,828	995	840	541
Glaucoma	119	119	126	130	86	103	132	294	146	123	84
Near vision loss	814	775	1,027	1,082	902	1,056	1,133	1,016	2,979	2,137	1,321
Other vision loss	334	334	344	342	282	294	328	491	464	385	289
Refraction disorders	1,984	2,005	1,917	1,862	1,773	1,659	1,748	2,255	1,955	1,634	1,070
Blindness and vision loss	4,091	4,079	4,248	4,276	3,706	3,899	4,230	5,844	6,302	4,914	3,246

[21] The rate is per 100,000 of the population.