

Accepted for publication in Clinical and Experimental Optometry, March 2025.

Title: Accessing emergency eye care by therapeutically qualified optometrists: a simulated-patient study in Quebec, Canada

Authors:

1. Benoit Tousignant^{a, b}
 - ORCID : 0000-0002-0395-5027
2. Catherine Binette^a
3. Ariane Duchesne^a

Author institutions:

- a. School of Optometry, University of Montreal, Montreal, Canada
- b. Department of Preventive Medicine, School of Public Health, University of Montreal, Montreal, Canada

Key words: Canada, emergency treatment, eye diseases/ therapy, health services accessibility, optometry

Contact author: Benoit Tousignant, benoit.tousignant@umontreal.ca

To cite this work: Tousignant B, Binette C, Duchesne A. *Accessing emergency eye care by therapeutically qualified optometrists: a simulated-patient study in Quebec, Canada*. Preprint. Accepted for publication March 2025, Clinical and Experimental Optometry.

Accessing emergency eye care by therapeutically qualified optometrists: a simulated-patient study in Quebec, Canada

Abstract

Clinical relevance

Therapeutically qualified optometrists are important providers of emergency eye care. To provide insight on how to optimise a population's accessibility to emergency care, it is helpful to examine factors which go beyond the scope of practice and number of practitioners in a jurisdiction.

Background

Therapeutically qualified optometrists play an important role in managing ocular emergencies. This study assesses the accessibility of emergency eye care for a new patient in Quebec and explores associated factors such as geographical region of practices and morbidity of patient symptoms.

Methods

Cross-sectional study using simulated-patient design. Scripted phone calls were placed to optometry practices, posing as patients seeking emergency care. A random sample of Quebec practices was stratified by region: urban, peri-urban, and rural. Each practice received one call for a simulated conjunctivitis (low morbidity) and one for a simulated retinal break (high morbidity). Outcomes included obtaining an appointment, time-to-appointment and out-of-pocket costs.

Results

Eighty-nine practices participated: 30 urban, 30 peri-urban and 29 rural. Some 46% of practices granted at least one eye emergency appointment (n = 41) with significant differences between regions: 40% in urban areas, 30% in peri-urban areas and 69% in rural areas (p = 0.008). Overall, median delay to obtain an appointment was 3.7 hours (interquartile range = 1.8 – 6.3) and median fee was 55 Canadian dollars (interquartile range 50 – 65). Low-morbidity appointments

were granted slightly more often ($p = 0.07$). Neither time-to-appointment nor fees differed significantly with morbidity or type of region.

Conclusion

In this simulated-patient study, less than half of optometry practices offered an emergency appointment to new patients in Quebec; more appointments were granted in rural areas and for low morbidity conditions. In a jurisdiction with many therapeutically qualified optometrists across its territory, accessibility to emergency eye care was somewhat limited, with significant geographical differences.

Introduction

In an increasing number of jurisdictions worldwide, optometrists are qualified to prescribe therapeutic agents to manage eye care pathologies. Since the 1990s, in many countries including the United States, Canada, New Zealand, Australia and the UK, the expansion of optometric scope of practice to include therapeutic care has been advocated to increase a population's accessibility to eye care.¹⁻⁷ Optometrists do not require referrals from another professional and can manage a wide spectrum of acute conditions. These range from low-morbidity conditions such as conjunctivitis to high-morbidity ones such as retinal breaks,⁸ for which advanced procedures such as a dilated fundus examination are required.

In 2003, in the Canadian province of Quebec (population 8.7 million, 1.7 million km²), optometrists were authorised to use therapeutic pharmaceutical agents to diagnose and treat ocular disease.⁹⁻¹² Certification for therapeutic privileges was granted to all practising optometrists pursuing additional graduate-level courses and to new graduates from optometry training programmes which covered the required competencies. Uptake for this training was broad and since 2021, barring a few exceptions, all practising optometrists in Quebec, totalling 1562 that year, are required to be therapeutically qualified.¹³ As a result, such practitioners are present in all regions across the province. In 2019, nearly 185,000 eye emergency services were billed by optometrists to the *Régie de l'assurance-maladie du Québec* (RAMQ, the universal provincial health care provider).¹⁴ The number of ocular emergencies treated by optometrists has increased significantly over the years.^{15,16} A 2016 study reported that optometrists were the professionals performing the largest proportion (44%) of ocular foreign body extractions, compared to years preceding the increased scope of practice of optometry.¹⁶ This contributes to decreasing the load of ophthalmologists, among others, who often have longer wait times and who require a referral from another professional.^{16,17}

However, despite having a large number of qualified professionals in a given jurisdiction, disparities in access to emergency health care can be caused by several interrelated factors, as explained in the model described by Andersen.^{18,19} This model details several dimensions of access to emergency care, each of which is defined by various factors: level of morbidity assessed by the professional at triage, time before obtaining the service, or associated costs and type of region (urban vs. rural).^{18,20} Studies report that access to eye care is reduced for residents of rural areas, typically due to lower numbers of health professionals, longer distance to travel and the lack of public transport.²¹⁻²⁴

To date, no studies exist on the accessibility of emergency eye services where optometrists are qualified to manage them. Conducted in Quebec, a jurisdiction with a large number of therapeutically qualified optometrists, this study aimed describe the accessibility emergency eye care appointment for new patients and explore factors which may affect it. These include morbidity of patient complaints at triage, geographical region of practices, and out-of-pocket costs incurred.

Methods

This cross-sectional study used a simulated patient approach, to replicate the reality of a new patient seeking emergency eye care. In assessing accessibility to healthcare, not all methods allow for valid measurement. Simulated-patient studies has been reported as both reliable and ethical: researchers will call practices posing as a patient, using varying scenarios of a patient seeking care.²⁵ This optimises objectivity and representativeness of the patient experience, by limiting recall and social desirability biases, which may be present when surveying practitioners. To reduce information bias from the interviewers or participants and to limit disruption to practice operations, researchers make calls to various practices, using predetermined scripts. This has been employed in various fields of health care,²⁵⁻³⁰ including eye care.³¹

This protocol simulated a situation where a patient did not know in advance which practices could offer them emergency eye services and could contact any practice in their area. All optometry practices in the province were considered for sampling, using a list obtained from the RAMQ.³² The only inclusion criterion was for a practice to have at least one optometrist registered there for RAMQ billing. There were no exclusion criteria. The list was randomised and stratified according to its region type: urban (> 100,000 inhabitants), peri-urban (30,000 – 99,999 inhabitants), or rural (< 29,999 inhabitants).³³ The sample size was projected to 90, based on a similar study which had contacted 85 practices regarding accessibility to emergency dental appointments.²⁶ This number was increased, aiming for 30 practices in each category of regions.

Before starting data collection, practices were contacted by telephone to offer participation in the study. If they were interested, verbal consent was obtained from the practice owner or manager. They were informed that two data collection calls would be made to the practice within the following six-month period, avoiding to specify the exact script, dates or times of the calls, to minimise social desirability bias. For the same reason, owners and managers were asked not to mention the study to their staff.

Student researchers called the participating practices during May and June 2022, at times of the week most likely to secure an appointment, such as weekday mornings. To minimise disruption to practice operations, some days were avoided: Mondays (busy after the weekend) and Fridays (fewer optometrists available). For each participating practice, two calls were placed by the same student researcher, spaced three weeks apart, in randomised order. Each presented one of two standardised scenarios, created with all relevant information for taking an appointment, including age, fictitious name, symptoms and complementary information revealed upon request (Appendix 1). The first scenario related a condition of suspected low morbidity in the form of an acute red eye, simulating a mild conjunctivitis (26-year-old with slight redness and some clear discharge, without photophobia, present and constant for the past

48 hours). The second scenario represented a condition of suspected higher morbidity, simulating an acute retinal break (26-year-old with acute and constant floaters and flashes for the past 48 hours). In the first call, if a participating practice informed researchers that the practice does not accept emergency appointments, the second call/scenario was omitted and considered an appointment refusal, to avoid unnecessary disruption to the practice operations.

After the data collection period, a debriefing email was sent to all practice owners who had been contacted. The email informed them that their practice had indeed been contacted, thanked them for their participation and provided an estimated publication date of the data.

The three main outcome variables were: obtaining an emergency eye appointment (granted or refused), time between the phone call and the appointment (time-to-appointment, in hours) and predicted out-of-pocket cost of the appointment (in Canadian dollars) for a patient with a valid RAMQ coverage.

The data on out-of-pocket fees regarded the therapeutic management of the emergency appointment. In Quebec, billing for optometric services is similar for all residents, combining both public and private coverage. Several optometric services are insured by the RAMQ and billed directly by the optometrist. Some additional costs, for uninsured acts are billed to the patient; some patients have complementary private health insurance to cover these fees. The diagnostic optometric examination for an emergency eye appointment is insured by RAMQ for anyone with valid coverage (all Quebec residents, no age restrictions). However, the therapeutic management of the condition is uninsured and the cost is therefore at the expense of the patient.^{34,35} Therapeutic management is defined as the application of clinical judgement by the optometrist and their management and professional responsibility following the examination, such as the treatment of the condition or the issuance of a pharmaceutical prescription.³⁵ In 2022, the fees for the therapeutic management of an ocular

pathology, as suggested by the Quebec Association of Optometrists, ranged from 60 to 85 dollars, depending on morbidity.³⁶ Although the professional association issues fee schedule yearly, each practice is free to fix their examination fees.

Statistical analysis was performed using JASP software (version 0.16; University of Amsterdam, The Netherlands, <https://jasp-stats.org>). In addition to descriptive statistics, between-group and within-group comparisons were made using Pearson chi-squared, for categorical variables. All continuous variables were tested for normality. Non-parametric tests (Wilcoxon signed-rank or Kruskal-Wallis tests) were conducted if distribution was not normal. When applicable, effect size was calculated using Cramer's V or Phi coefficient (ϕ).

The tenets of Helsinki were observed and the study was approved by the Clinical Research Ethics Committee (CERC #2022-1508) at the University of Montreal.

Results

Among the 1589 eligible optometry practices in Quebec, calls were made to a total of 95 practices. Six practices declined to participate and 89 practices consented to participate (response rate = 93.7%): 30 urban practices, 30 peri-urban practices and 29 rural practices. In all, 168 calls were completed and 58 appointments were granted. While the reason for appointment refusal was not systematically recorded, 10 practices stated on the first call that they could not offer any emergency appointments, which cancelled further calls to those practices. Of these, two stated not offering emergency services for new patients, prioritising established patients. Many practices reported offering emergency services to new patients, but not having the current capacity to grant an appointment. Thirteen practices offered information on out-of-pocket costs without granting appointments.

Table 1 describes the proportion of appointments obtained across regions and by levels of morbidity scenarios. In all, 53.9% of practices (n = 48), did not grant any eye emergency appointment. While a fifth of practices (n = 17, 19.1%) granted appointments for both clinical scenarios, practices giving only one appointment favoured the low-morbidity scenario twice as often as the high-morbidity scenario (18.0% vs. 9.0%).

(Insert Table 1 near here)

There was a statistically significant difference in likelihood of obtaining at least one type of appointment across regions (X^2 , $p = 0.008$, moderate effect size). Specifically, obtaining at least one type of appointment was more likely in rural practices (n = 20, 68.9%) compared to urban practices (n = 12, 40%, $p = 0.03$, moderate effect size) and peri-urban practices (n = 9, 30%, $p = 0.003$, moderate to high effect size).

Looking at the low-morbidity scenario (Table 2), 34.8% of all practices (n = 31) granted an appointment; more appointments were given in rural practices, (51.7%, n = 15), compared to urban (26.7%, n = 8) or peri-urban practices (26.7%, n = 8), although these differences did not reach statistical significance (X^2 , $p = 0.07$). Among all practices declining to grant an appointment for the low-morbidity scenario, five directed callers to a pharmacist.

(Insert Table 2 near here)

For the high-morbidity clinical scenario, 30.3% (n = 27) of all practices granted an appointment. More appointments for this scenario were given in rural practices, (48.3%, n = 14), compared to urban (23.3%, n = 7) or peri-urban (20.0%, n = 6) practices, with a statistically significant difference (X^2 , $p = 0.04$, moderate effect size). Statistically significant differences were found between rural vs. peri-urban practices (X^2 , $p = 0.02$, moderate effect size) and between rural vs. urban practices (X^2 , $p = 0.045$, moderate effect size).

Table 3 shows the delays between the phone call and the emergency appointments. Globally, median time-to-appointment was 3.7 hours (IQR 1.8 – 6.3). Two outliers were excluded, where practices granted low-morbidity appointments with wait times of over one week. Sensitivity analyses including these practices did not modify the output. Low-morbidity scenarios had a longer median time-to-appointment (4.9h, IQR 1.5 – 9.2) than the high-morbidity scenario (3.0h, IQR 2.6 – 4.6), but this difference was not statistically significant (Wilcoxon signed-rank test, $p = 0.8$).

(Insert Table 3 near here)

Median time-to-appointment was shortest in urban practices (2.9h, IQR 1.3 – 9.0), followed by rural (4.0h, IQR 1.6 – 18.0), and peri-urban practices (5.7h, IQR 5.5 – 8.9). However, no significant differences between regions were found (Kruskal-Wallis test; for both scenarios: $p = 0.3$; only low-morbidity scenario: $p = 0.3$; only high-morbidity scenario: $p = 0.5$).

The median out-of-pocket cost for all appointments was 55 dollars (IQR 50 – 65) (Table 3). Low-morbidity appointments had a median cost of 55 dollars (IQR 50 – 60), slightly lower than that of the high-morbidity scenario appointments, at 58 dollars (IQR 49 – 66), but this difference was not statistically significant (Wilcoxon signed-rank test, $p = 0.2$).

Median out-of-pocket costs for the low-morbidity appointments were slightly higher in urban and peri-urban practices (both 55 dollars, IQR 55 – 63) than in rural practices (50 dollars, IQR 10 – 80). High-morbidity appointments were most expensive in peri-urban practices (62 dollars, IQR 51 – 92), followed by urban practices (56 dollars, IQR 49 – 66), and rural practices (50 dollars, IQR 43 – 65). However, none of these differences between regions was statistically significant (Kruskal-Wallis test; both scenarios: $p = 0.2$; only low-morbidity scenario: $p = 0.2$; only high-morbidity scenario: $p = 0.5$).

Discussion

This study describes how the accessibility to emergency eye care is somewhat limited for new patients in Quebec, a jurisdiction with a large number of therapeutically qualified optometrists throughout its territory. The likelihood of obtaining an appointment is affected by geographic region of practices and to some extent, by the morbidity of patient complaints.

More than half of the practices (53.9%) did not grant any emergency appointments, as requested by the mystery patients. This is a disappointing finding, considering that all Quebec optometrists are qualified to treat ocular emergencies, that their role in managing emergency conditions is substantial since the increased scope of practice and that the universal healthcare system in Canada is under increasing stress, with long wait times for services such as ophthalmology.^{16,17} About half of the practices not granting emergency appointments directed patients to the closest emergency room or a pharmacist; many practices stated that they did not offer emergency services, or not for new patients; other practices responded that they could not grant appointments because they had reached their capacity for such appointments. All this suggests that demand for emergency optometric services currently exceeds the professional offer. The uptake of emergency appointments by optometrists in Quebec could be improved, and the solution may partly lie in a more equitable distribution of cases among practices.

Geographical location of a practice was determinant in the likelihood of obtaining an appointment. In rural practices, likelihood was higher compared to peri-urban or urban practices, especially for the high-morbidity scenario. This could be explained by the lower numbers of ophthalmologists and hospital emergency rooms in rural areas, which may increase the perceived responsibility of optometrists in emergency care.³⁷ There could also be a positive feedback loop of rural optometrists seeing more emergency patients, maintaining a higher level of confidence in managing them. However, it is

encouraging to see that more rural practices accepted emergencies than their urban or peri-urban counterparts, considering the known barriers to accessing health care in rural areas (distance to travel, scarcity of public transport).²¹

Regarding the morbidity of patient complaints, low-morbidity appointments were granted more often than high-morbidity ones, especially in practices granting only one appointment between the two proposed scenarios. This could be explained by the management of an acute red eye typically requiring less chair time and administrative procedures than an appointment for a presumed retinal break, which requires a dilated fundus examination and possibly a referral to ophthalmology. With busy schedules, some optometrists may not favour time-consuming, unplanned emergency appointments for new patients. Some practices alleviate this by planning for emergency appointments, keeping dedicated blank spaces in optometrists' schedules, filling them with emergencies as the day advances.

Across regions, when an appointment was granted, the time-to-appointment was short, with a median under four hours. Morbidity of complaints did not affect wait times significantly, but high-morbidity appointments tended to have slightly shorter wait times than low-morbidity ones. This is reassuring, considering their urgency and increased risk of potential vitreoretinal complications. Among practices not granting an appointment for a high-morbidity scenario, some practices mentioned the importance of continuing the search to be seen by an optometrist by warning of the risks that the patient would face, namely a retinal detachment. The staff also often directed callers to the emergency room, sometimes mentioning a specific hospital in the city where an ophthalmologist on call could be found. The exact number of referrals to the hospital was not retained, but it is estimated that some 30 practices made this type of recommendation, about half of the practices not granting an appointment. While this does not actively simplify access to care for a patient, at least they were informed of the importance of consulting urgently. Urban practices had slightly lower wait times than their rural or peri-urban counterparts; this could be due to

the higher number of practices in cities, which is known to facilitate access compared to rural areas.²²⁻²⁴

Out-of-pocket costs for emergency appointments were uniform across regions, typically situated between 50 – 60 dollars. These fees are in the lower range of Quebec Association of Optometrists recommendations at the time of data collection (55 – 80 dollars).³⁶ Unsurprisingly, fees for high-morbidity appointments were slightly higher, probably attributable to the additional testing they require. This relative uniformity of fees may be attributable to the publication of a recommended schedule from the local professional association. It is possible that an uneven distribution of fees would add another decisional factor for patients seeking care, especially in rural areas, should the few local practitioners request higher fees than elsewhere.

It is notable that at the time of the study, emergency appointments did not generate lower professional fees compared to comprehensive eye examinations. Indeed, an optometry practice received between 80 – 90 dollars for a given emergency appointment, combining the RAMQ reimbursement of an emergency diagnostic examination (27 dollars) to the out-of-pocket costs reported in this study.³⁸ A comprehensive exam, typically requiring more chair time, would generate between 59 – 76 dollars for a patient with routine RAMQ coverage (children, seniors and those receiving welfare benefits) and 124 dollars for uninsured patients, paying out-of-pocket.^{36,38} However, comprehensive eye examinations may generate additional practice income from the sale of spectacles. The financial aspects regarding the various types of appointments, and their effect on the uptake of emergency appointments by optometry practices, are elements to be studied further.

Generalisability of these results from Quebec may be limited when comparing to other jurisdictions with different geographical distribution of practices and type of insurance coverage differs. However, this study highlights how even with many highly skilled optometrists available across a large territory, accessibility

to emergency eye care may be limited. It may also be influenced by some of the factors such as the geographical spread of practices and the type of conditions of patients seeking care.^{18,19} From a public health standpoint, advocacy and policymakers should remain aware that in order to optimise accessibility of services, reflexion should go beyond the number of practitioners and their scope of practice.

Strengths of this study include its simulated-patient methodology, which standardises data collection and circumvents social desirability bias. It is also the first to use this to assess emergency eye care services. Sampling among all Quebec optometry practices was another advantage, supporting good validity throughout the province.

There are three main limitations. First, for reasons of feasibility related to this simulated-patient study, only scenarios involving new patients were used. For patients under current care of an optometrist, obtaining an emergency appointment is possibly easier than what is reported here.

Second, some methodological choices such as placing calls at the least busy times for practices, to avoid an undue burden on their activities, or having scripted scenarios with flexible patient schedules, may have overestimated the likelihood of obtaining appointments. Indeed, real patients could call at busier times, have more restrictive schedules, competing priorities and travel time, all of which could hinder obtaining an emergency appointment compared to the results presented here.

Third, this protocol could not capture the effect of the type of practice (commercial, independent practice, professional group, etc.) on the uptake of emergency appointments, although this may be another of its determinant factors. Indeed, there is some perception within the profession that optometrists in so-called commercial practices are less likely to accept emergency appointments, but no available data support this point. Avoiding to stratify the

sampling according to the type of practice was deliberate, to remain as close as possible to the experience of orphan patients. In search for an emergency appointment, they would likely approach any practice in their vicinity, regardless of its type. In addition, classifying the variety of practice models into a few categories may lead to misclassification bias. Indeed, differences in practice patterns among the same categories may be overlooked. This question, along with others about barriers and facilitators to the uptake of emergency patients, should be examined using a qualitative research protocol.

Conclusion

This study shows that in the Canadian province of Quebec, for a new patient, less than half of optometry practices would grant an emergency eye care appointment. When granted, wait time and out-of-pocket costs were low and fairly uniform. This illustrates that even in a jurisdiction where all optometrists are therapeutically trained and available across its territory, accessibility to emergency eye care is influenced by the geographical region of a practice and to some extent, by the level of morbidity of conditions of patients seeking care. These data may provide insight to policymakers and help advocacy efforts to improve accessibility of eye care.

Acknowledgments

The authors would like to thank the participating practices for their participation, making this study possible. No funding was received for this work.

References

- 1 The way forward - options to help meet demand for the current and future care of patients with eye disease. The Royal College of Ophthalmologists. 2017 Available from <https://www.rcophth.ac.uk/wp-content/uploads/2017/01/RCOphth-The-Way-Forward-Emergency-Eye-Care-300117.pdf>, Accessed on 2025-01-10.
- 2 Parkins DJ, Curran R, Pooley JE et al. The developing role of optometrists as part of the NHS primary care team. *Optometry in Practice* 2014; 15: 177-184.
- 3 Buchan JC, Barnes B, Cassels-Brown A et al. The urgent need to develop emergency EYE care in the UK: the way forward? *Eye (Lond)* 2017; 31: 1515-1518.
- 4 Working together for better eye care. *Optometry Australia*. 2021 Available from <https://www.optometry.org.au/wp-content/uploads/Working-Together-for-Better-Health-Care-update-16Aug2021-update.pdf>, Accessed on 2025-01-10.
- 5 Optometric scope: breaking down barriers. *Review of Optometry*, Spiegle L. 2024 Available from <https://www.reviewofoptometry.com/article/optometric-scope-breaking-down-barriers>, Accessed on 2025-01-10.
- 6 Eyes forward: advancing optometry with AI and teleoptometry. Canadian Association of Optometrists. 2024 Available from <https://opto.ca/sites/default/files/2024-01/Olf%20Report%20Optometry%20in%20Canada%202024.pdf>, Accessed on 2025-01-10.
- 7 Optometric practice reference standards of practice. College of optometrists of Ontario. 2022 Available from https://collegeoptom.on.ca/wp-content/uploads/COO_Standards-of-Practice_WEB-Dec-2022.pdf, Accessed on 2025-01-10.
- 8 Muth CC. Eye Emergencies. *JAMA Ophthalmol* 2017; 318: 676-676.
- 9 Buys YM, Nicolela M. Interprofessional care and collaboration: are ophthalmologists and optometrists ready? *Can J Ophthalmol* 2009; 44: 254-256.
- 10 Que fait l'optométriste? *Ordre des optométristes du Québec*. 2021 Available from <https://www.ooq.org/fr/grand-public/que-fait-loptometriste> Accessed on 2024/08/02.
- 11 Annual demographic estimates: Canada, provinces and territories, 2022. Statistics Canada. 2022 Available from <https://www150.statcan.gc.ca/n1/pub/91-215-x/2022001/sec1-eng.htm>, Accessed on 2025-01-13.

- 12 Québec facts and figures. Secrétariat du Québec aux relations canadiennes. 2015 Available from <https://www.sqrc.gouv.qc.ca/representation-quebec-canada/le-quebec/donnees-en.asp>, Accessed on 2025-01-13.
- 13 Health workforce in Canada: overview. Canadian Institute for Health Information. 2022 Available from <https://www.cihi.ca/en/health-workforce-in-canada-overview>, Accessed on 2025-01-14.
- 14 Banques de données des statistiques officielles sur le Québec. Examen d'urgence, Services optométriques. Gouvernement du Québec. 2021 Available from https://bdso.gouv.qc.ca/pls/ken/ken213_afich_tabl.page_tabl?p_iden_tran=REPERFF48KY2073437254732Z-Cy9&p_id_raprt=2401#co_tertr_refrn=00&nm_temps_refrn=2019&tri_opto=32, Accessed on 2024/08/02.
- 15 Campbell RJ, Hatch WV, Bell CM. Canadian health care: a question of access. *Arch Ophthalmol* 2009; 127: 1384-1386.
- 16 Tousignant B, Coulibaly D, Brûlé J et al. Ocular foreign bodies: evolution of professional roles and public costs in Quebec. *Can J Optom* 2021; 83: 9-15.
- 17 Waiting your turn - wait times for health care in Canada, 2022 report. Fraser Institute. Mackenzie M, Bacchus B. 2022 Available from <https://www.fraserinstitute.org/sites/default/files/waiting-your-turn-2022.pdf>, Accessed on 2024/08/02.
- 18 Andersen R. Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav* 1995; 36: 1-10.
- 19 Andersen R, Davidson P, Baumeister S. Improving access to care. In: Kominski G ed. *Changing the US health care system: key issues in health services policy and management*, 4e ed. San Francisco: Jossey-Bass, 2014. p 33-70.
- 20 Worsley D, Robinson P, Marshman Z. Access to urgent dental care: a scoping review. *Community Dent Health* 2017; 34: 19-26.
- 21 Kilmer G, Bynum L, Balamurugan A. Access to and use of eye care services in rural Arkansas. *J Rural Health* 2010; 26: 30-35.
- 22 Chou CF, Zhang X, Crews JE et al. Impact of geographic density of eye care professionals on eye care among adults with diabetes. *Ophthalmic Epidemiol* 2012; 19: 340-349.
- 23 Lee CS, Su GL, Baughman DM et al. Disparities in delivery of ophthalmic care; An exploration of public Medicare data. *PLoS One* 2017; 12.
- 24 Lee EY, Cui K, Trope GE et al. Eye care utilisation in Newfoundland and Labrador: access barriers and vision health outcomes. *Can J Ophthalmol* 2018; 53: 342-348.

- 25 Rhodes K, Miller F. Simulated patient studies: an ethical analysis. *Milbank Q* 2012; 90: 706-724.
- 26 Bisgaier J, Cutts D, Edelstein B et al. Disparities in child access to emergency care for acute oral injury. *Pediatrics*. 2011 [cited]; 127: 1428-1435.
- 27 Campbell J, Carter M, Davey A et al. Accessing primary care: a simulated patient study. *Br J Gen Pract* 2013; 63: 71-76.
- 28 Salisbury C, Montgomery A, Simons L et al. Impact of advanced access on access, workload, and continuity: controlled before-and-after and simulated-patient study. *Br J Gen Pract* 2007; 57: 608-614.
- 29 Parwani V, Ulrich A, Rothenberg C et al. National assessment of surprise coverage gaps provided to simulated patients seeking emergency care. *JAMA Netw Open* 2020; 3.
- 30 Corbisiero MF, Muffly TM, Gottman DC et al. Insurance status and access to otolaryngology care: national mystery caller study in the United States. *Otolaryngol Head Neck Surg* 2024; 171: 98-108.
- 31 Lee YH, Chen AX, Varadaraj V et al. Comparison of access to eye care appointments between patients with Medicaid and those with private health care insurance. *JAMA Ophthalmol* 2018; 136: 622-629.
- 32 Régie de l'assurance maladie du Québec. Facturation - Liste des établissements et des installations du réseau de la santé. Gouvernement du Québec. 2021 Available from <https://www.ramq.gouv.qc.ca/fr/professionnels/etablissements-reseau-sante/facturation/liste-etablissements/Pages/choix-region.aspx>, Accessed on 2024/08/02.
- 33 Statistique Canada. Classification des centres de population et des régions rurales 2016. Gouvernement du Canada. 2017 Available from <https://www.statcan.gc.ca/fra/sujets/norme/ccpr/2016/introduction> Accessed on 2024/08/02.
- 34 Urgences sans blessure. Association des optométristes du Québec. 2024 Available from <https://www.aoqnet.qc.ca/vision/urgences/urgences.php>, Accessed on 2024/08/02.
- 35 Régie de l'assurance-maladie du Québec: services optométriques. Gouvernement du Québec. 2020 Available from <https://www.ramq.gouv.qc.ca/fr/citoyens/assurance-maladie/services-optometriques>, Accessed on 2024/08/02.
- 36 Guide sommaire des tarifs. Association des optométristes du Québec. 2022 Available from <https://www.aoqnet.qc.ca/assets/pdf/Grilledetarifs2022-FR.pdf>, Accessed on 2024/08/04.
- 37 Supply, distribution and migration of physicians in Canada, 2022 — data tables. Canadian Institute for Health Information. 2023 Available from <https://www.cihi.ca/en/search?query=ophthalmology>, Accessed on 2024-09-19.

38 Manuel des optométristes - Entente et tarifs - RAMQ. Régie de l'assurance-maladie du Québec. 2020 Available from <https://www.ramq.gouv.qc.ca/SiteCollectionDocuments/professionnels/manuels/syra/optometristes/Manuel-optometristes.html#109403>, Accessed on 2024-09-27.

Corresponding author: Benoit Tousignant, benoit.tousignant@umontreal.ca

Table 1 - Frequency of emergency eye appointments granted by Quebec optometry clinics, by regions

	Appointments granted (n)	%	95% CI
All practices (N = 89)			
None	48	53.9	43.4 - 64.5
Both scenarios	17	19.1	11.5 - 28.8
At least one clinical scenario [†]	41	46.1	35.4 - 60.0
Only low-morbidity scenario	16	18.0	10.6 - 27.6
Only high-morbidity scenario	8	9.0	3.9 - 20.0
Urban (N = 30)			
None	18	60.0	40.6 - 77.3
Both scenarios	3	10.0	2.1 - 26.5
At least one clinical scenario	12 [‡] §#	40.0	22.6 - 59.4
Only low-morbidity scenario	7	23.3	9.9 - 42.2
Only high-morbidity scenario	2	6.7	0.1 - 22.1
Peri-urban (N = 30)			
None	21	70.0	50.6 - 85.3
Both scenarios	5	16.7	5.6 - 34.7
At least one clinical scenario	9 [‡] ¶#	30.0	3.8 - 30.7
Only low-morbidity scenario	2	6.7	0.1 - 22.1
Only high-morbidity scenario	2	6.7	0.1 - 22.1
Rural (N = 29)			
None	9	31.0	15.3 - 50.1
Both scenarios	9	31.0	15.3 - 50.1
At least one clinical scenario	20 [‡] §¶	68.9	49.1 - 84.7
Only low-morbidity scenario	7	24.1	10.3 - 43.5
Only high-morbidity scenario	4	13.8	3.9 - 31.7

[†] Low-morbidity scenario (acute red eye) or high-morbidity scenario (recent flashes/floaters)

Between-group comparison:

[‡] difference is statistically significant: $X^2(2, N = 89) = 9.7, p = 0.008$, moderate effect size (Cramer's $V = 0.3$)

Within-group comparisons:

[§] difference is statistically significant: $X^2(1, N = 59) = 5.0, p = 0.03$, moderate effect size ($\phi = 0.3$)

[¶] difference is statistically significant: $X^2(1, N = 59) = 9.0, p = 0.003$, moderate to high effect size ($\phi = 0.4$)

[#] difference is not statistically significant: $X^2(1, N = 60) = 0.7, p = 0.4$

Table 2 – Frequency of obtaining an appointment for emergency eye care in Quebec optometry clinics, by morbidity of clinical scenario

	Appointments granted (n)	%	95% CI
Low-morbidity scenario (acute red eye)			
All regions (N = 89)	31 [†]	34.8	25.0 - 45.7
Urban (N = 30)	8 [‡]	26.7	3.9 - 20.0
Peri-urban (N = 30)	8 [‡]	26.7	3.9 - 20.0
Rural (N = 29)	15 [‡]	51.7	9.8 - 26.2
High-morbidity scenario (recent flashes/floaters)			
All regions (N = 89)	27 [†]	30.3	21.0 - 41.0
Urban (N = 30)	7 ^{§#}	23.3	9.9 - 42.3
Peri-urban (N = 30)	6 ^{§¶}	20.0	7.7 - 38.6
Rural (N = 29)	14 ^{§¶#}	48.3	29.5 - 67.5

† All regions, between levels of morbidity: not statistically significant: $X^2(2, N = 178) = 0.4, p = 0.5$

‡ low-morbidity, between regions: not statistically significant: $X^2(2, N = 89) = 5.4, p = 0.07$

§ high-morbidity, between regions: statistically significant: $X^2(2, N = 89) = 6.6, p = 0.04$, moderate effect size (Cramer's $V = 0.3$)

¶ high-morbidity, rural vs. peri-urban: statistically significant: $X^2(1, N = 59) = 5.3, p = 0.02$, moderate effect size ($\phi = 0.3$)

high-morbidity, rural vs. urban: statistically significant: $X^2(1, N = 60) = 4.0, p = 0.045$, moderate effect size ($\phi = 0$).

Table 3 – Time-to-appointment and out-of-pocket costs for emergency eye care in Quebec optometry clinics, by regions and level of morbidity scenario

IQR: interquartile range
 CAD: Canadian dollars

	Time-to-appointment			Out-of-pocket costs		
	n	Median, h	IQR	n	Median, CAD	IQR
All practices (N = 89)						
All scenarios [†]	56 [‡]	3.7	1.8 - 6.3	71 [§]	55.0	50.0 - 65.0
Low-morbidity scenario	31 [¶]	4.9	1.5 - 9.3	39 [#]	55.0	50.0 - 60.0
High-morbidity scenario	27 [¶]	3.0	2.4 - 4.6	32 [#]	57.5	48.8 - 65.6
Urban practices (N = 30)						
All scenarios	15	2.5	1.3 - 5.3	18	55.0	53.1 - 62.5
Low-morbidity scenario	8	2.9	1.4 - 9.0	10	55.0	55.0 - 62.5
High-morbidity scenario	7	2.5	1.3 - 4.6	8	56.3	48.8 - 65.6
Peri-urban practices (N = 30)						
All scenarios	13	4.7	3.4 - 5.7	22	57.5	50 - 69.4
Low-morbidity scenario	7	5.7	5.5 - 8.8	12	55.0	50.0 - 60.0
High-morbidity scenario	6	3.2	2.6 - 3.6	10	62.5	51.3 - 91.9
Rural practices (N = 29)						
All scenarios	28	3.7	2.2 - 10.7	31	50.0	50.0 - 60.0
Low-morbidity scenario	14	4.0	1.6 - 18.0	17	50.0	50.0 - 60.0
High-morbidity scenario	14	3.7	2.4 - 6.2	14	50.0	42.5 - 65.5

None of the differences in median time-to appointment or out-of-pocket costs between regions or levels of morbidity were statistically significant

[†] Low-morbidity scenario (acute red eye) or high-morbidity scenario (recent flashes/floaters)
[‡] Excludes 2 practices which granted appointments but with more than one week of wait time
[§] Includes 13 practices which did not grant appointments but supplied data on costs

[¶] Difference was not statistically significant (Wilcoxon signed-rank test, p = 0.8)
[#] Difference was not statistically significant (Wilcoxon signed-rank test, p = 0.2)