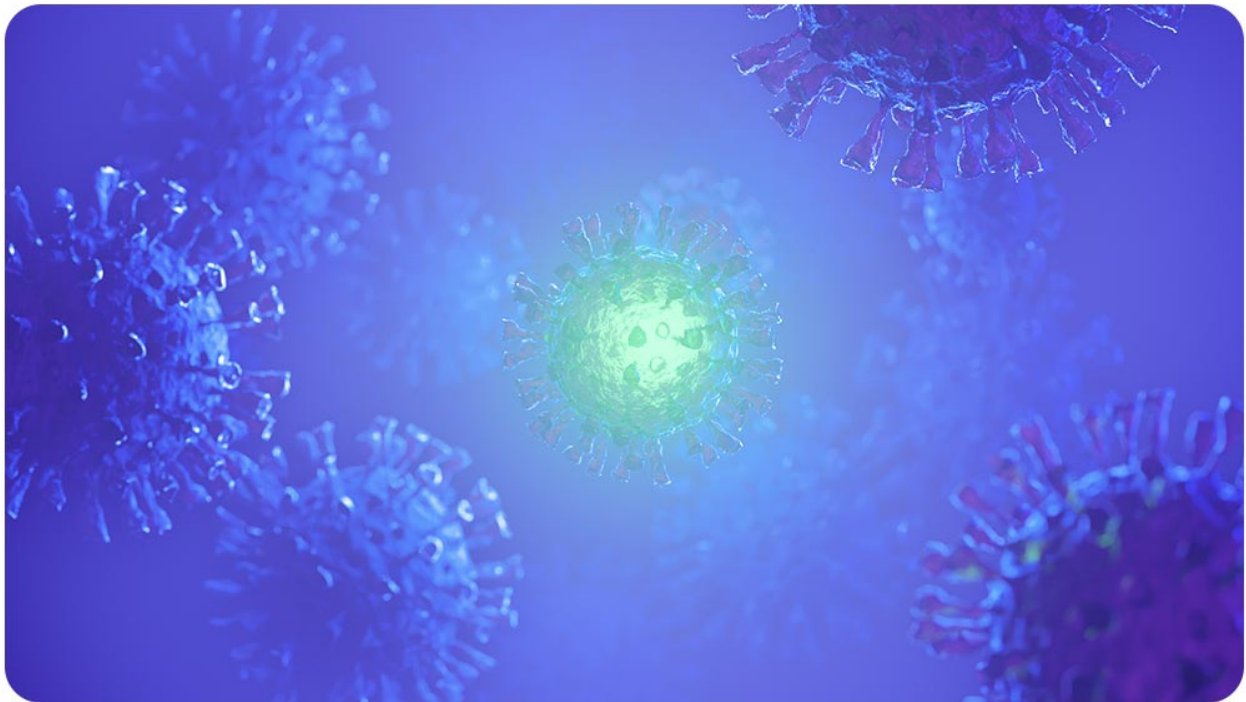




ADDENDUM TO THE SUMMARY REPORT ON THE COST OF VISION LOSS AND BLINDNESS IN CANADA



The Impact of the COVID-19 Pandemic On Eye Health in Canada

Canadian Council of the Blind

Keith D. Gordon, Ph.D.

September 2021

"This report estimates the change in costs for vision loss and blindness and the impact of both delayed and missed treatments due to the pandemic. To successfully prepare for ophthalmic care needs in Canada in the coming months and years, it is essential to better understand the broader clinical, health system, and economic impacts of the pandemic."

Addendum to the Cost of Vision Loss and Blindness in Canada Report
The Impact of COVID-19
Deloitte Access Economics
August 2021

Acknowledgement



The Canadian Council of the Blind (CCB) engaged Deloitte Access Economics in December 2020 to provide a contemporary estimate of the annual social and economic cost of vision loss (VL) and blindness in Canada. In support of this report, the CCB partnered with Fighting Blindness Canada and key partners the Canadian Association of Optometrists and the Canadian Ophthalmological Society.

The full report on the Cost of Vision Loss and Blindness in Canada using 2019 data was completed in May 2021. During the completion of that earlier document, it became apparent that the COVID-19 pandemic was having a major impact on the findings of the study. It was therefore decided to conduct a supplementary study on the impact of the pandemic in 2020 on the prevalence and cost of VL. The findings of that study are presented here as an addendum to the original report.



To fund this report, the CCB engaged with several of Canada’s corporate supporters and a number of Canada’s leading research-based pharmaceutical companies. No corporate or pharmaceutical entities have had any control over the development of this report.

We would like to recognize the significant sources of data received from VL stakeholders, our vision health population, and health policy researchers, in particular: Dr. Yaping Jin (University of Toronto), Dr. Ellen Freeman (University of Ottawa), and Dr. Walter Wittich (University of Montreal).

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A. Glossary



<u>Acronym</u>	<u>Full Name</u>
AMD	Age-related macular degeneration
CCB	Canadian Council of the Blind
CIHI	Canadian Institute for Health Information
COVID-19	Coronavirus disease 2019
VEGF	Vascular endothelial growth factor
VL	Vision loss

B. Introduction

In early 2020, the Canadian Council of the Blind (CCB) engaged Deloitte Access Economics to conduct an assessment of the prevalence and cost of vision loss (VL) and blindness in Canada in 2019.¹ The study estimated that 1.2 million Canadians were living with VL in 2019 and that the total cost of VL that year was \$32.9 billion. This cost consisted of a total financial cost of \$15.6 billion and a lost well-being cost of \$17.4 billion.

The emergence and expansion of the COVID-19 (coronavirus disease 2019) pandemic has had an enormous impact on health care systems and practices around the globe. This extends to crucial and often sight-saving ophthalmic surgeries and services in Canada, which saw a dramatic reduction in 2020. For this reason, it was deemed essential that the cost of vision loss and blindness report be updated with an addendum that assesses the impact of the pandemic on the reported prevalence and cost of VL.

To adequately plan vision health services for the future, it is necessary to understand the impact that the pandemic has had on the provision of services and what will be needed in the future to overcome any additional problems and backlogs created by the pandemic.

C. Executive Summary



The estimated costs detailed in this report reflect the impact of COVID-19 from March to December of 2020, highlighting aggregated, pan-Canadian effects resulting from:

- A reduction in the utilization of health services in 2020, which led to a reduction in overall costs. These are quantified for inpatient hospitalizations, day surgeries, pharmaceutical claims, as well as ophthalmologist and optometrist visits.
- Delays in the provision of specialist care and surgical interventions, including those for cataract surgery as well as anti-vascular endothelial growth factor (anti-VEGF) injections for age-related macular degeneration (AMD), diabetic retinopathy, and other eye conditions.
- A reduction in routine follow-up visits and prescriptions for patients, including a reduction in anti-glaucoma medications and supplements that reduce the progression of AMD.
- A reduction in new diagnoses and referrals to eye specialists.

D. Key Findings

1. **There was a 47% decrease in surgeries of all types performed across Canada between March and June of 2020, including surgeries for cataracts, glaucoma, retinal diseases, and other diseases with the potential to lead to VL.**

Data from the Canadian Institute for Health Information (CIHI)ⁱⁱ has revealed that 335,000 fewer surgeries of all types were performed between March and June of 2020 compared to the same timeframe from the previous year.

2. **The overall cost of VL to the health care system was reduced by \$730 million in 2020 compared to 2019 due to an underutilization of services.**

It is important to recognize, however, that this reduction will have serious and ongoing implications in relation to VL. These will likely occur between 2021 and 2023, and perhaps even beyond, for major eye conditions such as cataracts, glaucoma, AMD, and diabetic retinopathy.

3. **It is estimated that 2.9 million fewer visits to optometrists were made in 2020 compared to 2019.**



4. **An estimated 1,437 people lost vision due to delayed eye examinations and treatments in 2020.**
5. **Wait times for cataract surgery increased by 31 days in 2020, with an estimated 143,000 eye surgeries missed or delayed in 2020.**
6. **It is expected to take two years to clear the additional backlog of cataract surgeries caused by the pandemic. It is estimated that an additional \$129 million per year will be required to clear the backlog between 2021 and 2023.**
7. **An increase in wait times for surgery will result in a \$1.3 billion increase in the cost of VL over the next 2.5 years. \$253.3 million of these costs are direct health care system costs and \$1.1 billion result from the loss of well-being.**
8. **The cost of VL will be \$559.4 million higher annually from 2021 to 2023.**

The COVID-19 pandemic continues to challenge Canadian patients and the health care system. As such, the full extent of reduced ophthalmic care and the resulting complexities are still coming into focus. The continuation of data collection, analysis, and research is necessary to assess the longer-term impacts of the pandemic on the eye health of Canadians. As the pandemic continues to unfold and the disruption of care persists, further challenges undoubtedly lie ahead for Canadians living with VL. By studying the implications of COVID-19 on VL and anchoring decision-making on findings, it will at least be possible to design appropriate measures to manage the pandemic's effects on eye health over the next several years.



E. Recommendations

1. An analysis of health care system utilization for ophthalmic services shows that almost three quarters of the services delivered in 2020 were provided to people 65 years of age or older. It is essential that this age group be given priority as soon as services are available since they are the age group most affected by both the pandemic and sight-threatening eye diseases.
2. To overcome the backlog and make up for the estimated 143,000 ophthalmic surgeries that were not performed in 2020, it is essential that provincial governments provide additional funding to hospitals – funding that is specifically allocated to ophthalmic surgery to enable additional resources and operating room time to be allocated for this purpose. This study estimates that an additional \$129 million per year will be required to clear the backlog between 2021 and 2023.
3. Regular and comprehensive eye examinations are regarded as essential for minimizing VL. This report estimates that at least 2.9 million optometric services were not provided in 2020, which puts many people at serious risk of losing vision unnecessarily. It is recommended that an awareness campaign be undertaken to ensure that people return to their optometrists for comprehensive eye examinations. Furthermore, it is recommended that alternative means of providing comprehensive eye examinations, such as CCB mobile eye clinics, be investigated as a way to provide eye examinations to seniors and school children who have been unable to access them during the pandemic.
4. This report shows that there was a substantial decrease in the number of patients who received sight-saving medications, in particular anti-VEGF medications for AMD and diabetic retinopathy. It is essential that all patients receiving these therapies be made aware of the need to continue with therapy and that provincial governments allocate appropriate budgets over the next three years to account for the increase in costs compared with 2020.
5. The increase in the number of people who lost vision due to delayed eye examinations and treatments as a result of the pandemic (1,437 individuals) will increase the number of people seeking vision rehabilitation services over the next few years. Vision rehabilitation



organizations will need to expand their resources so that the needs of these individuals can be appropriately met.

6. All eye doctors should be encouraged to contact all patients who missed appointments during the pandemic to ensure their eye health is maintained.
7. It is recommended that parents and teachers encourage school children to spend more time outdoors to minimize the development of myopia.
8. People with VL and all seniors should be prioritized with respect to vaccination to minimize morbidity and mortality that may be associated with this group.
9. All people with friends or relatives living with VL should be encouraged to contact them regularly to ensure that they are accessing the necessary services and are not isolated and lonely within their homes.

F. Methods

Change in service delivery was assessed through available Canadian data on ophthalmologist and optometrist visits, hospital admissions, pharmaceutical claims, and day surgeries. Costs associated with this data were used to assess the total cost reduction in 2020.

Additional wait times from the surgical backlog were used to project additional days that people were living with VL as a result of the pandemic. Projections were made of the increased risk of VL using data for the number of delayed treatments and the decrease in eye examinations. Both the additional days with VL and the increased risk of VL were used to project the increased cost of VL from 2021 to 2023, which is comprised of costs to the health care system, loss of well-being, productivity losses, and other financial costs.



G. Results

G.1 Impact on service utilization

The reduced utilization of ophthalmic services resulted in a reduction in health care system costs estimated at \$730 million in 2020 (Table 1). Almost three quarters of the services delivered in 2020 were provided to people over the age of 65, the population facing a higher risk from the pandemic.

Cost component	Reduction in health care system costs (\$ million)
Inpatient hospitalizations	1.5
Outpatient services	
Cataract day surgeries	161
Other surgeries	126
Ophthalmologist visits	99
Pharmaceuticals	
Anti-VEGFs	116
Other ophthalmic drugs	21
Optometrist visits	206
Total	730

Table 1. Reduction in health care system costs in 2020

Source: Deloitte Access Economics analysis based on CIHI special data request and IQVIA PharmaStat database



G.1.1 Inpatient hospitalizations

Although hospitals and emergency departments could continue operation during the lockdown, the pandemic introduced significant changes in day-to-day life, resulting in a small decline in hospitalizations in 2020 compared to the same period in 2019.

Service utilization data provided by CIHI shows that there was a more substantial reduction in services delivered between April and June 2020, which recovered from July to September 2020 compared with the same period in 2019. Overall, the number of hospitalizations between April and December 2020 was 8% lower than the same period in 2019 (Table 2).

Table 2. Number of inpatient hospitalizations, April 2019 to December 2020

Condition	Apr. – Dec. 2019	Apr. – Dec. 2020	Change
Cataract, aphakia, or lens dislocation	739	784	6%
Glaucoma	1,145	1,211	6%
Disorders of refraction and accommodation	1,363	1,223	-10%
Other retinal disorders	1,712	1,455	-15%
Other	1,351	1,154	-15%
Total	6,310	5,827	-8%

Source: CIHI special data request



G.1.2 Outpatient services

As elective surgeries were restricted during the lockdown between March and June 2020, the number of day surgeries declined by a significant amount (36%) in 2020 compared to the same period in 2019 (Table 3). In 2019 there were 541,115 ophthalmic same-day procedures performed across Canada. It is estimated that the reduction in procedures across Canada for the nine-month period running from April to December of 2020 was 143,071. Using this number to project costs, it is estimated that an additional \$129 million will be required every year to clear the backlog between 2021 and 2023.

Table 3. Number of day surgeries performed in Alberta, Manitoba, Ontario, Nova Scotia, and P.E.I. from April to December (2019 compared with 2020)

Condition	Apr. - Dec. 2019	Apr. – Dec. 2020	Change
Cataract, aphakia or lens dislocation	165,479	109,854	-34%
Glaucoma	17,063	9,444	-45%
Disorders of refraction and accommodation	8,182	3,598	-56%
Other retinal disorders	8,393	5,220	-38%
Other	5,003	3,096	-38%
Total	204,120	131,212	-36%

Source: CIHI special data request. Note: procedure-related data was only available for Ontario, Alberta, Nova Scotia, P.E.I., and Manitoba.

Consequently, the total provided in the table is lower than the number of services performed across Canada.



G.1.3 Vision care

Almost all optometrists' offices were closed during the first lockdown from March to June 2020, with most offices restricting capacity for the rest of 2020. In addition, people have been hesitant to see health care professionals prior to being fully vaccinated in 2021.

It is estimated that there were 18% fewer visits to optometrists (2.9 million visits) in 2020 compared with 2019. It was estimated that the annual cost of an optometrist visit was \$72ⁱ, which meant that health expenditure on vision care in 2020 was reduced by an estimated \$205.6 million.

G.1.4 Pharmaceutical claims

Pharmaceutical claims data shows that there were almost a million fewer claims in 2020 compared with 2019 (Table 4). While the number of claims is spread out over the complete range of ophthalmic medications, the cost impact was largely due to the decrease in the number of anti-VEGF medications that were injected in 2020. The fact that there were 69,811 fewer claims for anti-VEGF preparations in 2020 is undoubtedly going to result in an increase in the number of people with VL, as well as the severity of VL, due to AMD and diabetic retinopathy (both diseases can lead to more severe forms if left untreated, often resulting in VL and blindness). Decrease in all medication use, but particularly anti-VEGF injections, resulted from a closure of ophthalmologist offices as well as reluctance on the part of many patients to visit doctors during the pandemic.ⁱⁱⁱ



Table 4. Reduction in claims for ophthalmic pharmaceutical preparations (January to December 2020)

Ophthalmic product	Change in number of claims compared with 2019 (Thousands)	Estimated cost impact (\$ million)
Eye tonics and eye vitamins	-3.1	0.01
Miotics and anti-glaucoma preparations	-184.6	8.95
Anti-VEGF products	-69.8	115.64
Ophthalmic non-steroidal anti-inflammatories	-54.3	1.23
Ophthalmic anti-infectives	-297.5	4.34
Ophthalmic anti-infective/anti-inflammatory combinations	-77.2	1.11
Ophthalmic corticosteroids	-219.6	4.20
Other	34.4	1.44
Total	940.4	136.91

Source: Deloitte Access Economics analysis of IQVIA PharmaStat database



G.2 Impact on patient outcomes

The COVID-19 pandemic had a substantial impact on patient outcomes in 2020. This is expected to continue for many years due to the delay in eye care provision experienced by many patients. There are four main contributors to this impact:

- a. The delay in diagnosis of eye disease and reduced referrals to ophthalmologists and ophthalmic sub-specialists.
- b. The reduction in the number of interventions such as cataract and glaucoma surgery, as well as anti-VEGF injections for AMD, diabetic retinopathy, and central retinal vein occlusion.
- c. The reduction in routine follow-up care for patients. This includes routine monitoring of conditions such as glaucoma, which in turn led to a reduction in the number of prescriptions for medications for sight-threatening conditions.
- d. The increased wait times for surgery, most specifically cataract surgery.

These issues also have a significant financial impact that will be felt for at least the next three years. It was estimated that the cost of VL will be \$559.4 million higher each year between 2021 and 2023 as a result of the pandemic (Table 5).

Table 5. Estimated impact on the annual cost of VL, 2021 to 2023

Measure	Annual cost (\$ million)
Delayed identification of eye disease	23.9
Reduced interventions provided	15.2
Impact of increased wait times	520.2
Total difference	559.4

Source: Deloitte Access Economics analysis



G.2.1 Delay in identification of disease

The number of cases of AMD, diabetic retinopathy, and glaucoma that were not diagnosed as a result of the pandemic was estimated and used to project the number of people who lost vision due to lack of diagnosis and treatment (Table 6). In total it was estimated that 879 people lost vision due to their condition not being diagnosed in 2020 during the pandemic. It is estimated that this will result in an additional annual cost of \$23.9 million from 2021 to 2023.

Table 6. Estimated impact of delayed identification of eye disease in 2020

Measure	AMD (No. of patients)	Diabetic retinopathy (No. of patients)	Glaucoma (No. of patients)
Estimated number impacted	7,159	11,575	1,968
Probability of VL with treatment	26.4% ^{iv}	2.1% ^v	5.0% ^{vi}
Probability of VL without treatment	35.1%	3.8%	7.8%
Difference	623	199	57

Source: Deloitte Access Economics analysis



G.2.2 Reduction in number of interventions

The number of glaucoma surgeries not performed and the reduction in the number of anti-VEGF injections were estimated from Canadian data sources.^{vii} These numbers were used to project the number of people who lost vision as a result of their not having received treatment for previously-diagnosed conditions (Table 7). In total it was estimated that 558 people lost vision as a result of not receiving treatment for their previously-diagnosed condition. This is expected to result in an additional cost of \$15.2 million.

Table 7. Estimated impact of the reduction in the number of interventions in 2020

Measure	AMD (No. of patients)	Diabetic retinopathy (No. of patients)	Glaucoma (No. of patients)
Estimated number impacted	1,500	458	7,619
Probability of VL with treatment	69.7%	2.1%	5.0%
Probability of VL without treatment	91.8%	3.8%	7.8%
Difference	331	8	219

Source: Deloitte Access Economics analysis



G.2.3 Impact of increased wait times

The wait times for all ophthalmic surgeries were estimated as having increased by 31 days due to the pandemic.^{viii} It was assumed that all people waiting for surgery incurred at least some symptoms of VL and thus will be likely to incur additional financial and well-being costs, the latter due to a reduced quality of life until they have surgery.

When the additional wait times were converted into additional costs, it was estimated that the additional cost of VL due to the additional wait times was \$520.2 million (Table 8).

Table 8. Additional cost of VL due to increased surgical wait times

No. of surgeries not provided	143,000
No. of additional days waiting for surgery 2020 - 2023	24.1 million
Annual financial cost of VL due to waiting for surgery	\$101.3 million
Annual lost well-being cost of VL due to waiting for surgery	\$418.9 million
Annual total cost of VL due to waiting for surgery	\$520.2 million

G.3 The backlog

The only currently available data on the backlog comes from Ontario^{ix} and Alberta.^x Ontario estimates the ophthalmic surgical backlog to be 114,490 surgeries, requiring \$82 million to clear in coming years. Both Ontario and Alberta estimate that it will take close to two years to clear this backlog. There is no data on how long it would take to overcome the backlog of optometrist and ophthalmologist visits, but it is highly likely that these backlogs will take at least as long as the surgical backlogs, particularly since capacity in doctors' offices has been reduced and is likely to remain reduced throughout 2021.



G.4 The personal impact of the COVID-19 pandemic on people with VL

A previous study conducted by the Canadian Council of the Blindⁱⁱⁱ showed that people with VL were under significant mental stress as a result of the pandemic. Many were experiencing loneliness and fear of the pandemic itself, fear of visiting doctors, fear of losing additional vision, and fear of going out since they were unaware of how to maintain social distancing. For a full description of this study on the personal impacts of the pandemic on people with VL, see the complete report.

There are a number of activities that have been greatly affected by the pandemic that have not been considered in this study. The following are some such activities:

- Vision rehabilitation services for the most part have not been offered to the same extent as they were pre-pandemic. Vision rehabilitation services have been delivered virtually. It is not known whether this has been as effective as in-person delivery of vision rehabilitation services.
- Eye-screening programs focused on the early detection of eye diseases and vision abnormalities in young children have been cancelled during the pandemic^{xi}, as have mobile eye clinics targeting both children and seniors. The impact of these cancellations is yet to be determined.
- The pandemic may have caused an increase in myopia in children due to decreased time spent playing outdoors and increased exposure to near vision activity, including prolonged time spent on screens, reading, and writing.^{xii} Survey data from CooperVision Canada and Maru/Blue indicated that 59% of Canadian parents reported their children under the age of 14 were spending more time doing activities that require their near vision compared to pre-pandemic times. Other studies have shown that there is less myopia in children who spend more time outdoors.^{xiii} Children should be encouraged to spend more time outdoors to minimize the development of myopia.
- People with disabilities are disproportionately impacted by COVID-19 and are at greater risk of morbidity and mortality. Given that VL primarily impacts older adults, the pandemic placed these people at increased risk of negative health outcomes, including worse mental health.^{xiv} Priority for people with disabilities for COVID-19 vaccinations



should be ensured to minimize the additional risk of morbidity and mortality faced by this group.

- The pandemic caused additional impacts for certain eye conditions such as Charles Bonnet syndrome, where people with vision loss experienced more intense and more frequent visual hallucinations.^{xv} Further, a Canadian study found that compared to the pre-COVID group of rhegmatogenous retinal detachment patients, the post-COVID group were more likely to present with generally more severe forms of the condition, and worse baseline visual acuity.^{xvi} However, functional outcomes at three months have been shown to be comparable between the two groups despite the delay.^{xvii}

H. Conclusion

In summary, COVID-19 continues to challenge the Canadian health care system. The full extent of the impact of cancelled and delayed ophthalmic care is still unclear. Continued data collection is required to assess the longer-term impact of the pandemic on the eye health of Canadians. Further challenges lie ahead for the Canadian health care system as it continues to address subsequent waves of the pandemic and ongoing disruptions to ophthalmic services.



I. Appreciation

This report was made possible by unconditional grants from many of the vision loss community's key stakeholders, several of Canada's corporate supporters, and a number of Canada's leading research-based pharmaceutical companies. The report's partners would like to express their sincere appreciation and gratitude for the sponsors' generous support, without which this important initiative could not have been accomplished.



J. Research Leads

Keith Gordon, Principal Investigator

Dr. Keith Gordon is the Senior Research Officer of the Canadian Council of the Blind (CCB) and the author of the CCB report "The Impact of the COVID-19 Pandemic on Canadians Who Are Blind, Deaf-Blind, and Partially-Sighted," published in April 2020.

Dr. Gordon is past Vice President Research of the CNIB and past Research Director of Blind and Low Vision New Zealand. He is also a board member of BALANCE for Blind Adults, and Chair of the Board of the international organization Retina Action.

He is an adjunct professor in the Department of Ophthalmology and Vision Sciences at the University of Toronto and an Honorary Teaching Fellow in the School of Optometry and Vision Science at the University of Auckland in Auckland, New Zealand.

Larissa Moniz, Investigator

Dr. Larissa Moniz joined Fighting Blindness Canada (FBC) in December 2019. She has a Ph.D. in molecular and cancer biology from the University of Toronto and has continued her research in the UK at University College London. Dr. Moniz has worked in research and knowledge translation at a number of health charities, both in the UK and Canada, most recently at Prostate Cancer Canada.

At FBC, Dr. Moniz's team works to deliver on the mission of the organization, which is to fund research toward treatments to preserve and restore vision, to ensure that all Canadians have access to appropriate vision care, and to provide support and information to individuals living with VL.

Chad Andrews, Investigator

Dr. Chad Andrews is a researcher and writer with a Ph.D. in Cultural Studies. As a consultant and advisor, he works with stakeholders in health science and policy to analyze and comprehend the physical, psychological, and socioeconomic impacts of disease and disability.

Collaborating with patients and patient groups, he has been involved in a number of burden of illness projects that study the personal and social dimensions of vision loss, including an article on patient communication and diabetic macular edema (DME) that was recently published in the *Canadian Journal of Diabetes*.



Dr. Andrews is also active in the humanities, occasionally teaching and publishing in the areas of literature, primarily speculative fiction; policy, especially frameworks that govern the products of technoscience; and political and technological theories.

Michael Baillargeon, Project Co-Lead

Michael Baillargeon is Senior Advisor, Government Relations and Special Projects for the Canadian Council of the Blind (CCB). Over the last 16 years, he has been an advisor to and advocate for the VL community. He has played a key role on a wide range of issues before the Council, including being publisher of *White Cane Week Magazine* and managing White Cane Week events.

Most recently, Baillargeon project-managed CCB studies on accessible technology and assistive devices, as well as the Survey Report on the Impact of COVID-19 on People with Vision Loss in 2020. Through advocacy and research, Baillargeon is dedicated to building public awareness and improving the well-being and quality of life of those living with VL. Baillargeon is proud of his efforts with the CCB to dismantle barriers to accessibility and to change what it means to be blind.

Doug Earle, Project Co-Lead

Doug Earle joined Fighting Blindness Canada (FBC) in December 2018 as President and CEO. Since then, he has been leading FBC through a transformation to accelerate research into all blinding eye diseases in order to discover treatments and cures for blindness, and to improve access to innovative gene and cell therapies and medications. Earle co-chaired the Canadian Vision 2020-21 Summits with Michael Baillargeon, consulting the community to identify its advocacy agenda in these symbolic years.

Over Earle's 30-year career, he has served in progressively more senior roles at five health charities, two hospitals, two universities, and TVOntario public television. He played instrumental roles in the advocacy that led to the Krever Commission of Inquiry on the Blood System in Canada and compensation for people living with HIV and hepatitis C through tainted blood, and has worked with philanthropists to fund millions in medical research and other projects.



K. Endnotes

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