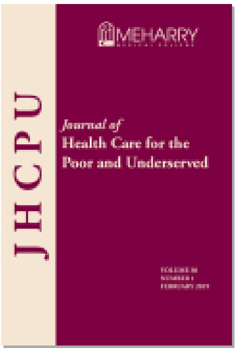
Access to Vision Services by Vulnerable Populations in Canada: A Scoping Review



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Access to Vision Services by Vulnerable Populations in Canada: A Scoping Review

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Abstract: Vision impairment has a significant impact on quality of life. Seventy percent of existing vision impairment in Canada is estimated to be correctable with prescription glasses. The sizeable proportion of correctable vision impairment appears related to the barriers to access to vision care in Canada. The objective of this scoping review is to determine gaps in the understanding of barriers to accessing vision care for vulnerable populations in Canada. The Arksey and O'Malley methodological framework was adopted. Studies published in English between 2005 and September 2017 on access to primary vision care by vulnerable populations in Canada were reviewed. Electronic databases used included Ovid MEDLINE, Ovid EMBASE, SCOPUS, ProQuest, and CINAHL. The Behavioural Model of Health Services Use was used to elucidate gaps in the literature. To develop relevant policies around vision care, efforts should be made to assess all dimensions of access for vulnerable populations across Canada.

Key words: Health services accessibility, health care disparities, primary health care, optometry, ophthalmology, Canada, vulnerable populations, delivery of health care, health status, health status disparities.

Vision impairment has significant impact on quality of life and may create a significant financial burden for both individuals and governments.[1,2] In 2007, 2.5% of Canadians were estimated to have vision impairment and this proportion was projected to increase to 4.0% by 2032.[2] Seventy percent of existing vision impairment in Canada is estimated to be correctable with prescription glasses.[3] The sizeable proportion of uncorrected vision impairment is suggestive of the barriers that exist in the access to vision care in Canada.

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Vision care coverage is available to the Canadian population through both public and private plans. Over the past 30 years, public vision care coverage has been limited to specific pockets of the population. In the 1990s, comprehensive, routine eye examinations were delisted from all provincial vision care insurance programs in Canada except in Ontario. Ontario maintained coverage for people 20–64 years of age until 2004.[4,5] The Federal government provides vision care coverage to all registered First Nations and recognized Inuit Indigenous Peoples through the National Non-insured Health Benefits (NIHB) program.[6] In Ontario, comprehensive, routine eye examinations and prescription eyeglasses are covered in Ontario through the Ontario Works program for all people with demonstrated financial need.[7] Private vision care programs exist in Ontario for people ineligible for public plans, mostly through full-time employment by large organizations.[8] Similar vision care insurance programs exist in other Canadian provinces.[4]

Despite various forms of vision health care coverage, barriers to vision care exist, especially for vulnerable populations across Canada.[9,10] Aday et. al defined vulnerable populations as groups of individuals at risk of poor health as a consequence of discrimination by virtue of differences in race/ethnicity, gender and other factors related to social status. Health may be physical, psychological, and/or social.[11] The use of eye care providers by vulnerable populations in Ontario decreased significantly after the delisting of comprehensive eye exams from provincial health insurance plans in 2004.[5] After delisting of eye care services, the gap in use of eye care services doubled to 11.2% between people with and without a high school diploma among Ontarians aged 40 to 64 years.[5] A study conducted in Brantford, Ontario in 2009 showed that the highest rate of uncorrected visual impairment was found among those with only primary school education.[3]

To address vision health disparities in Canada adequately, a comprehensive understanding of access to vision care, especially in vulnerable populations, is needed. The Behavioural Model of Health Services Use (BM) is a framework for access to care of general and vulnerable populations in various medical spheres. Developed by Ronald Andersen, this model is widely used.[12–14] The model was first created in 1968 and has undergone several modifications since then, with the most recent model published in 2005.[15–17]

Despite the significant burden of vision impairment in Canada, there is a paucity of literature on access to vision care in vulnerable populations across the country. A review conducted by Atkinson et al. in 2010 identified knowledge gaps about vision care in Indigenous children in British Columbia.[18] They noted that individual characteristics such as socioeconomic determinants of health, and contextual factors such as the availability of vision care amenities and professionals, create barriers to care.[18] The purpose of this scoping review is to build upon the work of Atkinson et al.[18] We seek to describe and document the literature on vision care access, and subsequently determine gaps that exist in our collective understanding of access for vulnerable populations in Canada. Such an understanding is critical in designing an effective health policy to benefit vulnerable populations. The descriptions of vulnerable populations by Aday et al.[11] will be adopted in the search strategy. Andersen's BM will be used as a conceptual framework.

Access to medical care: The Behavioural Model of Health Services Use. The key to understanding and creating health policy is to conceptualize and measure access with emphasis on contextual and individual determinants.[15] In their seminal work on access to medical care, Andersen et al. defined access as the use of health services and factors that facilitate or impede their use.[15]

The BM (Figure 1) was chosen as a conceptual framework for this review because of its comprehensiveness. Unlike other existing frameworks exploring access to care, this model emphasizes upstream *contextual* and *individual* characteristics that indirectly influence the more obvious and direct *health behaviours* of individuals and physicians that ultimately determine and describe access to care. This model also incorporates *outcomes of care* that are often used to measure the actual utilization of services. Outcomes and health behaviours in the BM in turn influence contextual and individual characteristics.

Contextual factors refer to aggregate circumstances that might influence access to care, such as *predisposing characteristics* of a certain group (e.g., age, gender, ethnicity, religion or societal belief), *enabling resources*, which include health policy and availability of community services, and *need factors* related to environmental characteristics or population health indices. Environmental characteristics also influence health. Examples in the context of vision care include the quality of the water and air (which can cause infectious diseases such as trachoma and conjunctivitis). Population health indices include epidemiological measures such as incidence and prevalence rates of eye diseases and conditions such as blindness, and low vision.

Health behaviours include personal health practices, processes of medical care, and the actual use of health services. Personal health practices include exercise, diet and nutrition, and adherence to medical treatment plans.[15] The process of medical care describes the behaviour of health care providers in the process of delivering care to

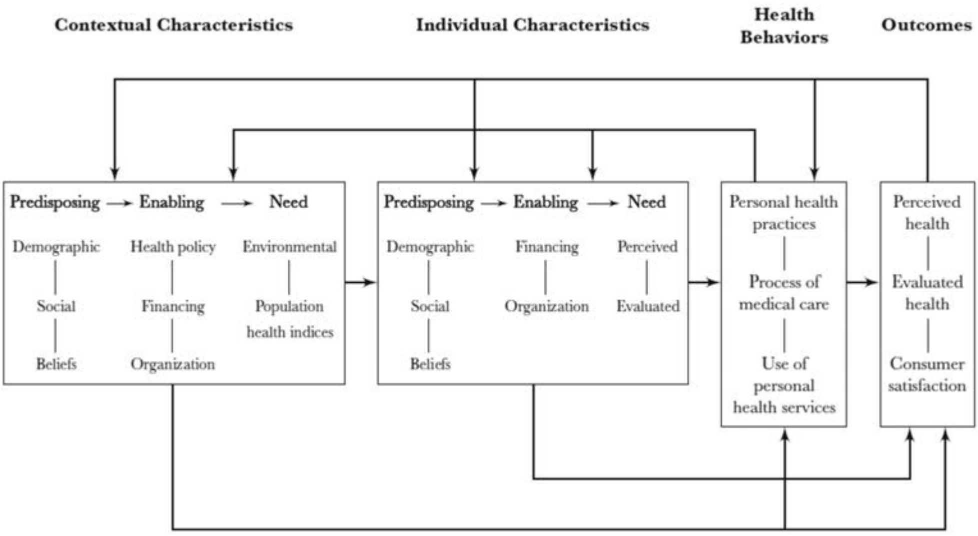

Figure 1. Behavioural model of health services use.[15]

patients (e.g., referral and prescribing patterns, and quality of communication with patients).[19]

Health outcomes may be measured by describing subjective perceived health, evaluated health as determined by a health professional, and consumer satisfaction which address the feelings of individuals with regards to health care services received.[15] Consumer satisfaction may be measured by ratings of communication with care providers and waiting time.[15]

Methods

Literature search strategy. The Arksey and O'Malley methodological framework guided the conduct of this scoping review.[20] The published and grey literature was initially searched on February 21, 2017 for relevant abstracts as a level-one screening. Electronic database sources were: Ovid MEDLINE (Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE® Daily and Ovid MEDLINE® 1946–Present), Ovid EMBASE (Classic & 1947–Present), SCOPUS, ProQuest, and CINAHL. A search strategy was developed for Medline in consultation with a health science information specialist, and subsequently modified for each database. Reference lists of key studies were searched for additional studies not found through the online database search. Additional sources included conference proceedings and professional websites of the Ontario Public Health Library Association, Canadian Ophthalmological Society Annual Meeting, and the National Collaborating Centre on Aboriginal Health. We manually searched the *Canadian Journal of Optometry* because of the relevance of its content and lack of indexing in the electronic databases selected. Four groups of search terms on *vulnerable populations*, *vision care*, and *access to care* concepts were used and linked with Boolean operators (Appendix A, available from the authors upon request).

Studies were limited to those published in 2005 to present. The year 2005 was selected because all provinces in Canada had delisted eye care services from provincial plans for middle aged populations (~20 to 64 years) by 2005. Therefore, it was assumed that vision care policies affecting access to care would be somewhat uniform across the country from 2005. Studies were limited to English language, because of limited resources to translate foreign language texts. Studies were excluded if they were not focused on a Canadian population, did not have a specific focus on primary vision care (e.g., diabetes screening, but not diabetic retinopathy), referenced data before 2005, or were case studies or validation studies and had no focus on vulnerable populations. Where there was uncertainty about the eligibility of a study, abstracts were maintained in level-one screening. However, abstracts could not be assumed to represent or capture the scope of the full article fully.[21] Therefore, all attempts were made to retrieve full or complete studies of abstracts for level-two screening. An updated search was conducted on September 12th, 2017.

Fifty percent of the full-length studies were each reviewed independently for eligibility by two of the authors (AA and MN) using the same inclusion criteria. Upon completion of the review by a researcher, relevant data were extracted (Box 1). Extracted data and studies were verified by the other researcher for accuracy and completeness. Disagreements between the researchers were resolved through discussion and through

Box 1.

SUMMARY TABLE OF STUDIES INCLUDED IN THE SCOPING REVIEW.

First Author	Year	Aim(s) of Study	Population Focus	Main outcome measures	Important Results	Setting
Nathoo[40]	2010	To assess the prevalence of diabetic retinopathy as identified by tele-ophthalmology	People living with diabetes in rural Alberta	Diabetic retinopathy diagnosis following a vision exam, medical history.	27% of patients were identified with diabetic retinopathy.	Eye clinic
Spafford[41]	2010	To determine barriers to access to low vision services	Seniors living with low vision in Ontario	Interviewed reasons for not using services	Service delivery strategies should consider knowledge access, practitioner behavior, and self-presentation strategies (patients fear losing independence)	Community Eye clinic
Arora[42]	2013	To test effectiveness of culturally sensitive tele-ophthalmology services to detect diabetes.	Indigenous diabetic patients, cultural liaison, nurses & program administrators in an Alberta Cree community	Barriers to care, perceptions and program attendance rate.	Economic, geographic, social, cultural barriers to health care exist; introduction of culturally-sensitive programs increased attendance from 25% to 85% and improved satisfaction.	Community Eye clinic
Chiarelli[43]	2013	To examine the prevalence of refractive error and other ophthalmic conditions.	Children attending the Sagamook First Nations Biidaaban Kinoomaagamik Elementary School and Day Care, Ontario.	Diagnoses of an eye condition and level of compliance with prescribed glasses	29% of children required spectacle correction. Higher rates of amblyopia (6%) and strabismus (4%) compared to other studies on Canadian indigenous children. Low rate of compliance with spectacle wear (33%) found at follow-up.	Community Eye clinic

(*continued on p. 11*)

Box 1. (*continued*)

First Author	Year	Aim(s) of Study	Population Focus	Main outcome measures	Important Results	Setting
Cui[44]	2014	To determine factors associated with low use of eye care services.	Caucasian seniors in Newfoundland & Labrador who participated in the Canadian Community Health Survey Healthy Aging 2009/09	Utilization of eye care; government insurance, presence of eye disease (glaucoma, cataracts, diabetes), Socioeconomic status.	Lack of government insurance (e.g. seniors with no eye disease), low levels of income and education, living in non-urbanized areas associated with under-utilization of eye care providers in Newfoundland and Labrador.	Eye clinic
Hong[45]	2014	To examine whether government-funded, low-income vision care programs improve use of eye care services.	Low-income, Caucasian individuals across Canada ≥ 45 years who participated in the Canadian Community Health Survey Healthy Aging 2008/09	Utilization of eye care providers, financial barriers to health care, vision problems not correctable by lenses.	Despite government assistance, low-income individuals use vision care services less often than wealthy individuals.	Eye clinic
Roy[46]	2014	To compare patient demographics, uveitis characteristics, and outcomes.	First Nations individuals with uveitis and non-First Nations controls from a single geographic catchment area, Manitoba.	Patient demographics, disease characteristics, and disease severity-related outcomes.	The age of onset of uveitis in First Nations patients (30.4years) significantly less than control patients (40.2years; $p<.0001$). Uveitis significantly more common in the First Nation group versus controls.	Eye clinic

(*continued on p. 12*)

Box 1. (*continued*)

First Author	Year	Aim(s) of Study	Population Focus	Main outcome measures	Important Results	Setting
Thomas[47]	2014	To evaluate the effectiveness of teleglaucoma as a screening device in comparison to in-person examinations.	Remote or underserved communities	Diagnostic accuracy, odds ratio, benefits, and cost-effectiveness of teleglaucoma.	Teleglaucoma detects more cases than in-person examination. Added benefits are early detection, reduced wait and travel times, increased specialist referral rates and cost savings.	Community Eye clinic
Verma[48]	2014	To review diagnostic outcomes and referral pathways of patients managed by collaborative care via tele-consultation for glaucoma.	Remote or underserved communities in Northern Alberta.	Diagnostic outcomes, referral pathways, follow up times, treatment recommendations.	27% were referred for in-person glaucoma evaluation, 69% were managed by referring optometrist, and 48% required repeat tele-consultation. Treatment was initiated before being seen for 87% of patients with definite glaucoma and 28% suspects.	Community
Brise[49]	2015	To explore barriers to eye care service access.	First Nations population in Woyenne, Lake Babine First Nation, British Columbia.	Current state of community eye care, facilitators and barriers to accessing eye care and community needs and preferences.	Barriers to eye care: awareness, attitudes, service related issues, social and economic factors.	Community

(*continued on p. 13*)

Box 1. (*continued*)

First Author	Year	Aim(s) of Study	Population Focus	Main outcome measures	Important Results	Setting
Hwang[23]	2015	To examine the association between socioeconomic factors, diabetes services and vision impairment in diabetic patients.	Respondents of the Survey on Living with Chronic Disease in Canada—Diabetes Component 2011 that self-reported type II diabetes.	Patient demographics, household income, duration of diabetes, vision impairment diagnosis, self-rated health, private insurance, discussion of diabetes complications.	Discussion of diabetic complications with health professionals (OR 2.02) & having private insurance (OR 3.23) associated with increased eye screening. Older age (OR 18.12), female sex (OR 1.53), duration of diabetes >10yrs (OR 1.53) & poor self-rated health (OR 3.10) associated with visual impairment.	Eye clinic
Kim[50]	2015	To develop, implement, and evaluate a service delivery model for teleophthalmology screening and follow-up.	At-risk and diabetic First Nations clients in Vancouver Island, British Columbia.	Utilization, system and use, community health provider feedback, and operational cost measurements.	Teleophthalmology clinics held in 43 (84%) communities. 524 clients screened, 140 referred. Ratings of teleophthalmology system were positive. Average cost savings per client: CAN $28.16, due to elimination of travel costs.	Community

(*continued on p. 14*)

Box 1. (*continued*)

First Author	Year	Aim(s) of Study	Population Focus	Main outcome measures	Important Results	Setting
Lam[51]	2015	To document the involvement of optometrists in the provision of low vision care, their referral patterns and barriers to care	Low vision patients in Canada.	Demographics of optometrists, low vision management and referral patterns of optometrists.	35% optometrists offered low vision care, 76% would manage a patient with minimum disability; 10.7% more than minimal disability and needed more specialised low vision devices. There is need for low vision education of optometrists, provincial health coverage and better collaboration.	Optometry clinic Community
Noel[52]	2015	To assess the prevalence of visual impairment and identify unmet eye care needs.	Homeless English-speaking individuals over age 18 (mean 48 years) in Toronto, Ontario	Rates of functional visual impairment and prevalence of nonrefractive eye pathology.	Homeless adults have a high prevalence of visual impairment (25%); only 14% currently utilizing eye care compared to Canadian average of 41%	Community Hospital
Thomas[53]	2015	To determine the cost-effectiveness of teleglaucoma screening device in comparison to the standard of care	Patients at-risk of glaucoma living in rural Alberta.	Health care system costs (human resources, IT and diagnostic equipment) and effectiveness (QALYs)	Teleglaucoma was more cost-effective than in-person exam with an ICER of $27,460/ QALY. Teleglaucoma prevents 24% cases of glaucoma blindness after 30 years.	Community Hospital

(*continued on p. 15*)

Box 1. (*continued*)

First Author	Year	Aim(s) of Study	Population Focus	Main outcome measures	Important Results	Setting
Murray[54]	2016	To evaluate the effect of diabetes education program attendance on prescriptions and visits for retinopathy screening.	Seniors diagnosed with diabetes living in Ontario	Filling a prescription for a cardiovascular concern.	Diabetes self-management education at diabetes education programs is associated with better quality of care in Ontario's elderly.	Community Primary care clinic
Kanjee[55]	2016	To determine prevalence and incidence rates of diabetic retinopathy by evaluating a tele-ophthalmology screening program.	Patients with type 2 diabetes in Northern Manitoba	Total number of patients and new cases of diabetic retinopathy	Prevalence of diabetic retinopathy was 25% annually, cumulative incidence was 17% across 6 years. Average savings per tele-ophthalmology exam was $1007	Community
Noel[56]	2016	To determine rate of vision impairment and quantify unmet eye care needs.	Homeless English-speaking youth aged 16–24 years in Toronto, Ontario.	Lifetime duration of homelessness, visual acuity, nonrefractive pathology.	High rate of youth (19%) with reduced vision; only 18% currently utilizing eye care compared to Canadian average (41%)	Community Hospital
Chris[57]	2017	To determine the level of uncorrected refractive error and quality of vision care services available.	Children in First Nations Band-operated elementary schools (JK to grade 8) in Ontario.	The percentage of children wearing glasses per school. The availability and regularity of vision services on and off reserve.	25% of school children wore glasses. Remote communities with a visiting optometrist had more children wearing glasses (29%) than communities without a visiting optometrist (19%).	Community Optometry clinic

consultation with a methodology expert. Extracted data from all included studies were synthesized and summarized. To determine the areas of access to care explored in the Canadian literature, concepts of access were borrowed from the BM.[15]

Results

A total of 19 studies dating from 2010 to 2017 met the eligibility criteria and were subsequently included in this review. Studies were excluded because they included data prior to 2005, were reports (not studies), had no focus on vision health, included a non-Canadian or non-vulnerable population, used a case study or validation design, or were not written in English. Figure 2 is a PRISMA[22] (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow chart describing the process of selecting studies at each stage of the review process.

Of the 19 eligible studies included, two studies were published in 2010 on vision care access in vulnerable populations. The majority of studies (17) were published from 2013 to our final search date of Sept 12, 2017. The greatest number of publications in

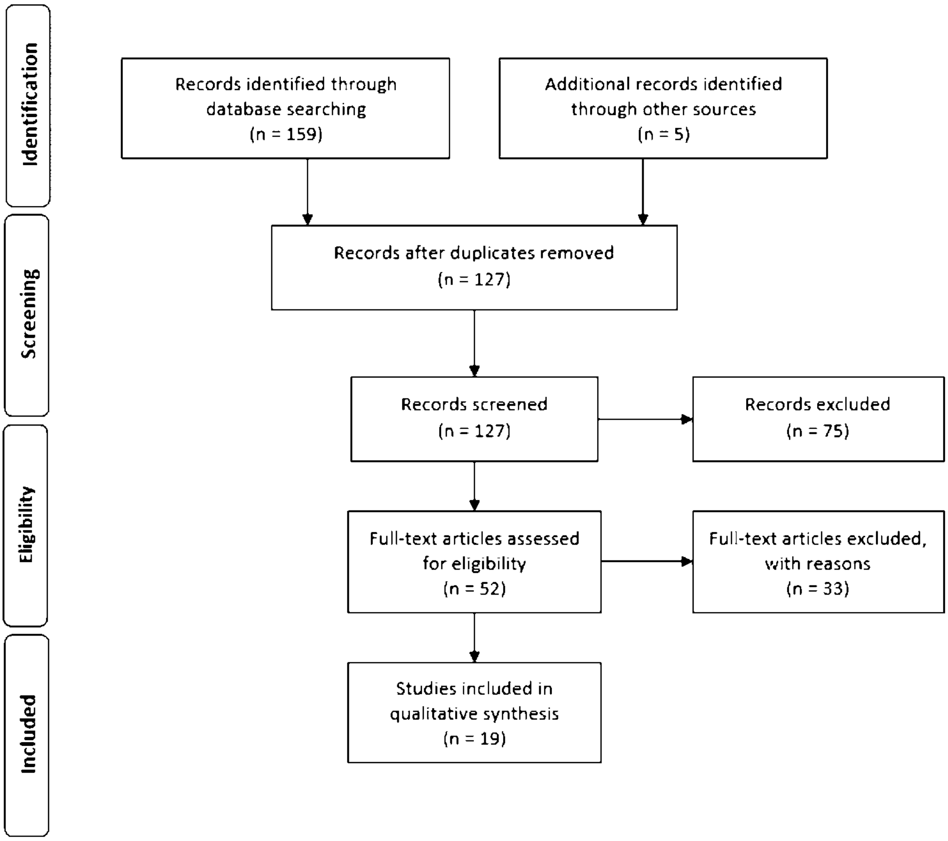

Figure 2. PRISMA flow chart[22] of studies included and excluded.
Note:
PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses

Figure 3. Included studies per Canadian Province or Territory.

a year was six (published in 2015). Included studies focused on populations living in five of the 13 provinces and territories in Canada and five studies did not focus on any specific province in Canada. The majority of studies were published in Ontario with six studies (21%), followed by Alberta with four studies (14%). (Figure 3).

Four general themes were identified: the epidemiology of ophthalmic conditions (six studies), vision care workforce and supply (one study), factors associated with (and barriers to) accessing vision care (five studies), and the effectiveness of intervention programs for vulnerable populations (seven studies). Six disease areas were identified: diabetic retinopathy (seven studies), glaucoma (four studies), low vision (two studies), refractive errors (one study), cataract (one study), and uveitis (one study). Two studies looked at eye conditions not correctable by lenses, and two studies looked at any ophthalmic condition in a specific vulnerable population. Five vulnerable populations were identified: the homeless (two studies), rural populations (seven studies) (including six studies on Indigenous, on-reserve communities), seniors (three studies), low-income individuals (one study), and chronic disease populations (eight studies). Six of the eight studies on people with chronic disease focused on diabetic retinopathy. These classifications were not mutually exclusive.

We also extracted the dimensions of access (as defined in the BM) for each study based on its main objectives. One study explicitly reported the use of the BM in its design.[23] In terms of dimensions of access to care, seven studies (37%) examined all four aspects of access used in the BM: contextual and individual characteristics, health behaviours, and outcomes. Sixteen studies (84%) examined contextual and/or individual characteristics of access. Fourteen studies (74%) addressed contextual characteristics and 12 studies (63%) addressed individual characteristics influencing access to care. Two studies (11%) addressed health behaviours and/or outcomes without addressing any contextual or individual characteristics of access to care. Taken together (both individual and contextual characteristics), 15 studies explored enabling resources and health behavior dimensions, 14 studies (74%) explored the need dimension, 13 studies (68%) explored outcomes, and 11 studies (57%) explored predisposing characteristics. All studies except one, examined the impact of health behaviours or outcomes on vision care access. The various dimensions of access represented by each study are summarized in Boxes 2 to 5.

Discussion

Since 2005, 19 studies have been published that address dimensions of access to vision care in vulnerable populations in Canada. The number of publications has increased steadily over the years with the greatest number of studies published in Alberta and Ontario. The proliferation of studies in these provinces may be the result of their comparatively large population base, as well as the number of large research centres and universities in these two provinces.

The most commonly studied vulnerable populations were chronic disease and rural populations. Of the studies focusing on chronic disease populations, most (6/8) focused on diabetic retinopathy, while six out of seven studies in the rural population group focused on Indigenous populations. This explosion of studies in chronic disease and rural populations comes as no surprise. Diabetes in particular has been examined extensively, partly because of its strong association with socioeconomic status.[24–27] In addition, Indigenous Peoples living on reserves in Canada have the lowest socioeconomic

Box 2.

STUDIES ASSESSING ‘PREDISPOSING CHARACTERISTICS’ AS A DIMENSION OF ACCESS, AS DESCRIBED IN THE BEHAVIOURAL MODEL OF HEALTH SERVICES USE

Predisposing Characteristics	
Contextual (n=3)	**Individual (n=8)**
Arora[42]	Arora[42]
Chiarelli[43]	Brise[49]
Chris[57]	Cui[44]
	Hwang[23]
	Noel[52]
	Noel[56]
	Roy[46]
	Spafford[41]

Box 3.

STUDIES ASSESSING 'ENABLING RESOURCES' AS A DIMENSION OF ACCESS, AS DESCRIBED IN THE BEHAVIOURAL MODEL OF HEALTH SERVICES USE

Enabling Resources	
Contextual (n=9)	**Individual (n=6)**
Brise[49]	Arora[42]
Chris[57]	Brise[49]
Cui[44]	Cui[44]
Hong[45]	Hong[45]
Kim[50]	Hwang[23]
Lam[51]	Spafford[41]
Nathoo[40]	
Thomas[47]	
Thomas[53]	

Box 4.

STUDIES ASSESSING 'NEED FACTORS' AS A DIMENSION OF ACCESS, AS DESCRIBED IN THE BEHAVIOURAL MODEL OF HEALTH SERVICES USE

Need Factors	
Contextual (n=6)	**Individual (n=8)**
Chiarelli[43]	Brise[49]
Chris[57]	Chiarelli[43]
Kanjee[55]	Hwang[23]
Nathoo[40]	Kanjee[55]
Noel[56]	Nathoo[40]
Noel[52]	Noel[52]
	Noel[56]
	Spafford[41]

Box 5.

STUDIES ASSESSING 'HEALTH BEHAVIOURS' AND 'VISUAL HEALTH OUTCOMES' AS DIMENSIONS OF ACCESS, AS DESCRIBED IN THE BEHAVIOURAL MODEL OF HEALTH SERVICES USE

Health Behaviours (n=15)	Vision Health Outcomes (n=13)
Arora[42]	Arora[42]
Brise[49]	Brise[49]
Chiarelli[43]	Chris[57]
Chris[57]	Chiarelli[43]
Cui[44]	Cui[44]
Hong[45]	Kanjee[55]
Hwang[23]	Kim[50]
Kim[50]	Hong[45]
Lam[51]	Noel[52]
Murray[54]	Noel[56]
Nathoo[40]	Roy[46]
Noel[52]	Thomas[47]
Noel[56]	Verma[48]
Spafford[41]	
Verma[48]	

status of all groups in Canada.[28] First Nations People living on-reserve have the highest rate of diabetes in Canada.[29,30]

The BM describes the use of contextual and individual determinants, health behaviours, and outcomes as the best approach to understanding access to care to inform health policy, with significant emphasis on contextual and individual determinants.[15] Despite the widespread use of the BM as a theoretical framework for studies in other health care disciplines, only one study in our review specifically mentioned the use of the model in its design. In addition, seven out of 19 studies (37%) addressed all four dimensions of access to care.

Enabling resources and health behaviours were the most common dimensions used to explain access to vision care in the included studies, followed by outcomes, predisposing characteristics and need dimensions. Enabling resources were addressed by assessing individual income and vision care coverage (private and public), the adequacy of eye care facilities in rural communities, service delivery strategies, and effectiveness and costs of vision care programs. Health behavior dimensions were largely addressed by examining optometrist and ophthalmologist referral pathways, communication patterns with patients, and treatment recommendations. In addition, personal health practices, especially of those living in rural areas (e.g., buying drug store reading glasses without a formal eye exam), and individual motivations and barriers to the utilization of eye care services were explored. Patient compliance with treatment plans were also common health behaviours that were addressed. Predisposing characteristics explored in the reviewed studies included ethnicity, culture/social circumstance, location of residence, and beliefs of Indigenous People which affect access to care. Need characteristics identified in reviewed studies were centred primarily on the prevalence and incidence of eye diseases of individuals and populations. Finally, vision outcome dimensions included number of eye examinations and screening services in populations of interest, and prevalence of vision disorders.

In his premier article on health care access, Andersen predicted that predisposing, enabling, and need factors would have different abilities to explain use depending on the type of service access examined.[17] More severe health problems and conditions requiring hospital services would be largely explained by need and predisposing (demographic) characteristics, while health services perceived as optional (such as dental and vision) would more likely be explained by social conditions, health beliefs, and enabling resources. [17] These predictions are consistent with the trend in vision care research identified, as many studies focused on enabling resources.

Gaps were identified in the Canadian literature on vision care access in vulnerable populations. These were: (1) fewer studies addressed factors that predispose people to access vision care, especially at the contextual level; and (2) limited studies in the most resource-limited regions of the country. Future studies exploring contextual predisposing characteristics in vision care could explore novel but suggested associations between demographic and/or social characteristics of communities (e.g., age, sex, marital status, ethnicity, educational level, employment level, proportion of immigrants) and access to vision care services in vulnerable populations. Belief systems and perceptions, and how they affect access to services, are also extremely important in vision care, especially among vulnerable populations. Specific populations may have beliefs that preclude them from accessing vision care. For instance, in a study conducted in the U.S. with a Hispanic immigrant population, it was found that participating parents believed that glasses damaged eyes and that unobserved eye problems did not exist.[31] Another study exploring vision screening in young children under the age of six years in Ontario found that only 50% of parents followed up with an optometrist after a child failed a vision screening.[32] Studies designed to understand the reasons for lack of follow-up and possible perceptions that may exist are important in understanding access to care, especially in vulnerable populations. Contextual need characteristics and their impact on health behaviours and outcomes may be important in vision care, especially in rural and resource-limited areas such as Indigenous reserves where the quality of water and food has been reported as significantly poorer than in non-reserve communities.[33] While associations have been determined between low socioeconomic status, mortality, and blindness,[34,35] this observation has not been widely explored in the literature, especially in Canada.

Studies have not been published on vision care access in the least populated areas of Canada. Because of the remote nature of these territories and subsequent disparities in general health care experienced by people living in these areas, it is expected that access to eye care services will be limited. [36] As of 2012, the proportion of optometrists and ophthalmologists per 100,000 population in the least populated jurisdictions of

Canada ranged between 2.66 to 6.24 (3.01 in the Territories of the North, 3.93 in Newfoundland, 2.66 in Prince Edward Island, and 6.24 in New Brunswick*).[37] The ideal ratio of eye care providers to population is unknown.[37] However, considering a ratio of 3 ophthalmologists per 100,000 population as ideal,[38] the number of ophthalmologists working in the Northern territories and in Newfoundland is inadequate. This suggests barriers to vision care access in these least populated regions of Canada. Therefore, there is value in assessing other dimensions of access to vision care, especially in these regions that are known historically to face health disparities.[36]

Conclusion. To address the alarming rate of increasing health care expenditures in Canada,[2,39] access to vision care, especially among vulnerable populations, must be well understood and addressed with appropriate policies and programs. This understanding can be acquired by assessing all dimensions of access in people with the most need. Using the BM as a framework, gaps were identified in the literature on vision care access in vulnerable populations in Canada. These gaps included limited studies addressing contextual factors that predispose people to access vision care. There were also a limited number of studies in the least populated and probably the most resource-limited regions of the country. More studies are needed to address these gaps. It is also recommended that researchers in vision care access apply comprehensive frameworks such as the BM in developing their designs.

This study has some limitations. In line with the Arksey and O'Malley methodology for conducting scoping reviews, the quality of included studies was not assessed. An assessment of quality might have provided additional opportunities to determine gaps in the literature on vision care access in Canada. Additionally, some studies meeting the eligibility criteria may have been missed due to the selection of electronic databases used, and/or poor or absent indexing with the electronic databases selected for the review. Recent published studies may have not been indexed at the time of conducting the literature search. The strength of this study lies in its use of a comprehensive, systematic search strategy using both published and unpublished literature sources. It is the first study in Canada to look at the scope of research on vision care access. Through its identification of gaps in the literature, this study provides valuable information that could inform the direction of future research studies and encourage relevant research. This research could in turn, influence the introduction of appropriate vision care policies in Canada.

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* The proportion of ophthalmologists per 100,000 population is 1.57 in Newfoundland, 0 in Prince Edward Island, and the Northern Territories, and 0.79 in New Brunswick.37

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