



TELEOPHTHALMOLOGY

Diabetic retinopathy screening
among First Nations in Quebec

EVALUATION FROM 2010 TO 2015



TELEHEALTH:
it's more than an option,
IT'S A SOLUTION!



FIRST NATIONS OF QUEBEC
AND LABRADOR HEALTH
AND SOCIAL SERVICES
COMMISSION

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SECTION 1

CONTEXT AND METHODOLOGY



1.1 CONTEXT OF THE EVALUATION

1.1.1 Context

In 2008, a teleophthalmology project to offer diabetic retinopathy (DR) screening in four First Nations communities in Quebec was established. This first phase was subject to an evaluation begun in 2010 to assess the pertinence, implementation and cost benefits of the project.

The deployment of the service in other communities as of 2010 led to several changes in the organization of services. Several items were reviewed to adapt them to the context and specificities of each community and region.

Given that the screening has been implemented in the four pilot communities for more than five years and implemented thereafter in several other communities, the purpose of this second evaluation is to update information on the project and determine the medium-term effects on the organization of services in the communities.

1.1.2 Objective of the remote diabetic retinopathy screening project

In the deployment phase, the ultimate objective of the project remained the same as in the initial implementation phase and may be described as follows:

“[The] implementation of this project aims to reduce the incidence of blindness and ocular deficiency among the First Nations members while fostering First Nations control over care for diabetic individuals.” (FNQLHSSC, 2013)

To achieve this objective, the project was considered as a means to “implement a remote screening service for DR in the First Nations communities through the use of telehealth” (FNQLHSSC, 2013). The implementation of the project would also serve to “establish a continuum of services, involving first- to third-line services, for the treatment and follow-up of DR and the diabetic individuals in the First Nations communities of Quebec.” (FNQLHSSC 2013)



1.1.3 Objective of the second evaluation of the remote diabetic retinopathy screening project

A second evaluation of the remote DR screening project was requested by the FNQLHSSC Informational Sector, as the project had been implemented five years earlier. Given the benefit of sufficient hindsight with respect to the initial implementation of the project in the four pilot communities, it is possible and pertinent to document the changes that took place after this first implementation and the medium-term effects of the DR screening in these same communities. In light of these reasons, the new evaluation will serve to:

- Illustrate the need to adapt the service models to the implementation contexts.
- Understand the medium-term effects of the remote DR screening project in the four communities.
- Ascertain the profitability of the project in the medium term.

1.2 METHODOLOGY OF THE SECOND EVALUATION OF THE REMOTE DIABETIC RETINOPATHY SCREENING PROJECT

1.2.1 Ethics

This evaluation was carried out in compliance with the AFNQL's *First Nations of Quebec and Labrador Research Protocol* (2014) and the OCAP™ principles. The four principles are: collective **O**wnership of information by First Nations communities; **C**ontrol over the research approach and information collected; **A**ccess to the information and data; and, finally, physical **P**ossession of the data. The evaluation was carried out in compliance with quality standards, methodological rigour, respect of privacy and confidentiality, and the protection of data stipulated in the *Code of Research Ethics* adopted in the *First Nations Regional Health Survey* (2004).

A consent form was used to obtain the free and informed consent of each participant, to whom it was explained that participation in the evaluation was voluntary. The participants were told they might withdraw at any time or refuse to answer a question without prejudice and that all information collected would remain confidential. Consequently, the names of participants would not appear in any report and the content of evaluation discussions would not be made public under any circumstances. The consent form also indicated that community information collected during the project belonged to the participating communities and that it would be stored at the FNQLHSSC under lock and key, on behalf of the communities, for a period of five years. Community consent was also sought from the chiefs, health directors and social service directors of the four pilot communities. Each of these individuals was informed of this second evaluation so they would allow first-line workers from their communities to participate in this process.

1.2.2 Result validation

Some information in this report, such as the medium-term effects of the implementation in the four pilot communities, was validated by first-line workers in the communities that were consulted during the data collection to ensure that the analysis reflected the reality of the remote DR screening services offered in their community. This evaluation report was also sent to the health centres of communities that had participated in the pilot project. The purpose was to allow the screening service providers who offered the service to familiarize themselves with the content of the report in order to clarify or qualify information presented, if need be.





1.2.3 Type of evaluation

Since the initial evaluation dated back five years, there was sufficient background information to undertake an evaluation of the medium-term effects.

This evaluation pertains to the medium-term effects of the initial implementation of the remote diabetic retinopathy screening project in the four pilot communities. The effects are defined by Ridde and Dagenais (2010, p. 328) as “changes observed following a community intervention; they may be anticipated, attributable directly or indirectly to an action, identifiable in the short or medium term (knowledge acquisition, improvement of skills; behaviour modification, etc.)” [translation]

The evaluation also documented the service model changes made to the implementation strategy during the deployment in other First Nations communities, as these changes could have had an impact on the way the diabetic retinopathy screening services are delivered in the communities. In other words, to properly evaluate the medium-term effects of the initial implementation in the four pilot communities, this evaluation retraces events and decisions that took place between the first evaluation and 2015. The context underlying the medium-term effects of the initial implementation were highlighted and served to clarify a portion of the effects determined in this second evaluation.

The deployment of the diabetic retinopathy screening service in other communities may also have had effects on costs associated with the implementation of such a project. Therefore, it is pertinent to consider these effects on a larger scale by updating, at the regional level, the economic analysis carried out during the preceding evaluation.

1.2.4 Population and sampling

Two categories of actors were consulted to evaluate the medium-term effects of the initial implementation of the DR screening in the four pilot communities and the economic impacts at the regional level of the deployment of the project in other communities.

- Local actors: meaning first-line workers in the pilot communities responsible for carrying out remote diabetic retinopathy screening, namely nurses and imagery technicians. These actors were consulted through telephone interviews individually or in groups, as per their preference, in order to document the medium-term effects observed in the four pilot communities since the implementation of the remote DR screening service.
- Regional actors: meaning FNQLHSSC employees responsible for supporting the communities in the implementation of the remote DR screening.





1.2.5 Evaluation approach and data collection tools

This second evaluation of the remote DR screening project took place during the 2015–2016 fiscal year. In the summer of 2015, the research officer responsible for the project implementation first documented the changes made to the project since Phase 1. This person evaluated the effects of the changes through documentary analyses as well as interviews and focus groups conducted with FNQLHSSC employees responsible for supporting the implementation of remote DR screening service. The economic analysis of the project was updated in the fall of 2015 using the information available at the FNQLHSSC. During the winter of 2016, the medium-term effects of the remote DR screening project in the four pilot communities were evaluated by consulting with first-line workers involved with the screening in these communities.

1.2.6 Limits

Some issues and limits warrant consideration, given the short amount of time to conduct the second evaluation. The time allowed for this evaluation, namely the 2015–2016 fiscal year, meant restricting the number of evaluation questions. Some items related to changes and medium-term effects were either not addressed in this evaluation or only addressed summarily.

The evaluation did not take account of the experience of all the actors for this reason, but also because the project could not provide the objectivity required for an evaluation of the long-term effects. Among other things, the opinions of patients benefiting from the remote DR screening in the four pilot communities were not collected. Consequently, this evaluation cannot ascertain whether, in addition to reducing the incidence of blindness and ocular deficiency among First Nations peoples, the project fostered "First Nations control over care for diabetic individuals" (FNQLHSSC, 2013).

Nonetheless, data collection conducted among those responsible for the project at the FNQLHSSC and among first-line workers providing the remote DR screening service in the four pilot communities served to document changes made to this screening over the past five years, update the economic analysis and identify the medium-term effects of the project implementation.



SECTION 2

CHANGES MADE TO THE SERVICE

A first report assessing the remote DR screening pilot project among First Nations of Quebec was tabled in 2013 (FNQLHSSC, 2013). It covered the implementation of the service in four pilot communities and the short-term impacts of these new screening services. A cost-effectiveness analysis was carried out concurrently.

The DR screening project was continued after this first evaluation, and many communities have since benefited from it.

Several issues emerged in the wake of the first implementations, some of which imperilled the implementation of the project in other communities, as well as the sustainability of the screening services in the pilot communities. Changes were made to ensure long-term sustainability.

This section of the report highlights changes made to the service and the impacts of these changes.

It is important to note that the changes made pertain to the project operations and organization. Consequently, the objective of the remote DR screening project remains to:

“Reduce the incidence of blindness by providing access to remote diabetic retinopathy screening for First Nations living in the communities.” (FNQLHSSC, 2015)

Between 2010 and 2015, the period covered by this evaluation, a total of 21 communities implemented the remote DR screening service. The table that follows presents the implementation year for each.

TABLE 1: IMPLEMENTATION YEAR IN THE COMMUNITIES

| 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|----------------------------|------------------------|------------|----------|----------------------------|---------------------------|
| Kipawa (Eagle Village) | Kitigan Zibi | Kitcisakik | Pessamit | Essipit | Kanesatake |
| Timiskaming | Lac-Simon | Manawan | | Gesgapegiag | Ekuanitshit (Mingan) |
| Winneway (Long Point) | Pikogan (Abitibiwinni) | Wemotaci | | Listuguj | Pakua Shipu |
| Wolf Lake (Hunter's Point) | | | | Wendake | Unamen Shipu (La Romaine) |
| | | | | Rapid Lake (Barriere Lake) | |
| | | | | Nutashkuan | |



2.1 OUTLINE OF THE 2010 IMPLEMENTATION OF THE REMOTE DR SCREENING SERVICE IN FOUR PILOT COMMUNITIES

Prior to documenting changes occurring since the implementation of the project in the four pilot communities, it is important to remember how the pilot project was first implemented. Many aspects of the first evaluation deal with the start of the project, the partners involved, the implementation process and the evolution of the project.

2.1.1 Project background and partners involved

Several partners cooperated in the development of the remote DR screening project:

- The FNQLHSSC
- The First Nations Inuit and Health Branch, Québec Region (FNIHB-QC)
- McGill University's Réseau universitaire intégré de santé (RUIS McGill)
- The Algonquin Nation Programs and Services Secretariat

It should be noted that RUIS McGill gradually withdrew from the project, but continued to follow its evolution in order to draw on what was learned from this implementation in order to apply this knowledge to other telehealth projects (FNQLHSSC, 2013, page 21).

The project was funded by two organizations, Health Canada and Canada Health Infoway.

- The financing structure was as follows:
 - Health Canada (FNIHB) covered:
 - License fees
 - Server rental costs
 - Fibre-optic connection, security and archiving costs
 - Reading fees

- Canada Health Infoway covered:
 - Salaries (project manager and later, the nurse educator also)
 - Cameras
 - Tonometers
 - Screening equipment in the communities
 - Travel costs for FNQLHSSC employees in relation to the project

It is important to specify that Canada Health Infoway had established objectives to achieve to reimburse advanced costs. These objectives were referred to as milestones and appropriation targets. The milestones corresponded to the number of communities in which the project was implemented. There were four appropriation targets that pertained to the number of readings (or screenings) to carry out. Initially, funding granted by the two contributors was planned until April 2011 to cover the implementation of the project in the four pilot communities and the deployment of the project among interested First Nations communities in Quebec.





In addition to the two funding contributors above, other partners were involved in the implementation of the pilot project: the four Algonquin communities (Anishinabeg) of Eagle Village (Kipawa), Timiskaming, Winneway (Long Point) and Wolf Lake, and the Algonquin Nation Programs and Services Secretariat.

2.1.2 Training first-line workers in the communities

In the communities, remote screening training was provided by Health Canada to the nurses and imagery technicians involved in the project. The training of nurses took place in Montréal and allowed the first-line workers trained to acquire the theoretical and practical knowledge required. RD screening was carried out by these trained first-line workers upon their return to their communities. Imagery technicians were trained during the implementation in the community. Therefore, screenings were carried out by trained workers (nurses and imagery technicians) under the supervision of Health Canada instructors during the week the project was implemented. Health Canada provided clinical and technological support to the nurses and imagery technicians, upon request. Note that the project involved four pilot communities. Because one of the communities had few diabetic patients, the patients from that community were screened in another pilot community nearby. Consequently, training was provided to health first-line workers in three of the four pilot communities.

2.1.3 Materiel used in screening

The pilot communities in the project shared the material required for remote DR screening, including a non-mydratic camera to take digital images and a tonometer to measure intraocular pressure. A camera-sharing schedule was set up in the communities to co-ordinate screening.

2.1.4 Clinical model used

During the pilot project, the choice was made to use a recognized Gold Standard clinical model that consists of systematically dilating the pupils of each patient to ensure optimal image quality. (ETMISS, 2008). This medical act was carried out by the nurses in the pilot communities who had received the training and held corresponding collective prescriptions.

2.1.5 Image capture

Image capture was done by a trained imagery technician. During the pilot project, 14 images per patient were taken, because six fields of the retina and one of the anterior eye were required per eye.

2.1.6 Transmitting images to the reading centre

Once the examination was complete, the imagery technician used a software program to send the patient's images and clinical data to a private laboratory. Ophthalmologists then studied the images sent earlier to the reading centre. Once the images had been examined, the ophthalmologists sent a report to the patient's community and physician indicating whether an ophthalmology referral was required. From among the 149 screenings done during the pilot project, thirty-four ophthalmology referrals were recommended, a 22.8% referral rate. (FNQLHSSC, 2013, page 64). Each screening was invoiced at a cost of \$115.





2.2 SERVICE IMPLEMENTATION FROM 2011 TO 2012

In 2011, the job description for the pilot project manager position was reviewed when the manager left her position at the FNQLHSSC. This led to the creation of a new telehealth position: the project manager for the deployment of DR screening in other First Nations communities in Quebec.

Following the implementation of remote DR screening in the four pilot communities, the project was expanded to other interested communities. By 2012, ten communities (including the four pilot communities) had implemented remote DR screening.

This deployment phase begun in 2011 basically took place in the same manner as the four pilot communities. Accordingly, the material used for screening remained the same. The clinical model involving the systematic dilation of all patients' eyes was maintained, as were aspects related to image capture and transmission to the reading centre. Health Canada remained responsible for developing service corridors, the signature of collective prescriptions, training, and clinical and technological support.

New cameras were purchased as the communities applied to implement the service. Camera sharing was encouraged, with the main criteria being communities close enough to one another so as to be able to share a camera rather than maximize material investments. Although camera sharing between a larger number of communities might have contributed to splitting the costs of acquiring screening equipment, community proximity and remoteness were taken into consideration for camera allotment. Likewise, the increased risks of equipment damage due to travel and the time required to carry out screening clinics were also considered to determine the number of communities that might share a same camera.

This approach was pursued until 2013, the pivotal year for reviewing the implementation process and the attendant issues.

2.3 SERVICE IMPLEMENTATION 2013 TO 2015

2.3.1 Transfer of clinical and technological expertise to the FNQLHSSC

That same year, for the sake of developing the capacities of First Nations and by mutual agreement with Health Canada, the FNQLHSSC appropriated the responsibilities related to the clinical and technological expertise. The results were twofold: the project manager was trained so that she might, in turn, train the imagery technicians, and the FNQLHSSC created the position of nurse educator that was filled in September 2013.

Reasons for transferring the expertise to the FNQLHSSC

By appropriating the responsibilities and the development of the clinical and technological expertise in the field of DR screening, the FNQLHSSC wished to foster capacity-building and self-determination among First Nations. Indeed, the desire to encourage capacity-building is an integral part of the infrastructure development approach presented in the Quebec First Nations Regional Infrastructure Action Plan (QFNRIAP) 2012-2015 (FNQLHSSC, 2011, page 15).





The desire to foster self-determination is expressed in the 2014–2017 FNQLHSSC Strategic Plan, specifically under Stake 3: strengthening First Nations governance. This stake is broken down into several intervention focus areas, each of which has several objectives. With respect to the issue of governance, the transfer of project expertise to the FNQLHSSC is in line with objective 1 of intervention focus area 6.1: “Promote the creation of local and regional governance structures.” (FNQLHSSC, 2014, page 44)

As mentioned earlier, this transfer took place by mutual agreement with Health Canada, which also shares the FNQLHSSC’s vision in this regard. This is clearly indicated under objective 2.2 of the Health Canada Strategic Plan:

“We will continue to support First Nations and Inuit in their aim to influence, manage and/or control health programs and services that affect them.” (FNIHB, 2012, page 14)

2.3.2 Impacts of the transfer of clinical and technological expertise

The transfer of the clinical and technological expertise of the project to the FNQLHSSC had several impacts.

Regional human resources

First, resources could be organized differently, in particular the creation of a nurse educator position within the FNQLHSSC thanks to funding from Canada Health Infoway.

Training first-line workers in the communities

Once the clinical and technological expertise was transferred to the FNQLHSSC, training was no longer provided by Health Canada, but by the FNQLHSSC. The DR project manager trained the imagery technicians and provided technical support, while the nurse educator trained the nurses in the

communities and offered them clinical support. To achieve this, the two instructors, in turn, received training in order to train interveners. Training continued to be provided directly in the communities. The first screenings took place during training sessions so the first-line workers could immediately practise what had been learned.

Certain changes were made to the training as a result of the change of clinical model and the revision of interveners’ mandates to be presented later in this section. The transfer of clinical and technological expertise was also beneficial in terms of the recognition of the training provided to the nurses under the terms of the DR screening project. Although the training already allowed the nurses to benefit from six HFA (hours of accredited training recognized by the Ordre des infirmières du Québec), this recognition was further enhanced. Since October 2015, nurses are now granted 10 HFA owing to the fact they take both imagery technician training and nurse training.

Finally, although the transfer of expertise did not result in the complete reorganization of training, it nonetheless served to adapt the training to different changes made to the project and the clinical model.

2.3.3 Findings following the transfer

The transfer to the FNQLHSSC of the responsibilities related to clinical and technological expertise was a major change, in that it allowed the project team to take account of several observations made during the last years of implementation. Decisions taken as a result of these findings were to have a major impact on the pursuit of the remote DR screening project.





Limitations in the field

First, the team noted that of the 10 communities that had implemented the project (including the four pilot communities), only six were operational. In fact, screening was taking place in six communities only.

Objectives anticipated by the funding contributors

The team noted that problems achieving the milestones and appropriation targets set by Canada Health Infoway were not related solely to the challenge of aligning the agendas of the educators and the communities (refer to the financing structure presented in the "Project background and partners involved" Section 2 on page 12). Discussions within the team during this period highlighted the existence of a difference of opinions between the two funding contributors regarding the evolution of these screening services.

Emergence of a dilemma

A dilemma emerged, arising from incongruity between the requirements of the funding contributors and the limitations in the field. Health Canada asked that new funding contributors be sought to pay for the readings, given that funding would not be ongoing. Canada Health Infoway asked the FNQLHSSC to achieve the milestones and appropriation targets set to reimburse the sums invested for which an end to financing was foreseen. Discussions then took place on whether the project implementation should continue and strategies be adopted in the event the project be pursued.

Debate on the pursuit of the project

A working group was formed to reflect upon the looming issue of sustainability. It was made up of FNQLHSSC staff working on the project, First Nations and Inuit community representatives (FNIHB–Québec Region), the Algonquin Nation Programs and Services

Secretariat and the Ministère de la Santé et des Services sociaux du Québec (MSSS). The first meeting was held in November 2013. A total of six meetings took place between November 2013 and November 2015. The working group's mandate was stated in its terms of reference:

Generally speaking, the group's mandate would be to seek solutions and take necessary steps to ensure the sustainability of the remote DR screening service in First Nations communities in Quebec.

To maintain quality screening and guarantee the continuation of these services over time, the group must explore different approaches to the organization and funding of:

- Local service offered
- Reading and diagnostic services
- Training for nurses and imagery technicians
- Quality assurance program, patient follow-up

(FNQLHSSC, working group terms of reference, 2013)

The project team and the working group explored the following aspects to ensure the sustainability of the project. Their discussions led to major changes required for the implementation of the service.

2.3.4 Change to the clinical model

Although the type of camera chosen to take the digital images does not require pupil dilation, dilation occurred systematically. It is generally accepted that dilation is in order for First Nations populations owing to the colour of the iris and small pupil size. The pertinence of this approach was called into question, considering that technology and practices evolve constantly.





A literature review was done on recognized clinical models for DR screening in order to simplify and better adapt these services to the needs of First Nations communities. Apparently, other clinical models were used in Scotland and France, and that their readings were perfectly valid (ETMIS 2008, HAS 2010, OPC 2013). The working group raised the possibility of using a non-dilation or sequential dilation model (dilation carried out only when required by specific clinical conditions). In March 2014, tests without dilation were carried out in a first community, and the results were conclusive. The FNQLHSSC then proposed that non-dilation and sequential dilation clinical models might be used in the other communities. Once the new clinical models had been tested (without dilation or with sequential dilation), the two FNQLHSSC instructors carried out screenings in the communities prior to implementing the screening service. The project team referred to this intensive period of screening as the “screening blitz.” Between April and May 2014, one hundred and sixty-nine screenings took place in three communities. They served to confirm the feasibility, on a larger scale, of the screening model without dilation, in addition to offering the service to populations in communities that had not yet had the opportunity to implement the service and see what a screening clinic was all about.

Systematic dilation during DR screening was initially done because that clinical model had been included in the ophthalmology screening protocol and that it was believed the dark eyes of First Nation individuals required systematic dilation to ensure optimal quality images. This seemed all the more pertinent, since poor quality images made them

hard to read and increased the number of requests for new images and ophthalmology referrals. However, the outcome of the first screening campaigns presented to the working group in May 2014 was very positive:

From the onset, there was a reluctance to not dilate the eyes of First Nation individuals due to their dark irises. However, practice showed that image quality without dilation sufficed for reading. Only one or two patients out of 20 required dilation. This new approach saved a considerable amount of time. It would be possible to do 25 screenings a day. (FNQLHSSC, report on the meeting held by the sustainability group in May 2014).

Non-dilation also presented numerous advantages. For example, collective prescriptions were no longer necessary to carry out screenings. Therefore, this facilitated access to the service in communities that had problems obtaining the service or where there was significant nursing staff turnover. It should be noted that a collective prescription requires specific training in order to be entitled to use it and that said prescription is not transferable among peers.

Non-dilation had a significant impact on the personnel involved, because the imagery technicians could now do screenings even when the nurses were unavailable, insofar as no dilation was required. Indeed, under the aegis of a nurse, the imagery technicians could now proceed with screening without dilation (patient evaluation, signature of the consent form).





2.3.5 Impacts of the change in model

Changing the model, which was done to adapt it to diverse community realities and meet the funding contributors' expectations, had several impacts.

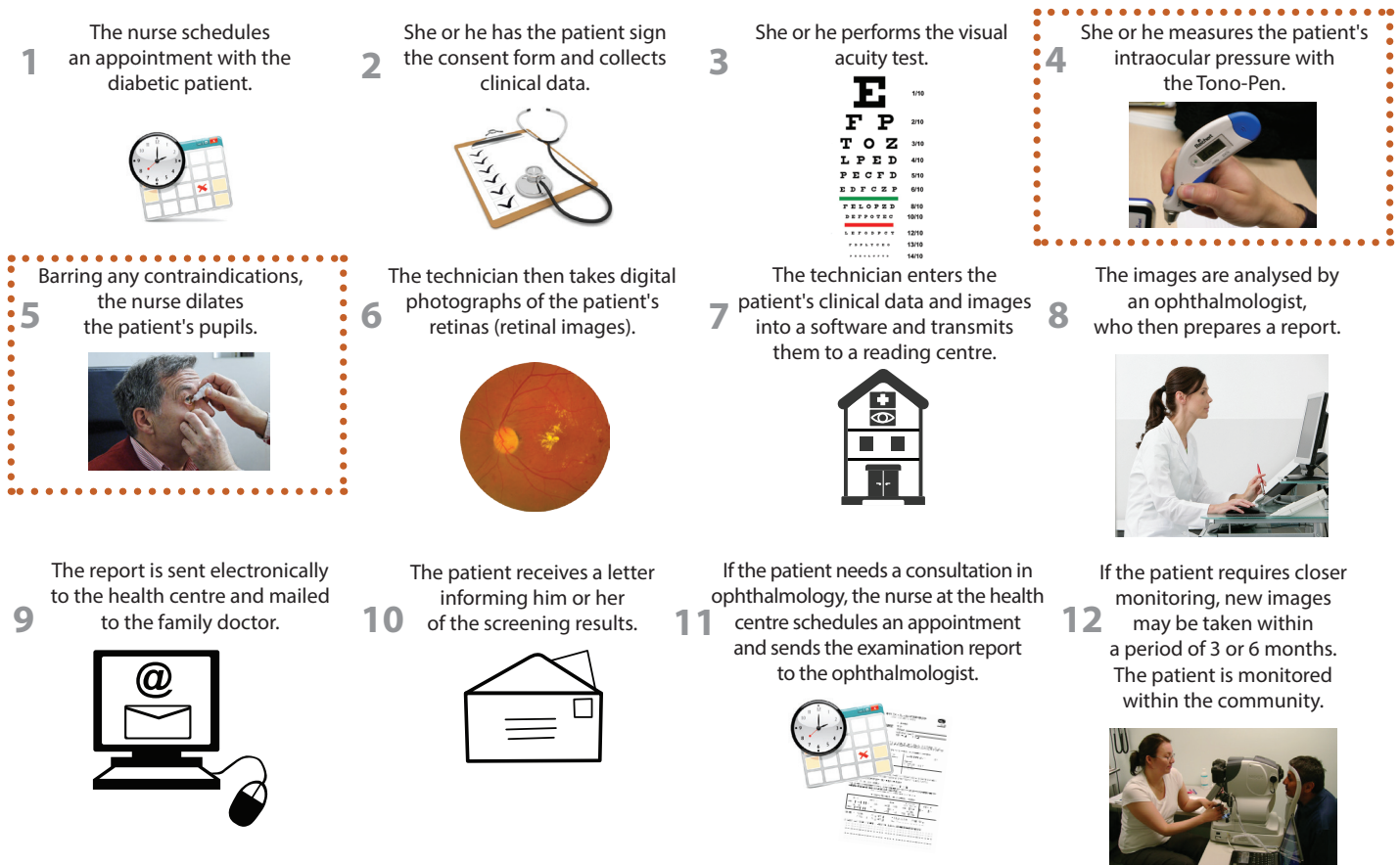
First, the pilot communities now had the opportunity to reconsider the procedure of systematic dilation and choose between the three clinical models at their disposal.

Likewise, communities that had yet to implement the service now had the opportunity to choose the model best suited to their needs: dilation, non-dilation and sequential dilation (refer to the different clinical models in Appendix 4).

Screening process

The screening process remained the same, though intraocular pressure readings and pupil dilation were no longer necessary under this clinical model (steps 4 and 5 of the following figure).

FIGURE 1: SCREENING PROCESS



Patients with normal screening results receive yearly follow-up.

The steps in the dotted frame are only performed when the patient's eyes are or will be dilated.





Revision of the number of images required

The change in procedure also reduced the number of necessary images to take to four. Images were broken down as follows: three internal images (three fields of the retina) and one external image (image of the anterior eye). The total number of images per eye dropped to four (eight per patient), whereas the previous clinical model had required seven images per eye, for a total of 14 per patient.

Efficient use of local resources

The change in model also resulted in the efficient use of resources and contributed to easing the workload of first-line workers in the communities. Since 90% to 95% of the DR screenings could be done without dilation, delays associated with establishing collective prescriptions no longer impeded project implementation in the communities. The fact that a collective prescription was no longer necessary to proceed with screening without dilation led to a redefinition of the nurses and imagery technicians' mandates. Image capture no longer required dilation, and could now be performed independently by the nurses and imagery technicians.

- However, it must be stated that, regardless of the clinical model chosen by a community's health centre, the nurses remain responsible and accountable for patient care and follow-ups, as well as ensuring a functional and efficient referral corridor exists, as set out in Bill 90 (An Act to amend the Professional Code and other legislative provisions as regards the health sector). This entails:
- Screening has become a reserved act for nurses, despite the fact that in DR screening clinics, screening without dilation is done by imagery technicians. Nurses may not do screening if no functional referral corridor exists.
- Nurses are responsible for ensuring a functional and efficient referral corridor for patients with an ophthalmology referral.

It is important to note that the implementation of the new clinical model did not lead to an increased number of ophthalmology referrals. Since the project was first implemented, the ophthalmology referral rate had remained below international standards of 25% as an acceptable rate. In fact, the ophthalmology consultation requests rate for the entire project (2010 to November 2015) was 12.6%.

2.3.6 Validation of community interest

All the communities were consulted during a survey conducted in April 2014. At the time, they were asked to indicate, based on their situation, if they would like to continue to offer remote DR screening or if and when they would like to implement it, in cases where implementation had not taken place. Survey results revealed that a majority of the communities already enjoyed remote RD screening and wished to continue to offer it. A large number of communities that had not yet received the screening indicated their interest in having it implemented in their communities over the coming years.

The results of the survey confirmed the value of continuing the project, which was consistent with the recommendations of the first project evaluation report of the pilot sites published in 2013. This report recommended pursuing the project and highlighted several positive outcomes, in addition to other beneficial effects anticipated in the medium and long term (lower cost of long-term appropriation, decrease in diabetes-related complications, less congestion of the healthcare system, shorter screening waiting times, etc.).





2.3.7 Conditions for pursuing the project

Although the project team had community support for pursuing the remote DR screening project, the team knew that they had to take into account the issues and situation of each community. The team had to adapt to the needs and specific realities of the communities and, by the same token, attempt to ease the workload of community healthcare teams during screening clinics, as well as limit inconvenience for users. All this had to be done in a manner conducive to ensuring the sustainability of the service.

The new clinical model options were part of the solution in that they provided increased flexibility to the communities and greater latitude regarding collective prescriptions. It was now effectively possible to carry out screenings without dilation, even if the collective prescription had yet to be obtained. It is important to note that negotiations and a lengthy administrative procedure are required to obtain the signing of a collective prescription.

2.3.8 Change of reading centre

One of the working group's mandates regarding sustainability was to examine the possibility of reducing the cost of reading images. The issue of changing suppliers was raised in 2014. A non-profit organization affiliated with a university offered an interesting alternative and was chosen instead, for several reasons.

Lower reading costs

First, this new supplier was a non-profit organization with very competitive reading rates compared to the old supplier. The old supplier charged \$115 per screening, whereas the new reading centre requested \$18. This fee was subsequently raised to \$25.50 on April 1, 2015.

Association with a university

Second, using a university-affiliated reading centre allowed the project team and communities to benefit from practices at the cutting edge of research.

Change of image transfer software

Changing suppliers required some adaptation, in particular the image transfer software. Communities that had implemented the service had to change their image transfer software and begin using the new software. The project manager, who was also the person responsible for training the imagery technicians in the communities, trained them at a distance in the use of the new platform and offered them telephone support for data entry and image transfer.

Transition period between the two suppliers

The contract with the new reading centre started at the beginning of May 2014, and the contract with the old supplier came to term at the end of May 2014. Therefore, for one month, each of the centres was involved in reading images. During this transition period, images from newly implemented communities were sent to the new supplier and images from communities already benefiting from the service continued to be sent to the old one.





2.3.9 Impacts of the change of reading centre

The change of reading centre also had significant impacts on the pursuit of the project, particularly in terms of financial savings.

The FNQLHSSC project team carried out a literature review on current practices at the international level with regard to a lesser number of images. Since fewer images were required per patient as a result of the openness of the supplier and change of clinical model, first-line workers responsible for screening and patients were able to save a significant amount of time. Screening sessions were considerably shorter, since eight, rather than 14, images per patient were now taken, and dilation was no longer necessary. Previously, screenings lasted from 45 to 50 minutes. Now, screenings took between 10 to 15 minutes. This also decreased the duration of the screening campaigns and facilitated camera sharing among the communities in the same geographic area, because it was now feasible to perform up to 25 screenings per day.

Financial savings were also made possible by changing the supplier. Although costs were incurred for changing suppliers during the first year, there were substantial savings in terms of reading costs, which dropped from \$115 to \$18 in May 2014. Although the cost increased to \$25.50 on April 1, 2015, the difference in cost remained appreciable. The economic analysis presented in Section 3 presents the impact of this factor on whether to pursue the project.

2.3.10 Instructor training in the communities

To further contribute to community empowerment, the FNQLHSSC continued to support local capacity-building by training two nurse educators in 2014 and two imagery technicians in 2015, all of whom resided in the communities. Both English-speaking and French-speaking First Nations instructors are now available to support communities as needed. In time, this, too, will contribute to the sustainability of the project in other communities, over and above the funding granted to the FNQLHSSC for the project.



SECTION 3

ECONOMIC ANALYSIS

3.1 INTRODUCTION

During the first evaluation, a cost-effectiveness analysis was carried out on the implementation of the project in the four pilot communities. This second economic analysis covers the entire project—meaning costs incurred between 2010 and 2015 for the implementation of services in the 21 First Nations communities in Quebec that now offer remote DR screening as at December 31, 2015.

Since this analysis covers a project already implemented in four pilot communities, the baseline scenario used in the first evaluation, namely “no project”, was not used here.

Challenges that emerged during the completion of the economic analysis during the first evaluation remained the same. In fact, the complexity of the project in terms of the number of activities—and partners—remained the same throughout the project.

The purpose of this section is to update the economic analysis to reflect the total cost of the project between 2010 and 2015. The aim is to establish the current operationalization costs of the service and determine

whether pursuing the implementation of remote DR screening has served to amortize initial costs.

This economic analysis was established using the same premises as the analysis carried out during the preceding evaluation and will contribute to understanding the evolution of costs associated with the different phases of the project, from its implementation in the pilot communities to its five years of operations.

The first part of the economic analysis will cover the number of screenings done from 2010 to 2015. Then, the costs of the different phases of the project will be presented for the five years and include start-up, pre-implementation, implementation and operating costs. Thereafter, costs for reference year 2015 will be established in order to be able to compare them to the costs of implementing the project in the four pilot communities in 2010. Finally, a brief comparison of the 2015 reference year costs and 2010 costs will be made, in addition to the total costs incurred during the five years of the project, followed by a summary of the economic analysis. This will help determine whether pursuing the project has served to reduce the amortization period of the initial costs.



3.2 CHALLENGES ASSOCIATED WITH THE ECONOMIC ANALYSIS

Over and above the limitations of the evaluation itself, the economic analysis presented several challenges. First, an economic analysis was carried out during the evaluation of the implementation of the project in the four pilot communities. Therefore, this new analysis had to be based on the same premises in order to be able to compare cost trends and arrive at a conclusion regarding the potential amortization of initial costs following the decision to implement the project in other communities.

Second, although the data used for this economic analysis originated from regional sources, the challenge of a systematic and standardized compilation of the data existed, as was the case for the initial evaluation. Access to important data, such as the number of screenings, remained an issue.

Finally, some data available during the first economic analysis was no longer being compiled, thereby limiting possible comparisons with the preceding analysis and the potential scope of this analysis.

The number of individuals screened is no longer compiled. Therefore, it is not possible to determine whether the screenings covered new patients or served as a follow-up with the same individuals during successive screening clinics. In other words, it was not possible to determine patient retention rates or new patient rates for remote DR screening. Therefore, comparisons are based solely on the number of screenings done.

3.3 NUMBER OF SCREENINGS DONE DURING THE PROJECT

TABLE 2: NUMBER OF SCREENINGS DONE

| | REFERENCE YEAR 2010 (4 PILOT COMMUNITIES) | REFERENCE YEAR 2015 (21 COMMUNITIES) | TOTAL SINCE THE BEGINNING OF THE PROJECT (FROM 2010 TO 2015) |
|--------------------------------------|---|--------------------------------------|--|
| Number of participants | 87 | – | – |
| Screenings carried out | 89 | 465 | 1,609* |
| Normal tests (reimaging in one year) | 57 | 312 | 1,171 |
| Reimaging in four or six months | 8 | 20 | 111 |
| Ophthalmology referrals | 24 | 55 | 203 |
| Family physician referrals | – | 2 | 5 |
| Poor image quality | – | 76 | 115 |

* Invoicing revealed 1609 screenings, or four tests more than the number compiled by the FNQLHSSC. The difference may be the result of a compilation or invoicing error. It is also possible that this error originated prior to the transfer of the clinical and technological expertise to the FNQLHSSC in 2013. Discrepancies of this nature also occurred during the initial evaluation.



Information related to the number of individuals participating in the screenings—meaning individuals screened—was not available beyond the implementation of the project in the four pilot communities, because it had not been compiled by interveners in the communities responsible for DR screening.

Note that information on poor image quality had not been compiled during the first evaluation. Consequently, it was not possible to compare this information with the rest of the project—or reference year 2015—and determine whether image quality had changed over the past five years.

The Table 2 shows that implementing the project in other communities (a total of 21) over five years significantly increased the number of screenings done.

It is interesting to note that the ophthalmology referral rate has decreased since 2010. It was 27% in 2010 during the first screening clinics in the four pilot communities. The rate decreases significantly when compared to

the project as a whole (12.6%) or when compared to reference year 2015 (11.8%). One hypothesis is that patients requiring more urgent care presented themselves in greater numbers during the first screening clinics. Nonetheless, even when isolating the three communities that carried out their first screening clinics in 2015, the referral rate of 13.5% remains lower than that of 2010.

The current referral rate—and the rate of the entire project—meets international standards of an acceptable referral rate being one that is less than or equal to 25%. The project has served to decrease the amount of travel and related costs by offering screening whereby 12.6% of the screenings carried out led to an ophthalmology referral, resulting in the identification of patients at risk of developing serious eye problems that might eventually lead to blindness.

However, it is important to point out that not all patients received an ophthalmology referral as a result of their DR diagnoses. Likewise, for reasons of privacy and compliance with privacy protection rules, diagnosis data is unavailable. It was not possible to determine the rate of patients being diagnosed with DR from among those who were given an ophthalmology referral.

The data presented in Table 2 originates from a regional compilation and does not provide information on whether patients followed reimaging recommendations or consulted an ophthalmologist after being referred.





3.4 PRESENTATION OF PROJECT COSTS

3.4.1 Start-up costs

Start-up costs are non-recurring costs for activities required to launch the project. The costs remained the same, with the exception of costs for the change of supplier in the spring of 2014. These were added here, since they also consisted of non-recurring costs.

TABLE 3: ESTIMATED AND NON-ESTIMATED START-UP COSTS

| | PROJECT START-UP COSTS | COSTS TO CHANGE SUPPLIER |
|---------------|---|--|
| Estimated | <ul style="list-style-type: none">• Development of training material• Training of FNIHB-QC personnel• Preparatory training• Preparation of the service contract• Detailed architecture• Translation and revision• Evaluation of privacy factors | <ul style="list-style-type: none">• Adaptation and changes to training material• Continuous training of FNQLHSSC personnel• Change of supplier |
| Non-estimated | <ul style="list-style-type: none">• Project development• Collective prescription development• One-off services offered by the reading centres• Various committee meetings | |

3.4.2 Pre-implementation costs

Prior to implementing the service in the communities, costs for several preparatory activities were incurred. Activities during this phase remained the same: equipment purchases and meetings with professionals.

3.4.3 Implementation costs

As was the case with the first evaluation, these costs remained linked to activities to implement the screenings in community health centres. It is during this phase that the nurses and imagery technicians are trained and the first screenings carried out.

3.4.4 Operating costs

These costs represent all operating costs of the project and are recurring costs. They include costs for technology infrastructures and image reading.





TABLE 4: ESTIMATED AND NON-ESTIMATED PRE-IMPLEMENTATION, IMPLEMENTATION AND OPERATING COSTS

| | PRE-IMPLEMENTATION COSTS | IMPLEMENTATION COSTS | OPERATING COSTS |
|----------------|--|---|--|
| Estimated | <ul style="list-style-type: none"> • Presentation of project to communities, physicians, ophthalmologists and pharmacists in the region • Configuration costs per access point to the reading centre • Equipment purchases • Office supplies | <ul style="list-style-type: none"> • Training of technicians and nurses in the communities • Training of instructors (nurses and imagery technicians) • Support offered to the communities | <ul style="list-style-type: none"> • Reading centre operating costs • User fees per access point • Image reading costs • Meetings of the local working groups • Nurse recertification • Repairs to and/or replacement of equipment |
| Non-estimateds | <ul style="list-style-type: none"> • Technical support during start-up • Various committee meetings • Obtaining band council resolutions • Signing of collective prescriptions and contracts | <ul style="list-style-type: none"> • Health Canada human resources involved in the project • FNQLHSSC human resources involved in the project* • Human resources in the communities (nurses and imagery technicians) • Transportation of patients | <ul style="list-style-type: none"> • Quality assurance • Indirect costs associated with time mobilized by human resources in the participating communities • Equipment transportation • Connectivity fees • Transportation of patients |

* To ensure an accurate comparison between the costs being considered, human resource costs were not estimated in this evaluation since they were not estimated in the first evaluation. However, it is possible to determine that salary costs, including fringe benefits, totaled some \$160,000 for the two full-time positions (FNQLHSSC) in the project, in 2015.





3.4.5 Project costs between 2010 and 2015

TABLE 5: ESTIMATED START-UP COSTS

| | ACTIVITIES | EXPLANATION OF COSTS | ESTIMATED COST |
|--|---|---|---|
| | Development of training material | Costs for the development, revision, translation and publishing of training manuals used in training offered to nurses and technicians in the communities. | \$68,602.00 |
| | Training of FNIHB-QC personnel | Costs for training FNIHB-QC nurses and the technician who later offered training to nurses and technicians in the communities. | \$3,246.00 |
| | Preparatory training in Montréal | Two meetings to validate the content, duration and pedagogical approach to training offered to the nurses and technicians. The costs were associated with travel and accommodation for meeting attendees. | Training of technicians: \$4,539.30 Training of nurses: \$2,987.88 \$7,527.18 |
| | Preparation of service contracts | Costs for hiring a legal firm to prepare the service contracts between the FNQLHSSC and the communities and between the communities and Laboratoires de la rétine RD. | \$12,244.20 |
| | Detailed architecture | Costs for the evaluation of the computer architecture used in DR screening. | \$14,967.27 |
| | Translation and revision | Costs for the translation and revision of project documents between 2008 and 2011. | \$7,545.87 |
| | Evaluation of privacy factors | This evaluation served to verify the legislative and judicial foundations of the project. | \$9,600.00 |
| COST OF CHANGING SUPPLIERS | Adaptation of training material | Costs for the development, revision, translation and publishing of training manuals used in training offered to nurses and technicians in the communities. | \$1,912.49 |
| | Training of FNQLHSSC personnel | Costs for the continuous training of FNQLHSSC personnel in the remote DR screening project. | \$437.80 |
| | Change of reading centre | Costs for the change of reading centre. They included meetings between the FNQLHSSC and the new supplier and initial costs. | \$56,194.76 |
| Total | | | \$182,277.57 |
| Cost per community (estimated cost / 21) | | | \$8,679.88 |
| Cost per known diabetic (estimated cost / 3125) | | | \$58.33 |





TABLE 6: ESTIMATED PRE-IMPLEMENTATION COSTS

| ACTIVITIES | EXPLANATION OF COSTS | ESTIMATED COST |
|--|---|---|
| Presentation of the project to communities and health professionals | Costs incurred as a result of one person from the FNQLHSSC travelling to present the project to a region's communities, physicians, pharmacists and ophthalmologists. | \$12,506.34 |
| Configuration fees for all access points | Connection fees for each access point (communities sharing a camera have one access point). | \$14,000.00* |
| Equipment purchases | Includes the purchase of seven lots of screening equipment amortized according to the period of use. Each lot consisted of a camera and transport case, computer, table, UPS and tonometer. To obtain an amortized cost according to the period of use, the cost of the each piece of equipment was calculated for each year and divided by its service life (camera 17.5 years; tonometer 6.5 years) and multiplied by the number of years of use. | <p>Cameras**:</p> <p>2010: $(\\$38,264.63 / 17.5) \times 6 =$ \$13,119.30 2011: $(\\$65,100 / 17.5) \times 5 =$ \$18,600.00 2012: $(\\$29,595 / 17.5) \times 4 =$ \$6,764.57 2013: $(\\$28,726.22 / 17.5) \times 3 =$ \$4,924.49 2014: $(\\$28,595 / 17.5) \times 2 =$ \$3,268.00 2015: $(\\$29,595 / 17.5) \times 1 =$ \$1,691.43 Total cameras: \$48,367.79</p> <p>Tonometer:</p> <p>2010: $(\\$9,283.24 / 6.5) \times 6 =$ \$8,569.14 2011: \$0 2012: $(\\$11,166.38 / 6.5) \times 4 =$ \$6,871.62 2013: \$0 2014: $(\\$4,338.78 / 6.5) \times 2 =$ \$1,335.00 2015: $(\\$4,470 / 6.5) \times 1 =$ \$687.70 Total tonometer: \$17,463.46</p> <p>Other equipment for the entire period:</p> <p>\$2,995.21 \$68,826.46</p> |
| Office supplies | Cost established according to the list of FNQLHSSC transactions. | \$1,988.27 |
| Total | | \$97,321.07 |
| Cost per community (estimated cost / 21) | | \$4,634.34 |
| Cost per known diabetic (estimated cost / 3125) | | \$31.14 |

* Configuration costs are \$1,000 per camera. Although there are 7 cameras in use, total costs were \$14,000. When the change of supplier took place, configuration costs for the first cameras in use were invoiced once again by the new reading centre. Since 2015, new costs have been incurred with the change of suppliers.

** One camera was financed in part by a pharmaceutical company: Merck Canada.





TABLE 7: ESTIMATED IMPLEMENTATION COSTS

| ACTIVITIES | EXPLANATION OF COSTS | ESTIMATED COST |
|---|--|--|
| Training of nurses and imagery technicians | Until 2013, costs included travel and accommodation for FNIHB-QC instructors and trainees. After 2013, costs included travel and accommodation for FNQLHSSC instructors. | Before 2013: \$48,286.12 After 2013: \$15,089.84 Total: \$63,375.96 |
| Technical support offered to the communities | These costs refer to technical support offered by the reading centre during implementation. | \$6,860.00 |
| Training of nurse and imagery technician instructors | Costs include travel and accommodation for instructors and trainees during training and coaching, the fees for nurses and imagery technicians in the communities, and the fees of the referring physician. | Instructors: \$923.31 Trainees: \$2,871.58 Coaching: \$1,173.69 Fees: \$2,990.00 Total: \$7,958.58 |
| Project follow-up | Costs include travel for FNQLHSSC and FNIHB employees and experts during follow-up meetings on the project implementation. | \$4,151.84 |
| Total | | \$82,346.38 |
| Cost per community (estimated cost / 21) | | \$3,921.26 |
| Cost per known diabetic (estimated cost / 3125) | | \$26.35 |





TABLE 8: ESTIMATED OPERATING COSTS (FROM 2010 TO 2015)

| ACTIVITIES | EXPLANATION OF COSTS | ESTIMATED COST |
|--|--|--|
| Reading centre operating costs | These annual costs ensure project operation irrespective of the number of communities that do the screenings. | Server, optical fibre, security and archiving: \$44,065.00 Licence – first reading centre: \$76,610.00 Telecommunications: \$2,775.00 Fixed costs with the new reading centre starting in June 2014: \$45,055.00 \$168,505.00 |
| User fees for all access points | Fixed cost of \$50.00 payable monthly for each access point based on supplier invoicing. | \$6,200.00 |
| Image reading | Fixed costs of \$115.00 invoiced for image reading for each screening test done by Laboratoires de la rétine RD until May 31, 2014 (926 tests). From June 1, 2014, to March 31, 2015, the École d'optométrie invoiced \$18 for each test (377 tests); thereafter, the rate increased to \$25.50 on April 1, 2015 (369 tests until the end of June 2015). | 863 tests at \$115: \$99,245.00 377 tests at \$18: \$6,786.00 369 tests at \$25.50: \$9,409.50 \$115,440.50 |
| Meetings of the local working groups | Costs were determined for all individuals participating in the local working group according to their expense accounts. Several meetings took place via videoconference, thereby incurring no cost. | \$5,626.67 |
| Nurse recertification | Costs for nurse recertification. | \$0* |
| Equipment repairs and/or replacement | Costs for repairs and the replacement of equipment for the different cameras in use between 2010 and 2015. | \$7,236.11 |
| Total | | \$303,008.28 |
| Cost per community (estimated cost / 21) | | \$14,428.96 |
| Cost per known diabetic (estimated cost / 3125) | | \$96.96 |
| Cost per screening (estimated cost / 1609)** | | \$188.32 |

* Periodic recertification was a Health Canada suggestion during project development. However, it was noted that support offered by the nurse educator and follow-up done based on needs within the communities was sufficient. Therefore, there was no need to recertify the nurses between 2010 and 2015 as the initial training sufficed.

** It was decided that a line be added with the cost per screening to determine the real operating costs.





Table 9 presents a summary of project costs estimated during this economic analysis compared to project costs associated with the implementation in 2010.

TABLE 9: SUMMARY OF PROJECT COSTS ESTIMATED FOR THE ENTIRE PROJECT COMPARED TO 2010

| TYPES OF COSTS | FROM 2010 TO 2015 | | | | IMPLEMENTATION IN THE FOUR PILOT COMMUNITIES IN 2010 | | |
|--------------------------|----------------------|--|---|--|--|---|--|
| | TOTAL ESTIMATED COST | COST PER COMMUNITY (ESTIMATED COST / 21) | COST PER KNOWN DIABETIC (ESTIMATED COST / 3125) | COST PER SCREENING (ESTIMATED COST / 1609) | TOTAL ESTIMATED COST | COST PER PILOT PROJECT COMMUNITY (ESTIMATED COST / 4) | COST PER KNOWN DIABETIC (ESTIMATED COST / 175) |
| Start-up costs | \$182,277.57 | \$8,679.88 | \$58.33 | \$113.29 | \$123,732.52 | \$30,933.13 | \$707.04 |
| Pre-implementation costs | \$97,321.07 | \$4,634.34 | \$31.14 | \$60.48 | \$10,688.58 | \$2,672.15 | \$61.08 |
| Implementation costs | \$82,346.38 | \$3,921.26 | \$26.35 | \$51.18 | \$36,952.89 | \$9,238.22 | \$211.16 |
| Operating costs | \$303,008.28 | \$14,428.96 | \$96.96 | \$188.32 | \$53,756.54 | \$13,439.14 | \$307.18 |
| Total | \$664,953.30 | \$31,664.44 | \$215.78 | \$413.27 | \$225,130.53 | \$56,282.64 | \$1,286.46 |

When project costs for five years are compared to project costs during the implementation in the four pilot communities in 2010, the following observations may be made:

- Total implementation costs and costs per community increased compared to 2010 owing to the purchase of six new cameras.
- Since the costs are cumulative, total estimated costs are higher for the five years compared to 2010.
- Costs per known diabetic are lower for the five-year period than for 2010, because they apply to a greater number of potential patients (3125 rather than 175 in 2010). However, to understand the true cost of the project, it is better to focus on the cost per screening. For the project, the cost per screening is \$413.27.
- If the total cost per screening (\$413.27) is compared to the total cost of known diabetics (\$215.78), it is higher. This means that it would be possible to again reduce the total cost of the project by ensuring the participation, in remote DR screening, of a greater number of diabetic individuals in the communities.





3.5 PROJECT COSTS FOR REFERENCE YEAR 2015

The tables that follow present the costs of different phases of the project for reference year 2015. Based on these costs, it is possible to assess future costs associated with maintaining screening in the 21 communities having implemented it.

TABLE 10: PRE-IMPLEMENTATION COSTS FOR REFERENCE YEAR 2015

| ACTIVITIES | EXPLANATION OF COSTS | ESTIMATED COST |
|--|--|--|
| Presentation of the project to communities and health professionals | Costs incurred as a result of one person from the FNQLHSSC travelling to present the project to a region's communities, physicians, pharmacists and ophthalmologists. | \$0 |
| Configuration fees for all access points | Connection fees for each access point (communities sharing a camera have one access point). | \$7,000.00 |
| Equipment purchases | Includes the purchase of seven lots of screening material amortized according to the period of use. Each lot consists of a camera and transport case, computer, table, UPS and tonometer. To obtain an amortized cost according to the period of use, the cost of the each piece of equipment was calculated for each year and divided by its service life (camera 17.5 years; tonometer 6.5 years). | Cameras**: $\$220,337.72 / 17.5 = \$12,590.73$ Tonometer: $\$29,258.40 / 6.5 = \$4,501.29$ Other material: \$524.08 \$17,616.10 |
| Office supplies | Costs are established according to the list of FNQLHSSC transactions. | \$999.19 |
| Total | | \$25,615.29 |
| Cost per community (estimated cost / 21) | | \$1,219.77 |
| Cost per known diabetic (estimated cost / 3125) | | \$8.20 |





TABLE 11: IMPLEMENTATION COSTS FOR REFERENCE YEAR 2015

| ACTIVITIES | EXPLANATION OF COSTS | ESTIMATED COST |
|---|--|---|
| Training of nurses and imagery technicians | Costs include travel and accommodation for FNQLHSSC instructors. | \$3,663.43 |
| Technical support offered to the communities | These costs refer to technical support offered by the reading centre during implementation. | \$0 |
| Training of nurse and imagery technician instructors | Costs include travel and accommodation for instructors and trainees during training and coaching, the fees for nurses and imagery technicians in the communities, and the fees of the referring physician. | Instructors: \$923.31 Trainees: \$2,871.58 Coaching: \$1,173.69 Fees: \$2,990.00 \$7,958.58 |
| Project follow-up | Costs include travel for FNQLHSSC and FNIHB employees and experts during follow-up meetings on project implementation. | \$308.84 |
| Total | | \$11,930.85 |
| Cost per community (estimated cost / 21) | | \$568.13 |
| Cost per known diabetic (estimated cost / 3125) | | \$3.82 |

TABLE 12: OPERATING COSTS FOR REFERENCE YEAR 2015

| ACTIVITIES | EXPLANATION OF COSTS | ESTIMATED COST |
|--|---|---|
| Reading centre operating costs | These annual costs ensure project operation irrespective of the number of communities that use the service. In June 2015, these costs became fixed costs with the École d'optométrie. | \$17,238.00 |
| User fees for all access points | Fixed cost of \$50.00 payable monthly for each access point based on the previous supplier's invoicing. | \$0 |
| Image reading | Until March 31, 2015, the École d'optométrie invoiced \$18 for each test; thereafter, the rate increased to \$25.50 on April 1, 2015. | 377 tests at \$18: \$6,786.00 3369 tests at \$25.50: 9,409.50 \$16,195.50 |
| Meetings of the local working group | Costs were determined for all individuals participating in the local working group according to their expense accounts. | \$0* |
| Nurse recertification | Nurse recertification costs. | \$0 |
| Equipment repairs and/or replacement | Costs for repairs and the replacement of equipment for the different cameras in use. | \$1,091.89 |
| Total | | \$17,287.39 |
| Cost per community (estimated cost / 21) | | \$823.21 |
| Cost per known diabetic (estimated cost / 3125) | | \$5.53 |
| Cost per screening (estimated cost / 465)** | | \$37.18 |

* Meetings were held by videoconference, which explains why no cost is associated with this activity.





In this table, the cost per screening was added insofar as it reflects real operating costs per screening.

TABLE 13: SUMMARY TABLE OF ESTIMATED COSTS FOR REFERENCE YEAR 2015 COMPARED TO 2010

| TYPES OF COSTS | REFERENCE YEAR 2015 | | | | REFERENCE YEAR 2010 | | |
|--------------------------|----------------------|--|---|---|----------------------|--|--|
| | TOTAL ESTIMATED COST | COST PER COMMUNITY (ESTIMATED COST / 21) | COST PER KNOWN DIABETIC (ESTIMATED COST / 3125) | COST PER SCREENING (ESTIMATED COST / 465) | TOTAL ESTIMATED COST | COST PER COMMUNITY OF THE PILOT PROJECT (ESTIMATED COST / 4) | COST PER KNOWN DIABETIC (ESTIMATED COST / 175) |
| Start-up costs | \$0 | \$0 | \$0 | \$0 | \$123,732.52 | \$30 933.13 | \$707.04 |
| Pre-implementation costs | \$25,615.39 | \$1,219.78 | \$8.20 | \$55.09 | \$10,688.58 | \$2 672.15 | \$61.08 |
| Implementation costs | \$11,930.85 | \$568.13 | \$3.82 | \$25.66 | \$36,952.89 | \$9 238.22 | \$211.16 |
| Operating costs | \$17,287.39 | \$823.21 | \$5.53 | \$37.18 | \$53,756.54 | \$13 439.14 | \$307.18 |
| Total | \$54,833.54 | \$2,611.12 | \$17.55 | \$117.93 | \$225,130.53 | \$56 282.64 | \$1 286.46 |

Comparing the total costs between reference year 2015 and 2010 reveal that 2015 costs are lower. The total estimated cost is much lower in 2015 than in 2010 owing to the fact that start-up costs do not apply to 2015. The total cost per community is also lower in 2015, because the costs are broken down among a larger number of communities (21 communities in 2015 versus 4 communities in 2010). Likewise, the cost per diabetic is much lower in 2015: \$17.55 compared to \$1,286.46 in 2010. However, it is important to remember that the cost per screening provides a more accurate estimate of real expenses incurred for the reference year, namely \$117.93.

Although the pre-implementation costs for 2015 are higher than those for 2010 owing to the purchase of screening material for communities newly implementing the project, initial costs—the sum of start-up costs and pre-implementation costs—are lower in 2015 than in 2010. It is possible to state that pursuing the project and maintaining remote DR screening in the communities contributed to a decrease in the initial costs.

As anticipated in the economic analysis, operating remote DR screening was less costly in 2015, since operating costs totaled \$17,287.39 compared to \$53,756.54 in 2010.





3.6 COMPARISON OF COSTS FOR THE ENTIRE PROJECT AND COSTS FOR REFERENCE YEAR 2015

TABLE 14: COMPARISON BETWEEN TOTAL ESTIMATED COSTS FOR THE ENTIRE PROJECT AND REFERENCE YEAR 2015

| TYPES OF COSTS | FROM 2010 TO 2015 | | | | REFERENCE YEAR 2015 | | | |
|--------------------------|----------------------|--|---|--|----------------------|--|---|---|
| | TOTAL ESTIMATED COST | COST PER COMMUNITY (ESTIMATED COST / 21) | COST PER KNOWN DIABETIC (ESTIMATED COST / 3125) | COST PER SCREENING (ESTIMATED COST / 1609) | TOTAL ESTIMATED COST | COST PER COMMUNITY (ESTIMATED COST / 21) | COST PER KNOWN DIABETIC (ESTIMATED COST / 3125) | COST PER SCREENING (ESTIMATED COST / 465) |
| Start-up costs | \$182,277.57 | \$8,679.88 | \$58.33 | \$113.29 | \$0 | \$0 | \$0 | \$0 |
| Pre-implementation costs | \$97,321.07 | \$4,634.34 | \$31.14 | \$60.48 | \$25,615.30 | \$1,219.78 | \$8.20 | \$55.09 |
| Implementation costs | \$82,346.38 | \$3,921.26 | \$26.35 | \$51.18 | \$11,930.85 | \$568.13 | \$3.82 | \$25.66 |
| Operating costs | \$303,008.28 | \$14,428.96 | \$96.96 | \$188.32 | \$17,287.39 | \$823.21 | \$5.53 | \$37.18 |
| Total | \$664,953.30 | \$31,664.44 | \$215.78 | \$413.27 | \$54,833.54 | \$2,611.12 | \$17.55 | \$117.93 |

TABLE 15: INITIAL COST AMORTIZATION RATE

| Types of costs | FROM 2010 TO 2015 | | REFERENCE YEAR 2015 |
|----------------------------|----------------------|---|----------------------|
| | Total estimated cost | Average total estimated cost over five years* | Total estimated cost |
| Start-up costs | \$182,277.57 | \$36,455.51 | \$0 |
| Pre-implementation costs | \$97,321.07 | \$19,464.21 | \$25,615.30 |
| Total initial costs | \$279,598.64 | \$55,919.72 | \$25,615.30 |

* To calculate the initial cost of the amortization rate, an average of the initial costs over five years was calculated, as the compilation of data did not allow the establishment of these costs for each of the five years of the project.

The first evaluation report forecast stating that the initial cost amortization period would drop as the number of points of service and users rose proved correct. This comparative table reveals that the initial cost amortization rate (start-up costs + pre-implementation costs) for 2015 increased in relation to the average amortization over the five-year project timespan, since the average initial costs were \$55,919.72 and the initial costs for 2015 were estimated at \$25,615.30.



SECTION 4

MEDIUM-TERM EFFECTS OF THE IMPLEMENTATION IN THE FOUR PILOT COMMUNITIES

4.1 OBJECTIVE OF THE EVALUATION OF THE EFFECTS

Because the initial implementation of the project took place five years ago, there is sufficient information to document the effects of remote DR screening in the four pilot communities. The purpose of this section is to determine the effects of the implementation of the project in the four pilot communities. This section of the evaluation documents the medium-term effects that the project may have had on the organization of services, diabetic patient care, diabetes awareness and local capacity building.

4.2 DATA COLLECTION APPROACH

4.2.1 Time of collection

Data were collected primarily from November 2015 to January 2016.

4.2.2 Data collection method

Most of the data collection consisted of semi-directed interviews carried out among internal actors in the project, meaning first-line workers responsible for remote DR screening in the four pilot communities. Complementary information was collected on a continuous basis from regional actors involved in the remote DR screening project

through follow-ups and discussions to validate an understanding of the project and its implementation in the pilot communities, but also through a document review.

4.2.3 Respondent profiles

The respondents consulted in the course of the data collection were nurses and imagery technicians in the four pilot communities, responsible for remote DR screening in their community. Most of the respondents had been involved in remote DR screening since its implementation in their community. Employee turnover was observed in only one of the four pilot communities. In this case, it was necessary to consult more respondents in order to be able to identify the medium-term effects of the implementation of the project. Thus, various first-line workers having participated in remote DR screening over the five-year period in this community were approached to participate in the data collection.

Note that one of the four pilot communities did not offer screening directly in the community, owing to the small number of diabetic patients there. Consequently, these patients travelled to a neighbouring community to be screened. However, one respondent was consulted in the course of this data collection to the extent that his opinion was deemed pertinent regarding most of the points discussed herein.



Other means were used to collect information from regional actors, namely FNQLHSSC employees working on the remote DR screening project.

4.2.4 Number of respondents

For the interviews carried out with first-line workers offering remote DR screening in the four pilot communities, 11 first-line workers were consulted during semi-directed interviews. A total of six interviews were carried out individually or in groups, based on the respondents' preferences and availability.

4.2.5 Data collection limitation

The time allotted for the evaluation did not allow us to take into account the different actors' experiences and identify the medium-term effects on each. The medium-term effects of the implementation of the project in the four pilot communities were identified essentially through consultations with imagery technicians and nurses involved in remote DR screening. Those having benefited from screening were not consulted for this evaluation. However, a more comprehensive perspective, originating from FNQLHSSC employees who worked on the remote DR screening project, was considered. This provided insight on the viewpoints of these two groups of actors regarding the medium-term effects of the implementation of the project in the four pilot communities.

Only a small number of respondents were consulted, given the nature of the information sought in this data collection. Since the collection sought to document the medium-term effects of the implementation of the project in the four pilot communities, the pool of potential respondents consisted of those involved in remote DR screening in these communities, namely the nurses and imagery technicians who had been trained to do screening in their communities.

Owing to employee turnover in one of the communities, some respondents were only involved in remote DR screening for limited periods of time during the implementation of the project. Therefore, this limited our access to the respondents' global perspective of the effects of the project in their community. The research officer was able to trace variations in the way the screening was offered in the community by compiling interviews that took place in this community.

4.3 MEDIUM-TERM EFFECTS

It should be noted that some effects presented hereafter are linked directly to the implementation of the project in the four pilot communities, while others are attributable to changes made to the screening process over the years.

4.3.1 Effects on the organization of services

The analysis of data collected from among community first-line workers involved in remote DR screening indicated that since the implementation of the project, several respondents had had to reorganize their work schedule for various reasons. For some, it was directly related to delays associated with the collective prescriptions. For others, it originated with changes made to the camera-sharing schedule. Finally, four respondents indicated that the reorganization of their work schedule was directly related to the workload generated by the new screenings. These respondents indicated having to reconcile their initial mandate with remote DR screening.





This attests to an additional workload associated with the implementation of the project. This aspect was raised during the first evaluation. However, data collected during the interviews showed that this additional workload extended beyond activities to implement the service. Indeed, all the first-line workers consulted and involved in the project from the onset noted a persistent increase in their workload over the years. The participants who detailed reasons for the increase and maintenance of a greater workload since the implementation of the project attributed it to the growing number of patients participating in remote DR screening. In some cases, the workload increased as a result of the increased preparation associated with making appointments. In other cases, it was the time allocated to a greater number of screenings that was identified as being at the origin of the increased workload, although less time is devoted to screening today than at the beginning of the project. Several respondents indicated that screening takes less time now as they are much more experienced with the camera, but also because of the change of clinical model and the decrease in the number of images required. Although the workload has increased since the implementation of the project, almost all the respondents felt that their mandate remained the same. However, one respondent specified that having to contact new diabetic patients was not part of his initial mandate and that doing so had been added to his regular tasks.

The schedule for sharing screening equipment remained unchanged. However, some respondents indicated that the fact that one pilot community had recently begun to do more screenings than at the beginning of the project had modified the schedule somewhat. In their opinion, the use of the camera-sharing schedule was more formal at the start of the project. Since then, it became more informal.

4.3.2 Effects on patient care

Screening process

The analysis of the data collected showed that several changes took place in the DR screening process in the pilot communities, but only one change appears to have had a direct effect on the patients. The effects are more closely linked to changes made over the years, rather than the initial implementation of the project in the pilot communities.

To determine the effects of the project on patient care, it was necessary to first document the changes made to the screening process.

To do so, the respondents were asked to share their experience with regard to changes made to the remote DR screening process and the effects of these changes on patient care. All the respondents identified the change in clinical model as the major change made over the course of the five years and as having had an effect on patient care. The change from systematic dilation to non-dilation or sequential dilation was an issue for first-line workers in several of the pilot communities.

All the first-line workers agreed that this change of model had a positive effect on patients, because they no longer had to deal with the undesirable effects of dilation and could resume their activities immediately after screening. However, most of the respondents stated having a clear preference for the clinical model of systematic dilation. Indeed, some respondents indicated choosing dilation if nurses were available—and if patients agreed to it—in order to guarantee the quality of images taken. It is important to note here that the communities could choose from among the various clinical models available: dilation, non-dilation and sequential dilation. Despite the challenges associated with





renewing collective prescriptions, the clinical model without dilation allowed screenings to continue without delaying screening clinics. However, a decrease in the quality of images following the change of clinical model was mentioned on several occasions by respondents in the different pilot communities. Several respondents noted lesser quality images since the change of model. According to these respondents, this had an effect on the growing number of referrals. This is partially corroborated by data collected during the economic analysis. The comparison of raw data from one year to the next effectively shows an increase in the number of references in ophthalmology in the pilot communities after the model was changed. The number of poor quality images increased greatly with the change of model. However, the link between the lesser quality images and ophthalmology referrals could not be established on the basis of the data at our disposal. Other respondents indicated that their workload in relation to screenings increased due to the need to retake images several times to obtain good quality images. For some, the issue was also to be able to guarantee the quality of the service to patients having already undergone screening with systematic dilation. It should be noted that the FNQLHSSC project team responsible for the remote DR screening project is aware of this. Procedures are currently underway to replace the first cameras by better non-mydratic cameras.

Another change in the remote DR screening process that took place over the past five years is the decrease in the number of images required. This was mentioned by several respondents without, however, their indicating any effects resulting from this change.

Some respondents also discussed the change of reading centre. These respondents identified this change as having been an issue during the first year for teams involved in screening. The reports provided by the reading centre were in French only, whereas the four pilot communities are English-speaking. This was corrected thereafter. As of 2015, the communities received reports in English.

Post-screening follow-up

Respondents were questioned about screening follow-up, eventual changes made, and their effects. It would appear that no change has been made to post-screening follow-up since the implementation of the project in the four pilot communities. Nurses are responsible for this follow-up. Upon receipt of the results of screening test results from the reading centre, the nurses refer patients in ophthalmology, if need be. It is interesting to note that all the respondents agreed that patient follow-up became easier over time—their knowledge of screening steps and procedures was better integrated and mastered by the first-line workers and they had acquired greater experience in remote DR screening. Some respondents specified that follow-ups were simplified as a result of the recent stability of the local screening team. However, one respondent indicated that follow-ups depended on patients returning to the remote DR screening clinic from one year to the next. Participating patient turnover in DR screening was observed by one respondent who indicated that recruiting patients for screening and their use of the services from one year to the next was an issue. Preservation, on an annual basis, of a pool of participating patients for remote DR screening could not be documented in this evaluation. Information on new patients and returning patients was not collected by the pilot communities after the initial evaluation.

With regard to ophthalmology referrals based on screening results, it would appear that feedback between the local ophthalmologists and the DR screening teams in the communities following patient referrals is a major issue. Indeed, all the respondents indicated receiving no feedback from the local ophthalmologists regarding follow-ups of patients referred to them. The lack of the ophthalmologist's report makes follow-ups difficult, because the only sources of information related to the consultation of patient referrals depend on the will and capacity of the patients themselves to provide information during their next DR screening in the community.





4.3.3 Effects of diabetes awareness

Respondents were asked their opinion regarding the possible effects since the project implementation that the remote DR screening service might have had on diabetes awareness in their community. An analysis of the data revealed that several diabetes-related activities had been implemented in the pilot communities since the implementation of the screening. The respondents established a direct link between the implementation of these new activities and the implementation of remote DR screening in their community. They feel that offering remote DR screening served to further heighten public diabetes awareness and pave the way for establishing new diabetes awareness activities in their communities. The range, format and targeted audience of the awareness activities vary. Several respondents felt the population was more aware of diabetes and its consequences and generally better informed of the diabetes-related services offered in their community. Other respondents indicated having observed heightened awareness among patients participating in the screenings, but not among the population in general. It is also worth pointing out that several respondents noted that patients were increasingly aware of diabetes, leading them to ask more questions on the subject. In the opinion of one of the people consulted, the volume of information on diabetes provided in the community had more than doubled.

In one of the pilot communities, a diabetes-related position has been created since the implementation of the project. All these considerations demonstrate the importance of diabetes awareness in the communities, in particular in relation to the implementation of the pilot project.

All the respondents mentioned that an increase in diabetes awareness activities in their community had served not only to connect with more diabetic patients within the framework of the remote DR screening clinics, but also to offer screening more quickly following a diagnosis of diabetes, thereby considerably reducing ophthalmology referrals. Several respondents explained that the increase in diabetes awareness activities also increased the total number of patients having undergone remote DR screening from 2010 to 2015 without increasing the number of screenings annually. These respondents from different communities indicated having observed patient turnover in screening from one year to the next.

The respondents also specified that screening clinics provided a first-rate opportunity to provide specific information on diabetes and DR to patients.

4.3.4 Effects on local capacities

Opinions regarding the effects of the implementation of the project on local capacities differed somewhat between regional actors responsible for supporting the implementation of the project and local actors offering screening in their community. Community respondents indicated having become more comfortable over time. They mentioned gaining a better understanding of screening procedures. Some indicated feeling in complete control of the screening process, which they understood more and more, though they continued to be dependent on other structures, such as local hospitals, and delays arising from ophthalmology referrals. The respondents stated that support from the FNQLHSSC





for the collective prescriptions was both timely and appreciated. A portion of the respondents declared it was obvious that the project had contributed to generating savings in terms of screening costs outside the communities and reduced patient waiting times by offering patients access to remote DR screening directly in the communities. Two respondents stated that since the screening could take place without dilation, nurses no longer felt needed in the remote DR screening process. One of the two also indicated that for this reason, he did not think that the project had contributed to increasing the nurses' capacities. However, it might be true for the imagery technicians, who participated actively in the screenings.

Although the respondents did not mention it, it is important to note that the nurses remain accountable for patient care and follow-ups.

Overall, respondents in the communities did not indicate having noted that the implementation of the project contributed to the development of local capacities. However, the perception of regional actors in this respect appeared to differ somewhat. The regional actors' perception of the effects of the project was that local capacities were developed on account of the fact that first-line workers had been trained to carry out the screenings. In their opinion, the development of collective prescriptions also fostered nurse empowerment, allowing them to proceed with the dilation of patients' eyes and thus increase their ability to care for diabetic patients. At a more global level, the regional actors also considered that the instructor training offered to nurses and imagery technicians regionally for the purpose of having them train and support other remote DR screening teams in the communities also contributed to the development of local capacities. Two first-line workers in the pilot communities were among those who received the instructor training (see Section 2, page 21).

4.3.5 Respondents' suggestions to continue to improve screenings

All the respondents acknowledged the usefulness of DR screenings and the need to pursue it. Given their experience with the project, local respondents were asked for their input on how remote DR screening could be improved. Several stated that different solutions might be considered to deal with the loss of image quality following the implementation of screenings without dilation. Most suggested simply replacing the cameras, while others proposed another alternative in addition to this option, namely to renew the collective prescriptions required for a return to systematic dilation.

The issue of equipment was raised by other respondents who considered that a greater number of cameras—or their sharing among fewer communities—might address the problem of equipment sharing among the pilot communities and afford greater flexibility to carry out remote DR screening. Some respondents mentioned that sharing experiences with other communities would be beneficial.



SECTION 5

SUMMARY

5.1 CHANGES MADE TO THE PROJECT

FIGURE 2: MAJOR CHANGE TIMELINE:





TABLE 16: SUMMARY TABLE OF CHANGES

| | DURING THE IMPLEMENTATION IN THE PILOT COMMUNITIES | FOLLOWING THE IMPLEMENTATION IN THE PILOT COMMUNITIES (BETWEEN 2011 AND DECEMBER 2015) |
|---|---|--|
| Project objective | "Reduce the incidence of blindness by providing access to remote diabetic retinopathy screening for First Nations living in the communities." (FNQLHSSC, 2015) | Remains the same. |
| Funding contributors | <ul style="list-style-type: none"> • Health Canada • Canada Health Infoway | <ul style="list-style-type: none"> • Health Canada • Canada Health Infoway until June 2014. |
| Mandate breakdown | <ul style="list-style-type: none"> • Health Canada provided the training and ensured clinical and technical support. • FNQLHSSC: project co-ordination. | <p>2013: Transfer of the clinical and technological expertise to the FNQLHSSC.</p> <p>The FNQLHSSC was now responsible for co-ordinating the implementation, providing training and offering clinical and technological support.</p> |
| FNQLHSSC staff involved in the implementation of the project | The e-health officer was responsible for the remote DR screening project. | <p>2011: The person in charge of the project left the FNQLHSSC and her mandate was reviewed, leading to a new position in telehealth: DR project manager.</p> <p>2013: creation of the position of nurse educator.</p> |
| Training community first-line workers | Training ensured by Health Canada. | <p>After the transfer in 2013, all training was provided by the FNQLHSSC.</p> <p>The project manager trained the imagery technicians and offered them technological support.</p> <p>The nurse educator provided training to the nurses and offered them clinical support.</p> |
| Clinical model used | Systematic dilation applied to all patients. | <p>2013: research on other potential clinical models.</p> <p>2014: Introduction of the clinical model without dilation.</p> <p>The communities could now choose from among three clinical models (refer to the screening table, Appendix 4, page 59)</p> <ul style="list-style-type: none"> • Dilation • Without dilation • Sequential dilation |
| Ophthalmology referral rate | <p>22.8% (34 referrals out of 149 screenings).</p> <p>Note: international standards establish 25% as an acceptable referral rate.</p> | <p>For the entire project: 12.6%</p> <p>For 2015: 11.8%</p> |



| | DURING THE IMPLEMENTATION IN THE PILOT COMMUNITIES | FOLLOWING THE IMPLEMENTATION IN THE PILOT COMMUNITIES (BETWEEN 2011 AND DECEMBER 2015) |
|-----------------------------------|--|--|
| Collective prescriptions | Prerequisite to the implementation of DR screening in a community. | Following the change of model, less dependence on collective prescriptions; they are no longer an impediment to starting implementation. No need for a prescription for patients benefiting from the service and not requiring dilation. |
| Number of cameras | 1 | 7 |
| Number of communities | 4 | 21 |
| Material used in screening | Non-mydratiac camera and tonometer. The material is shared among the pilot communities. | Change of camera model for more recent and higher performance cameras that facilitate image capture without dilation. The material continues to be shared. |
| Image capture | Number of images: 7 per eye or 14 per patient—six fields of the retina and one of the anterior eye (iris, pupil, cornea). Images captured by an imagery technician. | Revision of the number of images required: Number of images: 4 per eye, or 8 per patient (3 fields of the retina and one of the anterior eye). Following a change of model, the mandates were re-aligned: the nurses are now trained also to capture the images. |
| Image transmission | Image transmitted to the reading centre by the imagery technician. | Following a change of supplier, the image transfer software was changed. With the change of clinical model, the images could then be transmitted by either the imagery technician or nurse based on how responsibilities are shared within each of the communities |
| Reading prices | \$115 per screening | Change of supplier in June 2014: Until May 2014: \$115 From May 2014 to March 2015: \$18 As of April 1, 2015: \$25.50 |

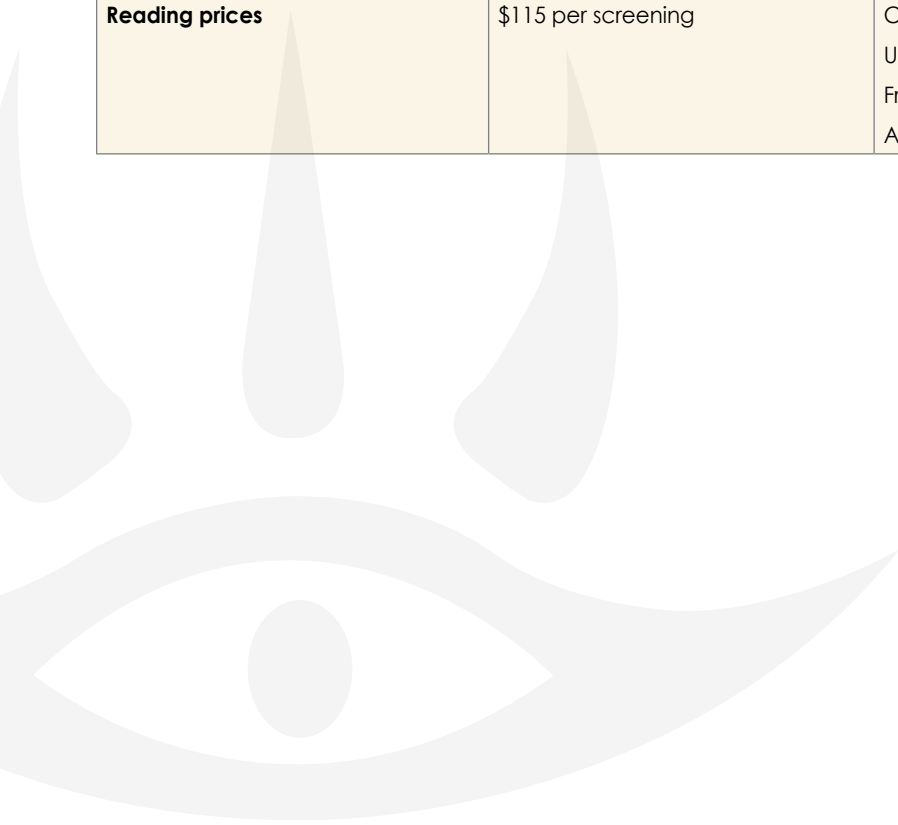
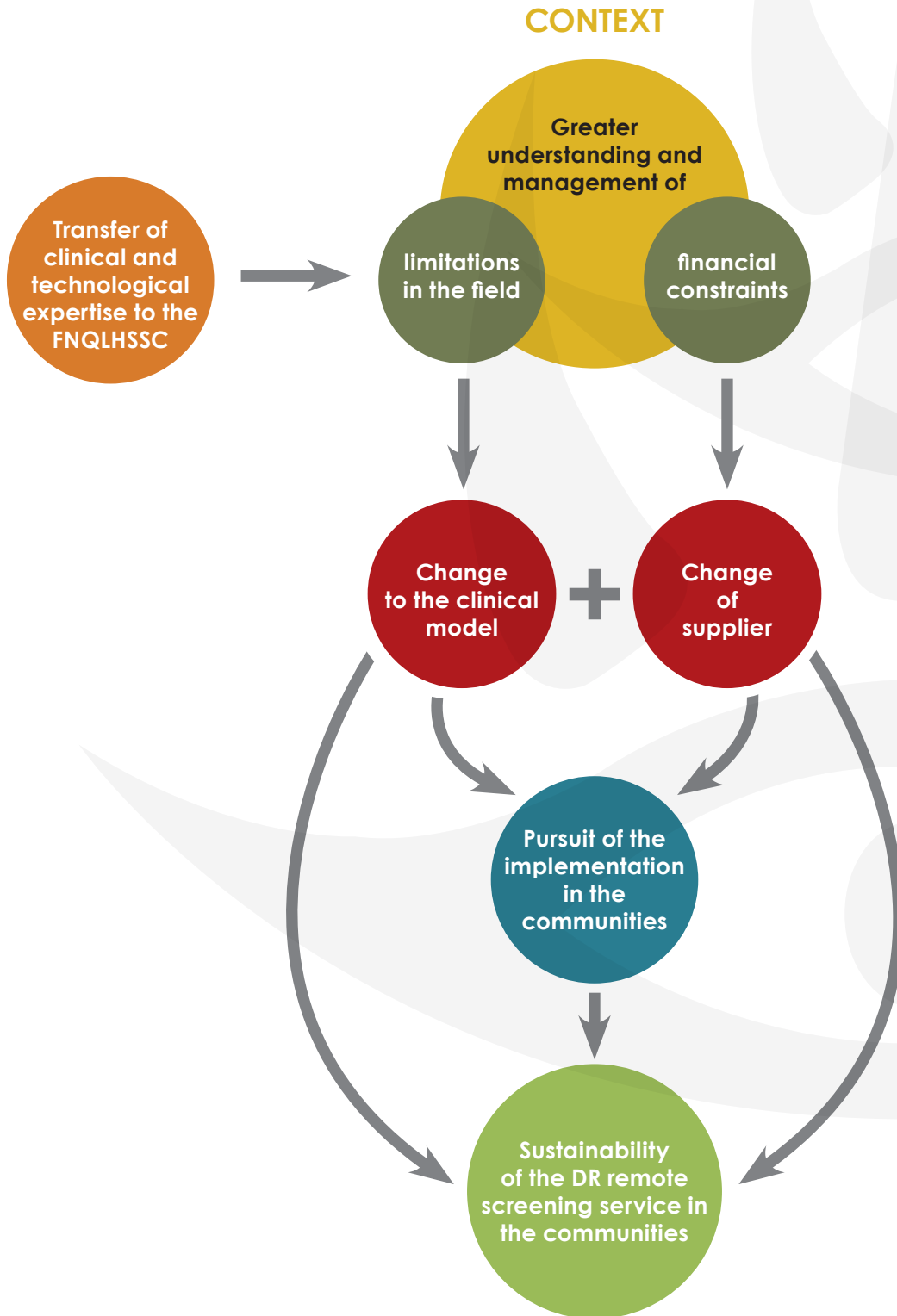




FIGURE 3: EFFECTS OF THE CHANGES ON THE PROJECT





5.2 ECONOMIC ANALYSIS SUMMARY

This section on the economic analysis revealed two major findings. The first concerns referral rates in ophthalmology following DR screening, and the second the decrease in the project operating costs during the 2010–2015 period.

5.2.1 Reference rate in ophthalmology

The referral rate in ophthalmology has decreased since 2010. The current referral rate—and that for the entire project—meets international standards that establish 25% as an acceptable referral rate. The project has served to reduce the amount of travel and related costs by offering remote screening. In all, 12.6% of the screenings done resulted in an ophthalmology referral, thereby allowing patients to avoid developing serious problems with their eyesight that might eventually lead to blindness.

5.2.2 Project operating costs

Costs incurred by the remote DR screening service were much lower in 2015 than in 2010. The increase in the number of points of service and a greater number of screenings contributed to reducing total project costs and increasing the initial cost amortization rate of the project.

5.2.3 Future anticipated costs

An increase in costs for the replacement of material is to be expected. Although the cameras have yet to reach the end of their service life (17.5 years), rapid technological advances could accelerate the obsolescence of the equipment in use and result in the earlier replacement of cameras than originally planned. Although the usefulness, pertinence and cost-effectiveness of the screenings have been demonstrated, thought should be given to replacing equipment and the impact that such replacement might have on the costs of maintaining the screening in the communities.

5.3 SUMMARY OF THE EVALUATION OF MEDIUM-TERM EFFECTS

The remote DR screening project would appear to have had medium-term effects on different aspects within the communities.

5.3.1 Organization of services

The analysis of data collected shows that the organization of services was affected at several levels as a result of the implementation of the remote DR screening project. It was necessary to reorganize the work schedules of the first-line workers involved in screenings, owing to the increased workload associated with the implementation of the remote DR screening service. The workload that, according to the local actors, was attributable to the growing number of patients participating in DR screening, appeared to have been maintained over the years despite reduced screening times. Equipment sharing between the communities remained the same and continues to be based on the sharing schedule.

5.3.2 Patient care

Although several changes took place in the screening process, it would seem that only the change of clinical model had an effect on patient care. All the respondents agreed that no longer systematically dilating patients' eyes was a positive factor, since the patients no longer had to deal with the undesirable effects of dilation and could return to their activities immediately after DR screening. However, a large number of respondents indicated a clear preference for systematic dilation and used this technique, when possible, to ensure better quality images. Several respondents noted a decrease in





image quality with the change of the clinical model and non-dilation. However, the possible correlation made by local actors between the decrease in image quality and the increase in ophthalmology referrals could not be verified with the data at our disposal for this evaluation.

Post-screening follow-up continued to take place in the same manner as during implementation. The nurses are responsible for this follow-up. However, communication issues between the health centre and the ophthalmologists to whom the patients are referred persist. All the respondents declared receiving no feedback from the ophthalmologists to whom patients were referred, based on the screening results.

5.3.3 Diabetes awareness

Several diabetes-related activities were implemented in the pilot communities as a result of the implementation of the project. According to many respondents, the population is more aware of diabetes and its consequences and more familiar overall with diabetes-related services offered in the community. However, other respondents felt that the increase in awareness was limited to patients participating in the screenings. It is interesting to note that the respondents generally agreed that the screening clinics provide an excellent opportunity to share information on diabetes and its complications, and on DR.

5.3.4 Local capacities

The opinions of regional and local actors differed somewhat on the issue of the effects of the implementation of the project on local capacities. Overall, the respondents in the communities did not mention that the implementation of the project encouraged local capacity building. Regional actors, on the other hand, indicated that they felt that local capacities were developed, because community first-line workers were trained to do remote DR screening themselves in their communities, and that collective prescriptions empowered nurses and their ability to take action.

5.3.5 Suggestions to improve screenings

It is important to note that all the respondents acknowledged the usefulness of the screenings and the need to continue to offer them. However, some suggestions were made by local actors on how to improve DR screening, including equipment renewal or the sharing of equipment among fewer communities, the re-issuing of collective prescriptions to allow the return of systemic dilation and the sharing of experiences among the communities.



SECTION 6

GENERAL OBSERVATIONS AND RECOMMENDATIONS

6.1 GENERAL OBSERVATIONS

During the period between 2010 and 2015, the remote DR screening service was implemented in 18 of the 23 communities interested in it. This resulted in 1609 screenings.

The implementation of the service and the pursuit of remote DR screening in the communities reduces travel time/distances and related costs by offering remote screening, but above all, allows patients participating in the clinics to avoid developing serious eyesight problems that might possibly lead to blindness.

In the wake of this evaluation, it would appear that several changes were made to the project over the past five years, primarily for the purpose of pursuing the implementation and continuing to offer this service. It has also been shown in the section on the economic analysis that costs incurred by remote DR screening decreased over the years. An increase in the number of points of service contributed to a decrease in total costs and an increase in the initial cost amortization rate of the project.

Finally, it would appear that the implementation of the service in the four pilot communities had effects at several levels: the organization of services, patient care, diabetes awareness and, to a certain extent, local capacity building in the four pilot communities.

6.2 RECOMMENDATIONS

Note that some of the recommendations that follow had already been mentioned in the course of the first evaluation. Such is the case for recommendations regarding:

- Roles and responsibilities.
- Documentation on the use of the service in each of the health centres where DR screening is implemented.
- The establishment of patient follow-up protocols between the health centres and the ophthalmologists at regional hospitals.

6.2.1 Recommendations to regional actors

Given the items highlighted in this evaluation, the following is recommended:

- Remote DR screening should continue to be offered in interested communities.
- The FNQLHSSC should continue to support communities that wish to implement the service.



- The FNQLHSSC should also maintain its offer of technological support to communities offering remote DR screening.
- The FNQLHSSC should pursue actions to encourage the autonomy of communities offering the remote DR screening service, in particular with respect to the application and renewal process for collective prescriptions.
- The FNQLHSSC should pursue its efforts to develop new partnerships with the health and social services network in Quebec.

It would also appear necessary to reiterate the conditions underlying the maintenance of remote DR screening in the communities, but also the objectives pursued by the project. In this respect, it would be interesting if the FNQLHSSC were to:

- Remind the communities that remote screening is able to be offered in communities because nurses at the health centres are involved in the remote DR screening clinics.
- Again provide the communities with information on nurse accountability with respect to patient care and follow-ups in particular, regardless of the clinical model chosen.
- Regularly reiterate the objectives of the remote DR screening service to the communities offering this service.

To address the issues of patient follow-up caused by the lack of communication between local ophthalmologists and DR screening teams, it would be beneficial if the FNQLHSSC were to:

- Again inform the local screening teams of the pertinence of establishing an information transfer protocol between local ophthalmologists and the remote DR screening team in the community to facilitate follow-ups and a continuum of services for referred patients.

- Remind nursing personnel that under the terms of Bill 90, it is their responsibility to establish a functional and efficient referral corridor to ensure the adequate care of their patients.

In response to the issue raised by the pilot communities regarding the decrease in quality of the images when the non-dilation clinical model is used, it would be interesting if the FNQLHSSC were to:

- Pursue the processes underway to renew the equipment currently consisting of first-generation cameras in the communities in question.
- Reassess the service life of the remote DR screening equipment to anticipate equipment renewals to come and the actual amortization of the investment associated with the purchase of equipment within the framework of the implementation of the project in the communities.

To support the local co-ordination of remote DR screening, it would be useful if the FNQLHSSC were to:

- Confirm with the communities, and encourage the maintenance of, the activities of local working groups.
- Be informed of the equipment-sharing strategies established by the communities.





6.2.2 Recommendations to local actors

It would be important that the communities remember the conditions underlying the maintenance of remote DR screening, but also the objectives pursued by the project. To achieve this, is it necessary that the communities:

- Understand that remote screening is able to be offered in the communities because the nurses at the health centres are involved in remote DR screening clinics.
- Consider nurse accountability regarding patient care and follow-ups, regardless of the clinical model chosen.
- Keep in mind the objective pursued by the remote DR screening project.

In order to assess patient satisfaction with remote screening and support the means associated with inviting patients to come to the screening clinics, it would be beneficial if the communities were to:

- Collect data and information on the patient retention rate for DR screening and on new patients. To achieve this, it would be pertinent to do one of the following:
 - Locally reinstate the screening sheet developed during the first evaluation that served to compile figures on new patients and the diligence of patients participating in remote DR screening. (Appendix 5)
 - Create or use patient information collection and follow-up tools from among those proposed by the FNQLHSSC (for instance, I-CLSC information system) during the training provided for the implementation of remote DR screening in the communities. (Appendices 7, 8, and 9).

To address the patient follow-up issues caused by the lack of communication between local ophthalmologists and DR screening teams and facilitate the follow-ups of referred patients, it would be beneficial if the local screening teams were to:

- Reconsider the FNQLHSSC proposal to use the professional's referral sheet. (Appendix 6)
- Establish internal communication strategies on the follow-ups of patients receiving an ophthalmology referral following DR screening.
- Remind communities that under the terms of Bill 90, nurses are responsible for establishing a functional and efficient reference corridor to ensure the adequate care of their patients.

To optimize the local co-ordination of remote DR screening (intra-community), it would be worthwhile to:

- Reactivate the local working groups in order to encourage the:
 - Sharing of experiences between the communities.
 - Organization of equipment sharing.
 - Planning of workloads for remote DR screening clinics in the communities.



CONCLUSION

In order to answer the question regarding the achievement of the objective of the remote DR screening project, it is interesting to review its initial formulation.

The objective of the project was indicated as follows by the project team:

“Reduce the incidence of blindness by providing access to remote diabetic retinopathy screening for First Nations living in the communities.” (FNQLHSSC, 2015)

Consequently, it would appear that the implementation of the project made DR screening accessible to patients in the communities, at lesser cost. It also limited the risks of serious eye diseases related to diabetes and thus, in the long run, reduce the incidence of blindness.

Over the past five years (from 2010 to 2015), DR screening was implemented in 21 of 23 communities expressing interest in the project. During the evaluation, it was observed that the increase in the number of communities having implemented remote DR screening and the growing number of screenings carried out in the communities had contributed to a decrease in travel outside the communities for the same examinations. From this perspective, it is possible to state that the project offers an interesting alternative to the issue of distance from major centres and specialized health services, but also to the congestion of these same services.

Prior to the project, all patients requiring DR screening had to go to ophthalmology departments for their examination. The systematic dilation model introduced during the implementation of remote DR screening in the four pilot communities served to reduce the number of ophthalmology referrals to 27% in 2010 (N=137). Thanks to the communities' ability to choose from among three clinical models (dilation, non-dilation and sequential dilation), the pursuit of the implementation and maintenance of DR screening again resulted in a drop in the number of ophthalmology referrals during the five-year period, because only 12.6% of patients screened were referred to an ophthalmologist (N=1609). In other words, the remote DR screening project implemented in First Nations communities of Quebec served to significantly reduce ophthalmology referrals. The goal was not to limit the number of ophthalmology referrals, but limit ophthalmology consultations to those patients truly in need of such services.

Therefore, it is interesting to note that in addition to offering quality screening services directly in First Nations communities, the project contributes both to exert better control over serious eye diseases and relieve the congestion of specialized health services.

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APPENDICES

APPENDIX 1: INTERVIEW WITH FNQLHSSC EMPLOYEES REGARDING CHANGES MADE TO THE REMOTE DR SCREENING PROJECT

| WHAT CHANGES? | REASONS FOR THE CHANGES | EFFECTS OF THE CHANGES ON THE PILOT COMMUNITIES | EFFECTS OF THE CHANGES ON THE OTHER COMMUNITIES |
|--|-------------------------|---|---|
| Suppliers <ul style="list-style-type: none"> Changes to technological equipment | | | |
| Service structure <ul style="list-style-type: none"> Service connection with the provincial government Organization of services: <ul style="list-style-type: none"> Schedule rearrangement One-off increase in workload Equipment sharing (via the calendar) Patient ophthalmology follow-ups | | | |
| Partners <ul style="list-style-type: none"> Changes in the roles, responsibilities and mandates? | | | |
| Clinical models | | | |
| Selection of communities for implementing the screening | | | |
| Pre-implementation steps | | | |





| WHAT CHANGES? | REASONS FOR THE CHANGES | EFFECTS OF THE CHANGES ON THE PILOT COMMUNITIES | EFFECTS OF THE CHANGES ON THE OTHER COMMUNITIES |
|--|-------------------------|---|---|
| Implementation process | | | |
| Clinical and technical training | | | |
| Human resources (internal and external) <ul style="list-style-type: none"> • How long have you been working on the DR project (mandate, etc.)? • Date the nurse educator was hired (reasons for this decision and the decision process, and his/her mandate)? • Change in responsibilities, roles and mandates? <ul style="list-style-type: none"> • Follow-up and project management mechanism | | | |
| Type of support from the FNQLHSSC | | | |
| Financing (funding contributors) <ul style="list-style-type: none"> • What is covered (page 111 of the report, Phase 1: no budget allocated to the health centres to compensate for the additional workload) | | | |
| Other changes that took place not addressed here: | | | |





APPENDIX 2: PREPARATORY INTERVIEW WITH FNQLHSSC EMPLOYEES ON THE DOCUMENT REVIEW AS PART OF THE ECONOMIC ANALYSIS

1. Are the costs of optometry services covered by the NIHB close to the real costs for those services?
2. Do the corridors allow better control of the costs of optometry services or are costs at the discretion of the optometrists?
3. Do you have access to the rate schedules of the Ontario Association of Optometrists and the Association des optométristes du Québec?
4. Do you have access to the costs of ophthalmology care covered by the RAMQ with respect to?
 - a. External clinics
 - b. Short-term hospital centres
 - c. Private clinics
 - d. Calculate the average of the three.
5. How many cameras are currently in circulation?
6. What are the camera-sharing criteria?
7. How many readings were done at a cost of \$115 each?
 - a. How many readings were done at the new reading centre at a cost of \$18 each? On what date did this rate take effect?
 - b. How many readings were done at a cost of \$25.50? On what date did the rate increase?
8. What records are available about the number of patients screened, the number of screenings done and the requests for ophthalmology follow-ups?
9. Do all the communities that implemented the DR screening service continue to offer this service or have some communities withdrawn?
 - a. Are there communities that plan to implement remote DR screening in the short term?
 - b. How many communities have demonstrated an interest in implementing the remote DR screening project?
10. What is the number of known diabetic individuals in the communities where DR screening is implemented?
11. To your knowledge, is the screening slip used during the first evaluation still used in the communities?





12. Were there costs associated with the following items?
 - a. Nurse recertification
 - b. Repeat training for replacement personnel
 - c. Replacing or purchasing new equipment
13. How many nurses and imagery technicians have been trained since the first evaluation?
14. Do you know the cost for shipping cameras (between the communities, but also between the FNQLHSSC and the communities)?
15. Would it be possible to know the year the project was implemented in each community as well as the number of screening clinics planned versus those actually done?
16. What are the different steps in the implementation process and what are the roles and responsibilities of each person during each step?
17. What are the next steps in the remote DR screening project?





APPENDIX 3: EVALUATION OF THE MEDIUM-TERM EFFECTS: INTERVIEW WITH FIRST-LINE WORKERS INVOLVED IN REMOTE DR SCREENING IN THE FOUR PILOT COMMUNITIES

Data collection on the medium-term effects of the implementation of the remote DR screening project in the four pilot communities

Evaluate the medium-term effects of the remote DR screening project in the four pilot communities.

| | WHAT CHANGES? | YES | NO | APPROXIMATE DATE OF CHANGES | REASONS FOR CHANGES | CHANGE INITIATED BY WHOM? | EFFECTS OF THESE CHANGES ON YOUR WORK | EFFECTS OF THESE CHANGES ON THE DIABETIC POPULATION IN YOUR COMMUNITY |
|--------------------------|--|-----|----|-----------------------------|---------------------|---------------------------|---------------------------------------|---|
| ORGANIZATION OF SERVICES | Schedule rearranged | | | | | | | |
| | One-time increase in workload | | | | | | | |
| | Change of mandates | | | | | | | |
| | Equipment sharing (via the calendar) | | | | | | | |
| | Follow-up with patients referred to an ophthalmologist | | | | | | | |
| | Increase in, or changes to, activities related to diabetes | | | | | | | |
| | Staff turnover of technicians and nurses responsible for remote DR screening | | | | | | | |
| | Other changes? (specify) | | | | | | | |





| | WHAT CHANGES? | YES | NO | APPROXIMATE DATE OF CHANGES | REASONS FOR CHANGES | CHANGE INITIATED BY WHOM? | EFFECTS OF THESE CHANGES ON YOUR WORK | EFFECTS OF THESE CHANGES ON THE DIABETIC POPULATION IN YOUR COMMUNITY |
|-------------------------|---|-----|----|-----------------------------|---------------------|---------------------------|---------------------------------------|---|
| SCREENING FOR DR | Changes in the way that remote DR screening has been done in the past five years. | | | | | | | |
| | Change in the dilatation model in the past five years | | | | | | | |

Post-screening follow-up:

1. Has post-screening follow-up become easier to perform since the project was implemented in your community (general diabetes follow-up, follow-ups for diabetic patients and DR)?
2. Who is responsible for supervising ophthalmology follow-ups?
3. How is this supervision accomplished? Has it changed since the project was implemented five years ago (change over the past five years)?

Diabetes awareness:

4. Has the implementation of remote DR screening allowed you to contact more diabetic patients?
5. In your opinion, has the implementation of the remote DR screening project in the four pilot communities served to raise diabetes awareness?
6. Do you provide more information and further raise diabetes awareness since the implementation of the remote DR screening project in your community (over the past five years)?
7. What diabetes-related activities have you developed since the implementation of the remote DR screening project?
8. Is the holding of these activities related to the implementation of the remote DR screening project in your community?

Local capacity:

9. How would you describe your level of comfort and autonomy with regard to remote DR screening?
10. Would you say that the remote DR screening project has contributed to local capacity building in your community? If so, which ones? If not, why?





APPENDIX 4: SUMMARY TABLE OF THE THREE CLINICAL DR SCREENING MODELS MADE AVAILABLE TO THE COMMUNITIES

SCREENING

| | A With pupillary dilation | B Without pupillary dilation | C Sequential dilation |
|---------------------------------|---|---|---|
| DESCRIPTION | This practice follows the recommendations of Canadian Diabetes Association 2008 Clinical Practice Guidelines. | Screening can be included in the overall management of the diabetic patient without a nurse certified in retinopathy. | Sequential dilation is recommended by the ETMIS 2008 report entitled Screening for Diabetic Retinopathy in Québec (vol. 4: No. 6, p. 49). |
| CONSULTATION TIME | Average of 45 min. | Average of 15 min. | Depending on what the patient's condition requires: 1. No dilation: 15 min. 2. Dilation: 45 min. |
| POSSIBLE SIDE EFFECTS | 1. Allergic reaction 2. Acute angle-closure crisis 3. Corneal abrasion | None | If dilation, see Model A; if no dilation, see Model B |
| ELIGIBILITY CRITERIA | - First Nations - Diabetic - Not allergic to latex - Not allergic to sulphonamides - No history of surgically untreated angle-closure crisis | - First Nations - Diabetic | - First Nations - Diabetics - See A if nessecary |
| DILATION CRITERIA | Systematic dilation | N/A | Recommended: pupillary diameter <3 mm Suggested: Patient with characteristics such as very slanted eyes, tremors of the eye, very dark irises |
| HUMAN RESOURCES REQUIRED | 1 permanent nurse 1 technician | 1 technician | 1 supervising nurse in case of need for pupil dilation 1 technician Suggested: 1 person to manage appointments |
| MATERIAL NEEDED | - 1 non-mydriatic camera + computer - 1 Tonopen + single-use protectors - 1 dark room - Medication/dilation/emergency kit - 1 Snellen scale and 2 tablespoons | - 1 non-mydriatic camera + computer - 1 dark room - 1 Snellen scale and 2 tablespoons | - 1 non-mydriatic camera + computer - 1 Tonopen + single-use protectors - 1 dark room - Medication/dilation/emergency kit - 1 Snellen scale and 2 tablespoons |
| FORMS REQUIRED | - Collective prescription - Technician clinical data form - Consent for telehealth | - Technician clinical data form - Consent for telehealth without paragraphs 8 and 9 (not necessary as related to dilation) | If dilation, see Model A; if no dilation, see Model B |





SCREENING (cont)

| | NUMBER OF PHOTOS | NUMBER OF SCREENINGS | NUMBER OF SCREENINGS |
|---------------------------|---|--|---|
| NUMBER OF PHOTOS | Four photos/eye (1 external eye and 3 internal) 1 X Photo NASAL - papilla 1 X Photo CENTRAL - macula 1 X Photo TEMPORAL 1 X Photo external eye | Four photos/eye (1 external eye and 3 internal) 1 X Photo NASAL - papilla 1 X Photo CENTRAL - macula 1 X Photo TEMPORAL 1 X Photo external eye | Four photos/eye (1 external eye and 3 internal) 1 X Photo NASAL - papilla 1 X Photo CENTRAL - macula 1 X Photo TEMPORAL 1 X Photo external eye |
| NUMBER OF SCREENINGS | Average of 5-6 screenings/day | Average of 25 screenings/day | If dilation, see Model A; if no dilation, see Model B |
| TRAINING REQUIRED | Nurse: Training with compulsory certification of each individual nurse to have the right to use the collective prescription on pupillary dilation Technician: Training on the use of the camera, including taking photos and making shipments to the reading centre | Nurse: None, but some basic training on DR remains essential to increase knowledge and provide support during monitoring of the patient Technician: Training on the use of the camera, including taking photos and making shipments to the reading centre | Nurse: Training with compulsory certification of each individual nurse to have the right to use the collective prescription on pupillary dilation Technician: Training on the use of the camera, including taking photos and making shipments to the reading centre |
| CERTIFICATION TRAINING | Nurses only: 6HFA/UDM | None. Screening without mydriasis does not require a collective prescription for nurses | Nurses only: 6HFA/UDM |
| SERVICE CORRIDORS | Remote reading centre Emergencies Ophthalmology Optometry | Remote reading centre Ophthalmology Optometry | Remote reading centre Emergencies Ophthalmology Optometry Pharmacy |
| SUSTAINABILITY AGREEMENTS | CSSS since the collective prescription is validated by a CPDP | | CSSS since the collective prescription is validated by a CPDP |
| ADVANTAGES | Requires the certification of onsite nurses Requires the presence of trained technicians | Requires the presence of trained technicians but training can be transmitted between colleagues. Ensures the autonomy of the service | Requires the presence of trained technicians For dilation only: Requires the certification of onsite nurses |
| ADVANTAGES | <ol style="list-style-type: none"> 1. Fundus photographs in 6 standard fields with dilation enable an ophthalmologist to grade the level of retinopathy according to the Early Treatment Diabetes Retinopathy Study protocol. 2. Category 3 is used to analyze the images. This category enables making a diagnosis as well as monitoring the progression of diabetic retinopathy. 3. Slightly higher percentage of interpretable photos (between 3-5% higher than without dilation). 4. "Alliance" of the CSSS and the community health centre concerning the collective prescription can lead to better recognition of one another. 5. This practice meets the highest standards for diabetic retinopathy screening but also for other eye diseases. 6. The collective prescription provides important leverage to enable nurses to work to their full scope of practice. | <ol style="list-style-type: none"> 1. No risk of side effects to the patient from medication needed for dilation. 2. Does not require a collective prescription for nurses, facilitating cooperation between the two networks. 3. Adaptable where personnel turnover is high. 4. Provides the ability to transmit training between colleagues, a plus considering the recurrent personnel shortages in some health centres. 5. Significantly reduces the time required for the intervention. 6. Promotes participation in screening and adherence to regular monitoring generating a better monitoring of the progression of the disease when present. 7. Ideally, basic training on diabetic retinopathy and its complications is still necessary since there is too little awareness of the disease, which results in its being often overlooked by nursing personnel. Greater awareness would increase their confidence in encouraging patients to participate in regular screening. | <ol style="list-style-type: none"> 1. Human resources time savings. 2. Financial benefit related to a significant reduction in the time allocated by professionals to screening. 3. Possible transmission of nursing training between colleagues. 4. Time savings for the majority of patients who will not have to undergo pupillary dilation and who will only need 2 or 3 photos to be taken instead of the current 7. 5. Further reduction of the risk of side effects associated with dilation and the measurement of intraocular pressure. |





SCREENING (cont)

A

With pupillary dilation

- DISADVANTAGES
1. Scientific oversight to keep the collective prescription valid can be problematic for some health centres that do not necessarily have access to the expertise.
 2. Potential for screening material and/or non-mydriatic camera to be underutilized.
 3. Screening method with pupillary dilation uncomfortable and long (about 45 min./patient), possibly affecting patient compliance.
 4. Surplus of recurring human resources tasks (nurse and technician)/lack of staff resulting in inability to release staff.
 5. Individual certification required in the context of a collective prescription therefore impossible to transmit expertise among colleagues.
 6. Efforts to get the provincial sector and communities working together still take a long time and have a high rate of failure.
 7. High turnover of nursing personnel in some communities.
 8. Necessity of clinical supervision.
 9. Surplus of non-essential data in the context of screening for diabetic retinopathy.

B

Without pupillary dilation

1. 3 to 5% increase in uninterpretable photos.
2. Slight increase in ophthalmology referrals.

C

Sequential dilation

1. The service in terms of making appointments.





APPENDIX 5: SCREENING SHEET USED DURING THE FIRST EVALUATION

| | |
|---|--|
| Date: mm / dd / yyyy | Patient # _____ |
| Patient arrival time: _____ | Patient departure time: _____ |
| Year of birth: mm / dd / yyyy Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female Type of diabetes: <input type="checkbox"/> Type 1 <input type="checkbox"/> Type 2 <input type="checkbox"/> Gestational diabetes | First screening <input type="checkbox"/> or follow-up <input type="checkbox"/> If follow-up, date of the last screening: mm / dd / yyyy |
| Difficulties encountered during the dilation of the pupils? <input type="checkbox"/> Yes <input type="checkbox"/> No If so, explain: _____ | |
| Difficulties encountered during the taking of photographs? <input type="checkbox"/> Yes <input type="checkbox"/> No If so, explain: _____ | |
| Difficulties encountered during the transmission of images? <input type="checkbox"/> Yes <input type="checkbox"/> No If so, explain: _____ | |
| Other comments: _____ _____ | |





APPENDIX 9: I-CLSC DIABETIC RETINOPATHY CODES PRESENTED BY THE FNQLHSSC TO THE COMMUNITIES

Clinic without dilation

Suggestion: use **mode form**

Register in advance the following suggested values:

Window : Ad hoc activity/Individual

Subprogram : code 419 diabetic Retinopathy

Type : code 1

File N°: of client

Profile : code 590 public Health

Reason : code 5500 Activities of screening-DR

Act : code 6945 screening of diabetic retinopathy

Follow up : code 600 follow up with formal external referral

Mode: code 1 Meeting with client

Location: code 100 Health Center

Language : code by language used in the community

Number of associated resources:
code 1 or 2 according to...

Clinic with dilation

Suggestion: use **mode form**

Register in advance the following suggested values:

Window : Intervention / Individual

Subprogram: code 419 diabetic Retinopathy

Type : code 1

File N°: of client

Profile : code 590 public Health

Reason: code 1314 diabetes type 2

code 1313 diabetes type 1

Act 1: code 6516 Nursing evaluation

Act 2: code 6103 Administering of medicine

Follow up : code 600 follow up with formal external referral

Mode: code 1 meeting with client

Location: code 100 Health center

Language: Code by language used in the community

Number of associated resources:
code 1 or 2 according to...





I-CLSC diabetic retinopathy codes presented by the FNQLHSSC to the communities (cont.)

Clinical monitoring

Suggestion: use **mode form**

Register in advance the following suggested values:

Window : Intervention / Individual

Subprogram: code 419 *Diabetic retinopathy*

Type: code 1

File n°: of client

Profile: code 590 *Public Health*

Reason: code 1611 *Diabetic retinopathy*

Act 1: If direct reference : code 6015

Action done to institution

Act 1: If re-imaging : code 6701

Follow up of the physical condition of the client

Follow up : code 600 *follow up with formal external referral*

Mode: code 1 *Meeting with client*

Location: code 100 *Health Center*

Language: Code by language used in the community

N°of associated resources: code 1 or 2 according to...

Emergency...

Suggestion: use **mode form**

Window : Intervention / Individual

Subprogram: code 419

Type : code 1

File n°: of client

Profile: code 590 *Public Health*

Reason: code 1602 *Glaucoma*

Act 1: code 6516 *nursing evaluation or re-evaluation*

Act 2: code 6103 *Administering of medicine*

Follow up : code 601

Follow up with formal referral external to a HC

Mode: code 1 *meeting with client*

Location: code 100 *Health Center*

Language: Code by language used in the community

N° of associated resources: code 1 or 2 according to...





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