

# Telehealth: Clinical Guidelines and Technical Standards for Telerehabilitation

SUMMARY

AGENCE D'ÉVALUATION DES TECHNOLOGIES  
ET DES MODES D'INTERVENTION EN SANTÉ



# **Telehealth: Clinical Guidelines and Technical Standards for Telerehabilitation**

## SUMMARY

Report prepared for AETMIS by Gilles Pineau, Khalil Moqadem, Carole St-Hilaire, Éric Levac and Bruno Hamel with the collaboration of Hélène Bergeron, Alexandra Obadia and Lorraine Caron

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The mission of the Agence d'évaluation des technologies et des modes d'intervention en santé (AETMIS) is to contribute to improving the Québec health-care system and to participate in the implementation of the Québec government's scientific policy. To accomplish this, the Agency advises and supports the Minister of Health and Social Services as well as the decision-makers in the health-care system, in matters concerning the assessment of health services and technologies. The Agency makes recommendations based on scientific reports assessing the introduction, diffusion and use of health technologies, including technical aids for disabled persons, as well as the modes of providing and organizing services. The assessments take into account many factors, such as efficacy, safety and efficiency, as well as ethical, social, organizational and economic implications.

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## FOREWORD

### TELEHEALTH: CLINICAL GUIDELINES AND TECHNICAL STANDARDS FOR TELEREHABILITATION

At a time when universal access to health care and services and to the subsequent follow-up is a concern, telehealth is an option for delivering and supporting certain services from a distance. From this standpoint, telehealth activities should complement existing services and be supported by information and telecommunications systems that facilitate their delivery when and where needed. Appropriate telehealth use could therefore help compensate for the uneven distribution of resources across Québec. Telehealth will thus play a key role in the major reorganization of the health and social services network that is in line with the direction currently taken by the Ministry towards promoting the continuity and complementarity of health services for all Quebecers.

It was in this context that the Direction générale des services de santé et médecine universitaire (DGSSMU) asked the Agence d'évaluation des technologies et des modes d'intervention en santé (AETMIS) to assess three priority areas of telehealth application for Québec's Ministère de la Santé et des Services sociaux (MSSS), the objective being to establish clinical guidelines and technical standards. The areas in question are telepsychiatry, telerehabilitation and telepathology. At the Ministry's request, three separate assessment reports have been produced, one for each area of application. This report and the report on telepsychiatry use the same approach and share certain sections. The evaluation of the technical standards for these two areas was done concurrently. In accordance with the work plan presented in April 2004 and with the DGSSMU's consent, a number of considerations relating to the economic, organizational, human, ethical and legal aspects of telehealth were added.

The main purpose of this report is, therefore, to propose clinical guidelines and technical standards for telerehabilitation.

In submitting this report, AETMIS hopes to provide the MSSS with information that will permit better decision making for standardizing telerehabilitation in Québec.

Dr. Luc Deschênes  
President and Chief Executive Officer

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**DISCLOSURE OF CONFLICTS OF INTEREST**

None declared.

# SUMMARY

## INTRODUCTION

With care and services being reorganized in Québec, telerehabilitation is being called on to play an important role in improving the continuity and complementarity of rehabilitation care and services throughout the province. However, in order to implement well-structured programs and foster optimal telerehabilitation use, standardization is necessary. This is the primary objective of this report.

This standardization involves two areas of equal importance: the clinical practice of telerehabilitation and the technical conditions for audiovisual transmission over distances. The economic, legal, ethical, organizational and human aspects are discussed here, more briefly, in order to highlight their importance in implementing programs successfully. A more thorough examination at a later time is, however, recommended.

## CLINICAL GUIDELINES

This report posits that the quality of telerehabilitation care and service delivery should be relatively the same as that expected in a conventional face-to-face rehabilitation setting. This principle serves as a basis for developing clinical guidelines and leads to the exclusion of certain clinical conditions and therapeutic interventions from the area of application of telerehabilitation. It should be stated at the outset that telerehabilitation is not an alternative to creating an infrastructure and establishing clinicians in the regions in order to meet the population's needs.

In the case of telerehabilitation, the scientific literature reviewed and the experts consulted state that certain clinical activities can

successfully meet client<sup>1</sup> needs: assessing a patient's clinical status from a distance, making a diagnosis, providing rehabilitation services from a distance to a client or group of clients when such services are not available locally, and allocating assistive devices. Because of their multidisciplinary nature, rehabilitation activities lend themselves particularly well to telerehabilitation, as well as to tele-expertise and teletraining.

However, telerehabilitation is contraindicated in a patient who refuses this treatment modality or who has a physical impairment preventing coherent communication or a health problem that cannot be evaluated via this technology or supervised from a distance.

In order for telerehabilitation to offer patients quality care and services, it is essential that the clinical activities involved be supported as follows:

- 1) A central reservation system and a generic consultation request tool must be available.
- 2) For each telerehabilitation activity, a medical file is opened at both the primary and secondary sites.<sup>2</sup> The information to be entered in these files is determined by agreement with the institutions concerned.
- 3) To avoid the proliferation of models, standard agreements are drawn up in consultation with the legal departments and organizations concerned, such as the Association des établissements de réadaptation en déficience physique du

1. The terms "patient" and "client" are used interchangeably for anyone who requests or uses rehabilitation services.

2. **Primary site:** The location of the patient or the health professional who is consulting. The **secondary site** is the location of the health professional or specialist being consulted. These definitions are consonant with the concept of primary and secondary care.

Québec (AERDPQ; Québec association of rehabilitation facilities for the physically impaired).

- 4) Conditions governing fee-for-service remuneration for physicians need to be established. This could be a significant disincentive to involving physicians in telerehabilitation.
- 5) Service providers must have adequate training in telerehabilitation. This is an essential prerequisite for the start-up and success of any program.
- 6) An organizational support structure must be put in place. Primary sites require a care coordinator, a site coordinator, and a regional coordinator. Secondary sites require a site coordinator and a provincial coordinator.

## TECHNICAL STANDARDS

Compliance with the following minimum technical standards is required in order to provide effective telerehabilitation services:

- 1) The teleconsultation room at the primary site should be at least 10 × 15 feet (3.05 × 4.57 m) and optimally 12 × 18 feet (3.66 × 5.49 m). The walls should be painted light gray, pale blue or dark blue and have a flat finish. The lighting should be as close as possible to daylight quality, and its intensity should be between 750 and 1000 lux. The room should be in an area where the noise level will not exceed 50 dB.
- 2) The equipment should include an omnidirectional microphone and two 27- to 36-inch (69- to 91.4-cm) monitors, depending on room's floor space. A 32-inch (81-cm) screen appears to be optimal for the room sizes mentioned above. To keep costs down, a CRT monitor should be used, unless the purchase of a mobile videoconferencing station with a flat screen is truly justified.
- 3) On certain conditions, two cameras can be used in telerehabilitation. The main one should be able to show practically the entire width of the room, have tilt and pan movement control, and have automatic or manual iris adjustment. Another camera, this one handheld, can be used at the primary site to transmit details concerning patient examinations. The room should also be equipped with a telephone and a fax machine. If one wishes to use a document camera instead of a fax machine, the purchase should be justified.
- 4) Videoconferencing requires a high level of data compression, which is governed by standards. Based on the scientific literature, the experts consulted, and the tests carried out, all the equipment should be gradually upgraded to the new H.264 compression standard. This standard provides a capacity equivalent to double the bandwidth and leads to a significant improvement in image quality at reasonable cost. All new equipment should be compliant with the H.264 compression standard.
- 5) A 384-Kbps reserved-bandwidth connection provides sound and image quality that is suitable for usual clinical telerehabilitation activities. When used with an H.263 compression standard, this bandwidth is the minimum standard, with the H.264 compression standard, the optimal standard. For both technical and economic reasons, going beyond this standard does not appear to be desirable at the present time, except for certain tele-speech therapy activities, where 768 Kbps bandwidth could be reserved on a spot basis. Indeed, testing enabled

evaluators to determine that the 384 Kbps standard permits adequate clinical activity. The testing also confirmed that the entire capture, transmission and reception chain must absolutely meet this standard. A single weak link would significantly diminish the quality. Data-packet losses of more than 0.5% compromise image quality to the point that it hinders clinicians in assessing the patient's clinical condition. This is also true of the latency, which should not exceed 500 ms.

## ECONOMIC ASPECTS

Very little has been done to assess the economic aspects of telerehabilitation, and methodological problems are frequently encountered when analyzing the evidence, which makes it difficult to compare face-to-face consultations with telerehabilitation. This analysis is therefore aimed only at providing budgetary indications on certain investment and operating costs. It does not include network infrastructure costs or the cost of training professionals involved in telerehabilitation activities. These costs are a major investment, which should be examined in a more in-depth analysis.

From a societal perspective, the incremental cost estimate is based on the assumption that telerehabilitation activities take up the equivalent of one and a half days per week. According to the experts consulted, this assumption is a realistic estimate of actual needs and takes into account the resources that are currently available. The room, the equipment, and the transmission lines of the *Réseau de télécommunications sociosanitaire* (RTSS; health and social services telecommunication network) could therefore be used for other purposes, such as tele-education and tele-expertise in other fields, which would help offset the required initial investment.

In this context, and based on the assumptions and scenarios used in this assessment, telerehabilitation should yield estimated

average annual savings of about CA\$29,000 per telerehabilitation unit. Given the paucity of the available information and the approximateness of the economic outcomes, the implementation of applications such as telerehabilitation should be followed by rigorous assessments. They should examine not only the economic parameters, but also patient and health professional satisfaction, improvement in the quality of care, care distribution and accessibility, and the technical performance of the equipment used.

## CONTEXTUAL ELEMENTS

As with other telemedicine applications, more often than not, the main obstacles to successful telerehabilitation have to do with clinicians and patients adjusting to the technology, not with the bandwidth used or the equipment required for teleconsultations. [ANAES, 2003]. The scientific literature contains many such observations, which underscores the importance of managing and supporting the change by adequately training caregivers and putting appropriate structures and procedures in place.

An adequate legal framework is an essential component of these structures. Telerehabilitation raises a number of legal issues that the traditional practice of rehabilitation does not, and the current legislation does not address them adequately. The same is true of requests for such services. The different insurance plans put in place might allow the insurer to choose telerehabilitation and thus jeopardize the client's freedom of choice. Furthermore, *An Act to Amend the Act respecting Health Services and Social Services and other Legislative Provisions* (An Act to amend the AHSSS) allows the client to request access to telerehabilitation without going through his or her attending physician. With regard to the patient's informed consent, the information provided to him or her should specifically include the fact that the health professional is at a distant location, the risks associated with teleconsultation, the creation of a file at both sites, and the consequences

of refusal. The consent should be obtained in writing. Special care should be taken to protect the confidentiality of the information and safeguard doctor-patient privilege.

Clinical and professional standards, which can have an impact on civil liabilities should also be adopted. In addition, a number of players are likely to be involved in telerehabilitation: all the caregivers and institutions that prepare and participate in consultations, Québec public authorities, equipment manufacturers and distributors, and telecommunications service providers. Steps should therefore be taken to ensure that each party has insurance coverage. An Act to amend the AHSS provides for patient complaints being made at the primary site. However, the feasibility of this solution in cases where the two sites are far apart needs to be examined. The Act also provides for the conclusion of agreements between the parties concerned, but it says little about the kind of administrative control necessary for verifying such agreements.

All telehealth caregivers will want to make sure that they receive fair and equitable compensation for their involvement in this new type of service. In this context, the remuneration of physicians must be reviewed to put in place mechanisms to cover the payment of telerehabilitation services. Lastly, the law seeks to ensure that the entire population has continuous and appropriate access to health care, regardless of regional geographic specifics. From this standpoint, telehealth could offer better access to care and services for people living in rural, isolated or remote areas. However, the implementation of telehealth services throughout Quebec could also result in an unfair distribution of health-care resources in the province. This matter needs to be examined.

Two aspects are discussed from an ethical standpoint: 1) the future prospect of increased access to specialized services in remote areas; and 2) the transformation of the traditional therapeutic relationship (face-to-face

consultation). It emerges that telerehabilitation alone cannot be viewed as the solution for overcoming the problem of providing good coverage throughout the province.

It seems essential to pay special attention to the elements that characterize the therapeutic relationship, such as communication, the clinician's behaviour (degree of empathy, professionalism), medical services (evaluation, diagnosis, prescriptions, treatment, etc.), the relationship of trust between the clinician and patient, and the measures for ensuring confidentiality and privacy.

## CONCLUSION AND RECOMMENDATIONS

Defining clinical guidelines and technical standards aimed at standardizing telerehabilitation practice will foster its broad implementation. Québec will thus be better able to avail itself of the large-scale projects funded by the Health Infoway. This treatment modality could prove to be a valuable asset in ensuring a more equitable distribution of rehabilitation expertise throughout the province. This would promote the smooth development of telerehabilitation activities in Québec.

Given the foregoing considerations, AETMIS recommends that the Ministère de la Santé et des Services sociaux adopt the main guidelines and technical standards proposed in this report, in cooperation with the authorities concerned. From this standpoint, to permit a quality practice environment, the technical infrastructure should be upgraded to a minimum standard of 384 Kbps of bandwidth together with an H.263 data-compression protocol, then gradually be brought up to an optimal standard of 384 Kbps of bandwidth with an H.264 compression protocol. Data-packet loss should not exceed 0.5%. Minimally, latency should be less than 500 ms, optimally, less than 300 ms. These standards should be applied to the entire data capture, transmission and reception chain.

Telerehabilitation consultation rooms containing the appropriate equipment and accessories should be set up in the appropriate clinical settings and where the needs are the greatest. Taking the human and organizational aspects into account helps ensure the success of this type of activity. The legal and ethical aspects should also be considered. As well, a more detailed economic analysis should be carried out prior to any massive investment in telerehabilitation. Lastly, the implementation of telerehabilitation should be subjected to a rigorous downstream assessment in order to improve its management and performance.

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