

# The use of electroconvulsive therapy in Québec

## SUMMARY

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

# The use of electroconvulsive therapy in Québec

Report prepared for AETMIS  
by Reiner Banken

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## MISSION

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. In order to accomplish this, the Agency advises and supports the Minister of Finance, the Economy and Research, as well as the decision-makers in the health-care system with respect to the assessment of health services and technologies. The Agency makes recommendations based on scientific reports assessing the introduction, distribution and application of health technologies, including technical aids for disabled persons, as well as the modes of providing and organizing services. The assessments take into account multiple factors, such as efficacy, safety and efficiency, as well as ethical, social, organizational and economic implications.

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# FOREWORD

## THE USE OF ELECTROCONVULSIVE THERAPY IN QUÉBEC

From the time it was introduced into psychiatry in 1938, electroconvulsive therapy – or ECT – has been highly controversial both socially and scientifically. With the introduction of neuroleptics and under strong social pressure, the use of ECT decreased dramatically in the mid-1960s despite the improvements made to the original technique. However, a resurgence of its use has been noted within the past fifteen years, including in Québec.

Against this backdrop, the Minister of Health and Social Services of Québec commissioned the Agence d'évaluation des technologies et des modes d'intervention en santé (AETMIS) to assess the practice of ECT in Québec. The report contained herein examines the efficacy and risks of this therapeutic approach, as well as the conditions of its use in Québec, in comparison with the experience observed elsewhere in Canada and in other countries. The assessment also discusses the social, ethical and legal issues surrounding this therapy.

With regard to the risks, ECT and the related anaesthesia may entail complications of a cardiovascular nature, potential brain damage, and negative consequences on cognitive functions, although in this case most disappear quickly or after a few months. With regard to efficacy, the evidence shows that ECT constitutes an accepted therapy for certain severe forms of depression. For schizophrenia and mania, its clinical use should be very limited, whereas, for reasons of vital urgency, ECT remains the treatment of choice for pernicious catatonia. Its use in neurology must be considered to be experimental. The potential substitution techniques for ECT have not yet gone beyond the experimental stage.

In conclusion, despite the increase in ECT use, in particular between 1988 and 1996, the use rates in Québec compare with those of other industrialized countries. Moreover, since the assessment highlights the need to provide good supervision of ECT practice to guarantee the respect and safety of patients, the Agency hereby submits various recommendations urging governmental, professional, hospital and community-based organisations to take the appropriate measures. It is recommended that research be promoted to expand knowledge on efficacy and risks of ECT use, and that quality control programs be implemented. Finally, this report emphasizes the need to improve the consent process, to increase the knowledge level of patients and the public, and to facilitate supportive actions by community groups.

In submitting this report, the Agency hopes to help decision-makers in the Québec health system to tackle this sensitive issue.

**Renaldo N. Battista**  
President and Chief Executive Officer

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## SUMMARY

From the time it was introduced into psychiatry in 1938, electroshock treatment, also known as ECT (for electroconvulsive therapy), has been highly controversial. In fact, it has been so controversial that in the mid-1960s, its use decreased considerably in the Western world, under social pressure and with the introduction of neuroleptics. However, the use of this therapy has been increasing since the mid-1980s. In 1997, *Québec Science* magazine published an article showing that the number of ECT treatment sessions in Québec had nearly doubled between 1988 and 1995, increasing from 4,000 to 7,200 during that period, much to the chagrin of ECT opponents.

Against this backdrop, the Minister of Health and Social Services of Québec commissioned the Agence d'évaluation des technologies et des modes d'intervention en santé (AETMIS) to assess the practice of electroconvulsive therapy in Québec. The report contained herein examines the efficacy and risks of this therapeutic approach, as well as the conditions of its use in Québec.

### **The controversy surrounding electroconvulsive therapy**

ECT has been highly controversial since its inception. Its proponents maintain that it is one of the safest and most effective therapies available. Its opponents consider it to be a means of controlling behavior and an inhuman and degrading treatment, with significant adverse effects that are responsible for memory loss and irreversible brain damage. This controversy has been fuelled by insufficient evidence on the mechanisms of action, efficacy and risks of ECT.

### **An evolving therapy**

The mechanism of action of ECT is still not understood. However, in recent decades, the

knowledge base concerning the conditions required to attain the therapeutic effect has evolved greatly.

Originally, the convulsion produced by the application of an electric current was considered to be sufficient to obtain the therapeutic effect sought by ECT. This convulsion is triggered by depolarization of the cerebral cortex neurons. We now know that the convulsion is necessary, but not sufficient, for treatment and that the therapeutic effect appears to result from the depolarization of deep cerebral structures.

Commencing in the mid-1950s, unmodified ECT was replaced by modified ECT with general anaesthesia, the administration of a muscular relaxant (curare-type agent), oxygenation of the patient, constant monitoring of the patient's vital signs, and, generally, the application of brief electrical pulses. During the same period, the right unilateral technique, which appears to have less-pronounced adverse effects, increasingly replaced the bilateral technique (application of electrodes on both sides of the head). Today, ECT is therefore very different from the original technique.

### **Risks of ECT**

The risks associated with ECT are of three orders: physical complications, potential brain damage and negative consequences on cognitive functions.

### **Physical complications**

The principal risk of physical injury associated with ECT is linked to the consequences of anaesthesia, the effects of the electrical stimulation on the cardiovascular system and the musculoskeletal impacts of the convulsion. However, in the latter case, developments in ECT techniques have eliminated

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the musculoskeletal problems. Cardiovascular complications are now the most significant risk associated with the administration of ECT, particularly in patients already suffering from cardiac problems. These complications include arrhythmia, cardiac ischaemia and infarction. An appropriate anaesthetic technique helps prevent this type of complication. Overall, the mortality risk is approximately one death per 80,000 treatments and one death per 10,000 patients.

### Brain damage

No human studies have demonstrated brain-structure injury following the administration of ECT. However, recent epilepsy research shows an effect of convulsions in animal models and in humans. The changes noted include the proliferation of glial cells and neuronal loss in the hippocampus, as well as a reorganization of the synaptic connections. In light of these results and in the opinion of several researchers consulted, ECT is probably responsible for subtle structural changes in the hippocampus similar to those observed following epileptic seizures.

### Cognitive-function consequences

Among the negative effects of ECT on cognition, the immediate-, medium- and long-term effects should be distinguished.

Immediately after an ECT treatment, the patient is in a state of confusion for a period of between a few minutes and a few hours. The use of the right unilateral technique, brief pulses and lower electrical charges decrease the length of this period of confusion.

The medium- and long-term effects include consequences on memory as well as on other cognitive functions. Concerning the memory effects, ECT may alter pre-treatment memory (retrograde amnesia) and the memorization of new events (anterograde amnesia). Anterograde amnesia generally

disappears within a few months – more quickly than retrograde amnesia. A number of patients suffer permanent effects on the pre-treatment memory, but the studies available have not been able to identify the risk level.

The technique of administering the electrical stimulation and the dosage of the anaesthetising agent play a major role in minimizing these adverse effects.

### Indications for ECT

We have excellent evidence that ECT is indicated for **major depression**. The studies show its efficacy in relieving the symptoms of depression for a period of a few weeks. In the opinion of experts, ECT appears to act more quickly and be more effective than pharmacotherapy. However, the risk of relapse is high if ECT is not followed up by another form of treatment – most often pharmacotherapy. Moreover, the efficacy of the consolidation and maintenance treatments (ECT treatments with regular intervals over extended periods) is not supported by any scientific evidence. In the treatment of depression, ECT must therefore be considered to be an accepted technology for the following indications:

- cases of severe major depression presenting resistance or intolerance to pharmacotherapy for which cognitive psychotherapy is not indicated or has not had any therapeutic effect;
- patients presenting a high suicide risk; and
- patients presenting psychic suffering or marked physical deterioration requiring very rapid onset of therapeutic action.

For **schizophrenia** cases, the level of evidence of ECT's efficacy is very low, despite more than a half-century of use for this indication. In this respect, the use of ECT as a treatment mode must be based on

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the physician's judgment and the patient's preferences and should be confined to rare cases.

In **mania** cases, there is also a discrepancy between the evidence available and expert opinion. AETMIS considers that, in these cases, the clinical use of ECT may be envisaged if the physician's judgment and the patient's preferences so dictate. The use of ECT as a treatment mode for mania should be confined to exceptional cases.

In **catatonia** cases, the response to ECT is sometimes spectacular. However, no randomized study appears to have been performed on the efficacy of the treatment. Nonetheless, in the case of pernicious catatonia and because of its life-threatening character, ECT constitutes a preferred treatment. For the other forms of catatonia, ECT constitutes a second-line treatment, after pharmacotherapy.

The use of ECT in **neurology** must be considered to be experimental. This treatment mode should be virtually confined to life-threatening conditions such as neuroleptic malignant syndrome and *status epilepticus* and used only after pharmacotherapy has failed.

### **ECT practice in Québec**

Data from the Régie de l'assurance maladie du Québec (Québec's health insurance board) show that ECT use has increased since 1988, in particular between 1988 and 1996. This increase is similar for both sexes and is slightly stronger for patients between 20 and 64 years of age than for patients 65 years of age and older. However, the use of ECT in children and adolescents is negligible. Between 1988 and 2001, the percentage of ECT treatment sessions administered in outpatient clinics increased from 18% to 28%. The nature of the data available does not permit comparison of the use of ECT for the various recognized indications of this treatment mode.

The rate of use of ECT in Québec falls within the limits of the rates observed in the other industrialized countries. According to Canadian Institute for Health Information data for the years 1994 to 2000, Québec's rate of use of ECT in hospitalized patients is among the lowest in Canada.

### **An important regulatory challenge**

ECT is intended for patients presenting mental-health problems, who are often marginalized and stigmatized, and who may be the subject of coercitive measures, such as imposed treatments. Consequently, the administration of ECT must be regulated to guarantee the respect and safety of the patient, in particular through a quality control program and a regulatory framework.

A concerted effort by the various stakeholders concerned, particularly the Collège des médecins du Québec (the college of physicians), the various medical associations, the Ministère de la Santé et des Services sociaux (the health and social services department), the regional boards of health and social services, the Association des hôpitaux du Québec (the provincial hospital association), and the various community groups and associations, is required to strengthen the existing regulatory framework. Moreover, the regulatory mechanisms should be flexible in order to adapt to recent and upcoming developments and practices and should be based on the principles of transparency and participation of the stakeholders.

### **Substitute technologies**

Transcranial magnetic stimulation (TMS) and vagus nerve stimulation (VNS) appear to be promising as ECT substitute technologies. However, according to the current state of knowledge, AETMIS is of the opinion that they must be considered to be experimental.

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## Conclusion

The prevailing uncertainties regarding the efficacy and risks of ECT are still important. It is therefore necessary to gather further information on these issues. In addition, the use of ECT in cases of depression must be based on a rigorous treatment algorithm, in association with pharmacotherapy and psychotherapy. Moreover, the various depression treatment modes must be accessible.

## Recommendations

AETMIS recommends that:

- 1) the Fonds de la recherche en santé du Québec (the health research funding agency) and the Ministère de la Santé et des Services sociaux (the health and social services department) promote projects that increase knowledge on the efficacy and risks of electroconvulsive therapy (ECT);
- 2) the Ministère de la Santé et des Services sociaux, in cooperation with the Association des hôpitaux du Québec (the provincial hospital association), set up registries concerning the use of ECT treatment in hospitals, for both hospitalized patients and patients treated in outpatient clinics;
- 3) the Ministère de la Santé et des Services sociaux, in cooperation with the Association des hôpitaux du Québec, support and finance pilot projects to test innovative institutional regulatory approaches with regard to ECT practice in hospitals, these projects to include patient representatives and persons independent from the institutions, such as representatives of community groups;
- 4) ECT practice in Québec be supported by evidence-based clinical practice guidelines, developed by the Collège des médecins (the college of physicians) in cooperation with the various groups concerned;
- 5) hospitals develop and implement quality control programs with regard to medical care and services involving ECT;
- 6) particular emphasis be placed on the consent process, considering the uncertainty regarding the risks of this treatment;
- 7) community mental-health groups be given the means to inform patients and the public regarding the evidence concerning ECT and to support patients, their families and friends in the treatment process.

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## GLOSSARY

**Anterograde amnesia:**

learning and short-term-memory disorder concerning the registration of new facts or facts that have occurred after an event taken as a reference point – in this document, the ECT treatment.

**Bilateral technique:**

placement of electrodes on both sides of the skull, generally on the temples.

**Depolarization:**

corresponds to the activation of a neuron or a set of neurons by inversion of the resting polarization of their membranes.

**Electroconvulsive therapy:**

therapeutic method used in the treatment of certain mental disorders that consists of triggering a convulsion by briefly passing an electrical current through the brain.

Synonyms: **ECT, electroshock therapy.**

**Neuroleptic malignant syndrome:**

very rare complication due to medications used in the treatment of psychoses and consisting of several symptoms including fever, muscular rigidity, instability of the autonomous nervous system, and confusion. This complication may be life-threatening.

**Neuroleptics:**

designates a type of medication used in the treatment of psychoses.

**Regulation:**

activities designed to oversee and supervise practices and procedures such as the ones relating to the practice of ECT in the health system. The present document refers to three types of regulation: legal, professional and institutional.

**Retrograde amnesia:**

memory disorder involving memory loss of certain facts prior to an event taken as a reference point – in this document, the ECT treatment.

**Transcranial magnetic stimulation:**

depression treatment method that consists of changing the activity of certain parts of the brain by using intense magnetic fields in the skull.

**Unilateral technique:**

placement of electrodes on the skull above the right hemisphere of the brain.

**Vagus nerve stimulation:**

depression treatment method that consists of stimulating the vagus nerve using electrical impulses having a given intensity, frequency and duration, emitted at regular intervals by a small apparatus implanted in the patient's chest.

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