Department of Health

Guideline

The Administration of Electroconvulsive Therapy

July 2022

Queensland Government

Guideline for the Administration of Electroconvulsive Therapy

Published by the State of Queensland (Queensland Health), July 2022

For more information contact:
Mental Health Alcohol and Other Drugs Branch, Department of Health, GPO Box 48, Brisbane QLD 4001, email OCP-MHAODB@health.qld.gov.au, phone (07) 332 89374.

An electronic version of this document is available at
https://www.health.qld.gov.au/qhpolicy/html/index-m.asp

The content presented in this Guideline is recommended for use by Authorised Mental Health Services (AMHS) (both Public and Private) for the purpose of administering electroconvulsive therapy. It sets out guiding principles and recommendations that, in the view of Queensland Health, should be followed by the AMHSs in the administration of ECT. Whilst this guideline makes every effort to be as comprehensive as possible, it does not cover every eventuality as the circumstances of treatment for individuals may differ. Psychiatrists and other health professionals are required to tailor treatments to individual patient needs.

This guideline is to be read in conjunction with the Chief Psychiatrist Practice Guidelines for Electroconvulsive Therapy https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/clinical-staff/mental-health/act/policies-guidelines.

Contents

Figures

1. Purpose

This Guideline provides recommendations regarding best practice for the administration of electroconvulsive therapy (ECT).

2. Background

ECT has been an important treatment in psychiatry since the 1930s. There has been increasing evidence demonstrating the effectiveness of ECT in the treatment of severe depressive illness. There is also evidence to support the use of ECT in the treatment of acute mania, catatonia and schizophrenia and as a long term maintenance treatment (M–ECT) for the same indications as for acute treatment. It is an available treatment option at many specialist mental health facilities in Australia.

A number of organisations in Australia and internationally have produced guidelines to promote best practice and optimal outcomes in terms of efficacy and safety. This Guideline includes material from some of these, and in particular those from New South Wales,[1] Victoria[2] and South Australia[3] are acknowledged.

This Guideline has been developed by the Queensland ECT Committee under the auspices of the Chief Psychiatrist, Department of Health. It is intended as a reference document to inform services undertaking the development or amendment of their own practices, procedures and work instructions.

3. Scope

In Queensland, ECT is performed at a range of facilities and settings. These include public and private hospitals in metropolitan and regional centres. A significant proportion of patients receive day procedure ECT as outpatients. However, ECT may only be performed in an authorised mental health service, declared under the *Mental Health Act 2016*.

This Guideline provides information for all Hospital and Health Service (HHS) employees (permanent, temporary and casual) and all organisations and individuals acting as its agents (including visiting medical officers (VMOs) and other partners, contractors, consultants and volunteers) involved in the delivery of ECT. It is also relevant to all staff of private sector authorised mental health services which are declared as an authorised mental health service for the purpose of providing ECT.

4. Related documents

4.1 Authorising Policies and Standards

- *Mental Health Act 2016*
- Guide to the *Mental Health Act 2016*
- *Hospital and Health Boards Act 2011*
- *Guardianship and Administration Act 2000*

- *Powers of Attorney Act 1998*
- National Safety Priorities in Mental Health 2005
- National Safety and Quality Health Service Standards 2012
- National Standards for Mental Health Services 2010
- Mental Health Statement of Rights and Responsibilities 2012
- National Safety and Quality Health Service Standards (second edition) 2017
- Australian and New Zealand College of Anaesthesia (ANZCA) Policy on Supervision of Clinical Experience for Vocational Trainees in Anaesthesia 2011
- Royal Australian and New Zealand College of Psychiatrists (RANZCP) Training and Assessment Regulations 2012
- Credentialing and defining the scope of clinical practice for medical practitioners and dentists: a best practice guideline. Chief Health Officer and Deputy Director-General, Prevention Division. Effective date: 23 October 2017.
- Patient Safety Health Service Directive 2014
- National Framework for Recovery-Oriented Mental Health Services 2013
- Australian Charter of Health Care Rights 2008
- National Practice Standards for the Mental Health Workforce 2013.
- RANZCP Electroconvulsive Therapy and Neuro-Stimulation regulations 2015
- RANZCP Electroconvulsive Therapy (ECT) Entrustable Professional Activity (EPA)
- RANZCP Electroconvulsive Therapy (ECT) Position Statement 74, 2014.

4.2 Procedures, Guidelines and Protocols

- Royal Australian and New Zealand College of Psychiatrists' Position Statement 74 Electroconvulsive Therapy (ECT)
- Guideline for Clinical Incident Management 2013
- Australia and New Zealand College of Anaesthetists (ANZCA) Handbook for Training and Accreditation 2014
- ANZCA Recommendations on Essential Training for Rural General Practitioners in Australia proposing to Administer Anaesthesia 2010.

4.3 Forms and templates

- ECT consent form
- ECT consumer information form
- Certificate to Perform Emergency Electroconvulsive Therapy
- Treatment Application (Electroconvulsive Therapy)—available from the Mental Health Act Delegate or Mental Health Review Tribunal.

4.4 Terminology used in guiding documents

- The Queensland Health Credentialing and defining the scope of clinical practice Health Service Directive requires that medical practitioners who perform ECT must have the administration of ECT documented in their approved scope of clinical practice (SOCP).
- Medical practitioners are ‘credentialed’ by a Hospital and Health Service to perform their defined scope of practice within that Hospital and Health Service.
- Credentialing is defined as ‘the formal process used to verify the qualifications, experience, professional standing and other relevant professional attributes for the purpose of forming a view about their competence, performance and professional suitability to provide a safe, high quality healthcare service within specific environments.’

5. Governance of the ECT service

It is recommended that the provision of ECT services occur within an organisational framework of an ECT service under the direct leadership of a psychiatrist who is the Clinical Director of ECT and has time allocated for this duty. The Clinical Director's role should include responsibility for ensuring that standards of ECT practice are maintained, including adequate orientation of new staff, training for credentialing purposes, documentation, data collection and auditing. It is also recommended that each service has a senior registered nurse appointed as the Senior Clinical Nurse for ECT or equivalent.

Each site administering ECT should establish an ECT quality or governance committee or equivalent governing body (ECT quality committee). A site is either a Hospital and Health Service or hospital or an agreed area covering smaller sites with fewer patient numbers to ensure the provision of sufficient expertise and support. The ECT quality committee must have clear reporting lines to the highest level of clinical governance within the service, whether directly or through other committees or individuals.

Staff involved in the therapeutic administration of ECT have a key role in educating other parties in understanding and de-mystifying ECT as a treatment modality. For the patient and the family/carer education focuses on generating an informed understanding of ECT. In most circumstances, the wishes of the patient are paramount, as enshrined in National Standards for Mental Health Services Standard 1: Rights and responsibilities and Standard 2: Consumer and carer participation. In addition, Carol Kivler highlights the role of the ECT staff in instilling hope; in making the difference between 'giving up' and 'full recovery'. [3]

5.1 Role and membership of an ECT quality committee

The ECT quality committee provides oversight of:

- reviews of adverse incidents or critical events
- staffing and resource allocation
- training of staff
- maintenance of standards, quality and safety and site suitability
- auditing for accreditation, including medical and legal issues
- reviewing feedback from patients, carers, family members and the community
- research interests
- the development of local procedures, work place instructions and operational guidelines to support local ECT practice.

5.1.1 Membership of the ECT quality committee

It is recommended that the membership of the ECT quality committee include the following:

- Clinical Director of ECT (Chair)
- medical/psychiatric staff
- Senior Clinical Nurse for ECT/ECT Coordinator

- anaesthetic staff
- administration staff
- management/administration Nurse Unit Manager (NUM/Nursing Director)
- patient safety/clinical governance staff.

5.1.2 Role of the Clinical Director of ECT

It is expected that the Clinical Director of ECT:

- provide ongoing education to medical and nursing staff about ECT
- develop, implement and evaluate local procedures and standards pertaining to ECT
- be responsible for assessing senior medical staff (staff specialists, clinical academics and visiting medical officers (VMOs)) in order to provide advice regarding suitability for credentialing and SOCP in ECT
- make recommendations to the relevant credentialing committee relating to individual credentialing to perform and supervise the delivery of ECT
- provide training for medical staff in the prescription and administration of ECT and be available to supervise ECT sessions
- conduct quality improvement programs in the prescription and administration of ECT.

5.1.3 Role of the Senior Clinical Nurse for ECT

It is expected that the Senior Clinical Nurse for ECT:

- ensure education is provided for patients, carers, family, community health care professionals and ECT practitioners
- coordinate training of nursing staff
- ensure ECT coordination and liaison including:
    - coordination of the list of patients who are having ECT for each session
    - liaison with anaesthetic services
    - appropriate staffing, equipment and supplies are available
    - establishment of regular checking, cleaning, sterilising and housekeeping routines for the care of ECT equipment.

5.2 Maintenance of equipment and supplies

It is recommended that ECT machines be serviced annually and a register kept of the service. A schedule of the maintenance and supply of anaesthetic equipment and emergency medications should also be maintained.

6. Staff training

The ECT service should coordinate ongoing education and training of all staff who are involved in the delivery of ECT. A register should be kept of training provided to

members of staff. Medical practitioners who perform ECT should administer ECT sufficiently frequently to maintain their skills.

6.1 Consultant psychiatrists

It is recommended that consultant psychiatrists who supervise or deliver ECT attend an ECT training course. The training course can be an external one, or one which has been set up within the service by the Clinical Director of ECT.

6.2 Trainees

Each service providing relevant training must meet all relevant requirements of the Royal Australian and New Zealand College of Psychiatrists (RANZCP).

As per the RANZCP 2012 Fellowship Program Regulations, Policies and Procedure, under Education Training Regulation 9.2, Stage 2 Mandatory Rotations 4.9.6, Mandatory Stage 2 General Psychiatry EPAs , by the completion of Stage 2 of Training, trainees must be entrusted with the Entrustable Professional Activity (EPA) ST2-EXP-EPA1 “Demonstrating proficiency in all the expected tasks associated with prescription, administration and monitoring of ECT” (the ECT EPA).

Trainees must have been entrusted with the ECT EPA before being allowed to administer ECT without direct supervision in the ECT delivery suite. The Clinical Director of ECT should ensure that there is a consistent approach to supervisor approval of the EPA.

6.3 Other medical officers

Other medical officers are to be trained in all the aspects of ECT consistent with relevant requirements of the RANZCP. The clinical standards applying to entrustment of ECT as a professional activity for RANZCP trainees should also be applied to any medical practitioners who are not RANZCP trainees who are delivering ECT under supervision.

6.4 Nursing staff

Nursing staff involved in the administration of ECT need to have appropriate training.

- The anaesthetic nurse assisting the anaesthetist must be trained according to ANZCA’s Guidelines on the Assistant for the Anaesthetist.
- Recovery Nurses must have annual competency based training in recovery, Basic Life Support and resuscitation procedures.
- Senior Clinical Nurses for ECT and ECT Coordinators must be appropriately trained in ECT, recovery and resuscitation.

6.5 Requirements for training courses

Training in ECT should be provided under the oversight of a psychiatrist (usually the Clinical Director of ECT) who has evidence of prior training, continuous professional development in ECT and is involved in peer supervision in ECT. It is recommended that an appropriate training course contain the equivalent of at least one day of training including theory and practical experience as follows:

- Theoretical component including: *Mental Health Act 2016* (MHA), statewide Guideline for the administration of ECT, consent process for ECT, mechanisms of action and clinical indications and contra-indications for ECT, pre-treatment clinical assessment, physical examination and investigations, the use of concomitant medication with ECT, role of ECT coordinator/nurse, operational and administrative considerations, patient preparation, theatre considerations, communication between psychiatric and anaesthetic teams prior, during and post ECT, pre-medications, anaesthetics and muscle relaxants with ECT, electrophysiology of ECT, treatment techniques including electrical stimulus, electrode placements, induced seizures, monitoring options, dosing protocols, course of ECT (acute, continuation and maintenance), assessment and care of ECT outpatients and day patients, adverse effects of ECT, ECT and risk management in high risk patients such as pregnant, elderly, adolescent or medically compromised patients, post-ECT evaluations, evidence base for ECT including key research papers.
- Practical component including: basic operation of the ECT machine, placement of the EEG and treatment electrodes, measurement and reduction of impedance, appropriate patient/procedure matching protocols, cuffed limb technique, placement of bilateral and unilateral ECT treatments and recording and interpretation of ictal EEG strips.

7. ECT credentialing and scope of clinical practice

Provision of ECT requires specialist knowledge and skills. Although all psychiatrists have been trained in ECT with recently trained psychiatrists receiving an ECT EPA, the specialist qualification alone is not sufficient to maintain ECT credentialing requirements. Individual hospital policy and procedure relating to credentialing must be followed in relation to ECT, e.g. Queensland Health Credentialing and Defining the Scope of Clinical Practice Health Service Directive 2014.

To make recommendations in relation to ECT credentialing, a Clinical Director will need to assess the psychiatrist's relevant training, competence and suitability to safely and effectively perform ECT.

Each health facility must determine whether it can support the delivery of ECT before it can consider granting clinical privileges to perform ECT to a credentialed medical practitioner. Factors to consider include sustainable resources, a suitable location and environment for the delivery of safe and effective ECT, and ongoing commitment to quality improvement.

Ongoing credentialing will require evidence of continued maintenance of a minimum standard of practice, usually evaluated on the basis of evidence of:

- requisite number of ECT treatments performed personally and/or jointly with another medical officer.
- ongoing education to update skills and knowledge.

8. Consent and legal issues

It is an offence under the *Mental Health Act 2016* for a person to perform ECT on another person unless it is performed in accordance with the Act. This is explained in Sections 8.1 to 8.3.

Evidence shows that while some consider ECT to be beneficial, others reported feelings of shame, terror and distress, and an invasion of personal autonomy, especially when administered without their consent.[5]

Care must be taken to impart information regarding the potential for cognitive impairment following ECT as the nature of cognitive impairment experienced by individuals is variable and may be long lasting, to such a degree that it may outweigh the individual's perception of any benefit from ECT treatment.

The consent process for all persons who are prescribed ECT is guided by the following:

- The person must be given information in a format that they can understand (both verbal and written and use of interpreter if required). Such information must be evidence-based and inform the person of potential adverse effects. This information must be discussed with the person, their next of kin and other family members in accordance with the person's wishes.
- Where applicable, cultural aspects should be considered and appropriate consultation carried out—refer Section 12.
- A consultant psychiatrist must have reviewed the person. The psychiatrist should be involved in the consent process by discussing the procedure with the person or by delegating this responsibility to a trainee or other appropriate senior medical practitioner who is directly involved in the person's care. This will involve a discussion about the nature of the treatment, the procedures involved, and the expected benefits, discomforts and risks.
- Consent must be obtained in written form on a specific ECT consent form. The anaesthetic consent may also be obtained on that document. The consent should be witnessed and signed by a third party. A copy of the consent document should be given to the person and their family or carer.
- Treatment should not usually occur more frequently than three times per week. Severe mania and catatonia may, rarely, require daily ECT for short periods. A voluntary consent can be for up to twelve treatments per course, with three months' total duration for acute treatment and up to twelve treatments with six months duration for maintenance ECT, after which a new consent must be obtained.
- When a significant change occurs in the person's treatment, consent must be sought again and a new form signed. A significant change could be a change of *Mental Health Act 2016* status; or an interval of more than seven days between treatments except in a maintenance situation.
- The doctor must make an assessment of the person's capacity to give informed and considered consent and confirm that by counter signing the consent document.

ECT is defined as 'special health care' under the *Guardianship and Administration Act 2000* (GAAA). The GAAA provides that consent for ECT cannot be given by a substitute decision-maker or the Queensland Civil and Administrative Tribunal. However, an individual may give informed consent in an advance health directive (see Section 8.1).

8.1 ECT is a Regulated Treatment under the *Mental Health Act 2016*

ECT is regulated treatment under the MHA and may only be applied in the following circumstances:

- for a person who is an adult-
    - with the approval of the Mental Health Review Tribunal (MHRT) if they are:
        - unable to give informed consent whether or not they are subject to a Treatment Authority, Forensic Order or Treatment Support Order, or
        - subject to a Treatment Authority, Forensic Order or Treatment Support Order,
    - otherwise–with the informed consent of the adult,
- for a patient who is a minor–with the approval of the MHRT, or
- for certain involuntary patients in emergency circumstances (see section 8.3).

Under the *Mental Health Act 2016* (MHA), informed consent for ECT is given by a person only if all of the following apply:

- the person has capacity to give consent to the treatment, meaning they have the ability to–
    - understand the nature and effect of a decision relating to the treatment,
    - freely and voluntarily make the decision, and
    - communicate the decision
- the consent is in writing, signed by the person.

The MHA states that informed consent for ECT can also be provided in an Advance Health Directive (AHD).

The MHA also requires that before informed consent can be provided, the doctor proposing the treatment must give the person a full explanation, in a form and language able to be understood by the person, about:

- the purpose, method, likely duration and expected benefit of the treatment, and
- possible pain, discomfort, risks and side effects associated with the treatment, and
- alternative methods of treatment available to the person, and
- the consequences of not receiving treatment.

If a doctor proposes to perform ECT for a patient who is a minor and subject to

involuntary treatment under the Act, then the authorised doctor must apply to the MHRT for approval to perform ECT.

If a doctor proposes to perform ECT for an adult patient subject to involuntary treatment under the Act and the patient–

- has capacity to give informed consent and gives consent, then the doctor must still apply to the MHRT for approval to perform ECT. This includes if the patient provides consent in an AHD.
- has capacity to give informed consent at the time and refuses to give consent, ECT cannot be performed. This does not preclude an application being made to the MHRT or emergency ECT being provided if the criteria are met.
- does not have capacity to give informed consent at the time but has given a direction in an AHD refusing ECT, the doctor may consider applying to the MHRT for approval to perform ECT, if the doctor is not satisfied the AHD can be relied upon in the circumstances or the AHD appears to be invalid or not clear.
- does not have capacity to give informed consent (or it is not clear that they have capacity), then the doctor must apply to the MHRT for approval to perform ECT.

The MHRT in making their decisions must have regard to the directions given by the patient in the AHD. The doctor must inform the MHRT of the direction provided for in the patient's AHD.

ECT may only be performed in an AMHS.

It is an offence to perform ECT other than in accordance with the MHA 2016.

8.2 Mental Health Review Tribunal Approval

- A doctor may apply to the MHRT for approval to perform ECT if:
  - the patient is an adult who is–
    - subject to a Treatment Authority, Forensic Order or Treatment Support Order, or
    - unable to give informed consent to the ECT, or
  - the patient is a minor.
- Prior to a doctor making an application to the MHRT, a psychiatrist must prescribe ECT, having regard to the person’s clinical condition, treatment history and any known views and wishes that the patient may have had in the past in relation to ECT.
- When making a decision about appropriateness of ECT, the patient’s support persons (i.e. nominated support person or, if the person does not have a nominated support person, a family member, carer or other support person) should be contacted to discuss any known views and wishes that the patient may have had in the past in relation to ECT. These views and wishes should be taken into consideration when deciding whether ECT is an appropriate treatment.
- The doctor may consider obtaining a second opinion from another psychiatrist if it is not clear whether a person has capacity to provide informed consent. If a second opinion was obtained, it must accompany any application to the MHRT.

- A detailed history of all prior treatment courses of ECT should be included with the application submitted to the MHRT.

The person who is subject to an ECT hearing is entitled to free legal representation.

In deciding whether to approve the treatment, the Tribunal must consider any views, wishes and preferences an adult has expressed about the therapy, whether in an AHD or otherwise. If the application relates to a minor, the Tribunal must consider the views of the minor's parents, and the views, wishes and preferences of the minor.

The Tribunal may give the approval only if satisfied:

- If the person is an adult and unable to give informed consent (as a voluntary or involuntary patient), that all the following apply:
  - performing ECT has clinical merit and is appropriate in the circumstances
  - evidence supports the effectiveness of ECT for the person's particular mental illness
  - if ECT has previously been performed on the person–of the effectiveness of ECT for the person.
- If the person is an adult and gave informed consent (as an involuntary patient), that all the following apply:
  - the doctor applying for ECT has given the person the explanation required under the Act
  - the person has given informed consent to ECT.
- If the person is a minor, that all the following apply:
  - performing ECT has clinical merit and is appropriate in the circumstances
  - evidence supports the effectiveness of ECT for the minor's particular mental illness and persons of the minor's age
  - if ECT has previously been performed on the minor–the effectiveness of ECT for the minor
  - performing ECT on the minor is in the minor's best interests.

If the Tribunal gives the approval, the approval must state the number of treatments that may be performed in a stated period under the approval and may be made subject to conditions the Tribunal considers appropriate.

8.3 Emergency ECT

In some circumstances, emergency ECT may be necessary to save the person's life or to prevent the person from suffering irreparable harm. In these circumstances, the Act allows a doctor to administer emergency ECT in an authorised mental health service for:

- an involuntary patient subject to a treatment authority, forensic order or treatment support order, or
- a person absent without permission from another State who is detained in an authorised mental health service.

In this situation, ECT may be performed without the person's consent if:

- the doctor and the senior medical administrator of the service certify in writing that performing ECT on the patient is necessary to save the relevant patient's life or to prevent the relevant patient from suffering irreparable harm, and
- an application has been made to the Tribunal to perform ECT for the patient.

The application may be an existing application to the Tribunal for the patient that has not been decided, or a new application.

It is recommended that a second opinion be sought from another consultant psychiatrist before taking this action.

9. Indications for ECT

ECT may only be prescribed by an authorised psychiatrist and should be based on a thorough physical and psychiatric evaluation.

As well as the diagnosis, the decision to use ECT must consider a number of factors including:

- the preference of the person and their family or carer
- past history of illness and treatment response
- the degree of suffering of the person
- the relative need for rapid response to treatment e.g. suicide risk
- the risks and benefits of ECT in comparison with other appropriate treatments.

ECT is a highly effective treatment with a strong evidence base, particularly for the treatment of severe depressive disorders, especially when one or more of the following features are present[4]:

- melancholic, catatonic or psychotic features
- suicide risk
- failure to eat or drink adequately
- inadequate response to antidepressant medication
- prior response to ECT.

Other indications may include:

- catatonia
- mania
- schizo-affective disorder
- neuroleptic malignant syndrome
- pregnancy-related disorders
- Parkinson's Disease.

ECT was first used as a treatment for schizophrenia before neuroleptic medications existed. While no longer a primary indication in the treatment of patients diagnosed with schizophrenia, in particular subsets of patients (catatonia, drug resistance, prominent affective symptoms and signs), ECT still has a role in treatment[6] including in conjunction with medication treatments.

10. Risks of ECT

10.1 Non-cognitive risks of ECT

Cardiovascular risks

The most serious complications of ECT are cardiovascular in nature, and can be categorised as follows:

- During and immediately following the electrical stimulus—sinus arrest, sinus bradycardia and hypotension resulting from a pronounced parasympathetic response
- During the seizure—tachycardia and hypertension, resulting from increased sympathetic outflow and adrenal catecholamine release
- Immediately following the seizure—there may be a rapid fall in heart rate and blood pressure to pre-treatment levels. It is during this post-ictal period that most serious cardiac complications occur
- Prominent cerebrovascular changes occur during the seizure, including an increased cerebral blood flow and increased intracranial and intraocular pressures.

Non-cardiovascular risks

Non-cardiovascular risks associated with ECT include:

- Suxamethonium-induced muscle fasciculation and muscle soreness
- Tonic spasm of the temporalis muscle due to the direct application of the electrical stimulus to the muscle
- Generalised tonic/clonic muscle contractions with the seizure
- Headache, which is often relieved by a simple analgesic such as aspirin or paracetamol.

High risk situations

There are no absolute contraindications to ECT—however, a number of high risk situations increase the risk of adverse events and require appropriate caution.

The decision to use ECT in the presence of one or more of these conditions should be made only after careful consideration of the risks and benefits of alternative treatments and of no treatment.

It is recommended that consultation with the anaesthetist, a second psychiatric opinion and relevant medical and surgical specialists occur to assist with evaluating the risk, optimising the person's medical condition and making modifications to the treatment to reduce the risks.

The person and/or their advocate must be fully informed of the risks which are specific to them, and of all potential adverse effects.

The situations of higher risk include the following:

- raised intracranial pressure
- intracranial lesions including infarction, haemorrhage, aneurysms, trauma, tumours and dementia
- cochlear implant in situ—refer Section 13.8
- history of post ECT delirium
- recent brain injury, infection, stroke or haemorrhage
- organic brain lesions, cerebral space occupying lesions but without raised intracranial pressure
- hypertension
- recent myocardial infarction, particularly within the first ten days
- unstable angina

- poorly compensated heart failure
- valvular disease
- bradycardia or heart block
- cardiac pacemakers
- vascular aneurysms—aortic and/or intracranial
- epilepsy—risk of inducing status epilepticus
- osteoporosis—risk of fracture
- retinal detachment and glaucoma
- endocrine disorders—thyrotoxicosis
- abnormal serum potassium levels.

Other patient factors that may increase the risk associated with ECT include:

- poor dentition
- obesity
- asthma and chronic obstructive pulmonary disease
- skull defects and titanium plates
- older age
- pregnancy and puerperium
- thrombo-embolic disease and pulmonary embolus.

Further considerations to maximise safety for the person with diabetes is discussed in Appendix 2.

10.2 Cognitive risks of ECT

The occurrence of cognitive side effects with ECT is well recognised and has been a major source of concern for persons undergoing treatment.[7,8]

It is important to note that conditions commonly treated with ECT are also associated with significant cognitive impairment.[9,10] Many persons report an improvement in memory and cognition as their depression improves after treatment with ECT.

The vast majority of research has been conducted in persons receiving ECT for major depression, which has aimed to characterise the incidence and severity of cognitive deficits associated with ECT.[11]

More recent research studies have aimed to optimise ECT technique in order to maintain efficacy whilst minimising cognitive side effects.[12]

The cognitive effects associated with ECT may be broadly considered as:[1]

- acute effects
- anterograde memory effects
- retrograde memory effects
- non-memory effects.

A number of factors have been reliably demonstrated to be associated with more severe cognitive side effects of ECT:

- bi-temporal electrode placement
- higher dose above seizure threshold

- increased frequency of treatments.

Other factors include:

- patient age
- cognitive reserve
- co-morbid neurological disorders.

While these factors may be relevant, the importance or effect of these factors is yet to be fully documented.[13,14]

The use of ultra-brief pulse width ECT—pulse width of 0.3 milliseconds—significantly reduces the cognitive side effects of right unilateral ECT, which may have an important role in reducing the cognitive side effects of other forms of ECT[15] but equivalent efficacy is yet to be researched.

Treatment options to reduce cognitive side effects may include:

- changing electrode placement—unilateral (right or left) or bi frontal—refer Section 17.2
- consider re-titration to determine if person could be effectively treated at lower dose
- reducing the frequency of treatment
- review concurrent medication(s)
- consideration of a switch to right unilateral ultra-brief pulse width ECT.

Persons with cognitive impairment at the completion of an ECT course should have at least one cognitive assessment after one month as part of a routine clinical follow-up in order to ensure a resolution of or improvement in cognitive impairment. Further cognitive assessment should be considered if significant impairments persist.[1,16]

10.3 Adverse incident or critical event

Adverse clinical incidents or critical events associated with ECT are to be recorded in the clinical incident management system, by the authorised mental health service.[17] Reporting enables statewide analysis of clinical incident data to identify and correct underlying system issues, to identify areas for improvement, and aims to reduce preventable harm.

Adverse clinical incident reporting is a mandatory requirement of National Safety and Quality Health Service Standards.[18]

11. ECT in special populations

11.1 Children and adolescents

ECT is very rarely given to children prior to puberty. ECT is not recommended for this age group.

Consent for ECT in adolescents must be sought from the MHRT, with issues carefully considered, and the opinion of a child and youth psychiatrist sought.

The indications, effectiveness and adverse effects of ECT, as well as predictors of response in adolescents may be similar to those in adults.

There is currently no evidence that ECT causes damage to a young person's brain or adversely affects brain development. However, there is little data available and more research is required.

A psychometric assessment should be performed at baseline and at six months after the completion of ECT where possible.

The determination of dose is by individual titration of the seizure threshold—starting with lower doses is recommended.

Studies in Australia and France have found that most adolescents who received ECT, and their parents, view the treatment positively.[19] Respondents would have the treatment again, if indicated, and would recommend it to others. The overwhelming majority of respondents and parents rated the illness as worse than ECT or medication.

11.2 Pregnancy

Pregnancy is not a contraindication to ECT and it can be used safely during the second and third trimesters. Little evidence exists on its use in the first trimester, particularly relating to the potential teratogenic effects of the medications used during ECT.

The decision to prescribe ECT needs to take into account the risks of alternative treatments, the risks to the mother and foetus of having an untreated illness, and any complications which may increase the risks of ECT or the anaesthetic.

Careful monitoring of maternal physiologic parameters is necessary and ECT induced hypertension needs to be managed.

The anaesthetist may need to make modifications to ensure adequate oxygenation and prevent aspiration, especially in the third trimester.

Consultation and close collaboration with the obstetrician and anaesthetist is recommended.

11.3 The elderly

ECT can be an effective treatment in this population and is often used as a higher rate of depression with psychomotor changes, psychotic features, and poorer tolerability of antidepressant medication exist in this group.

Concurrent medical morbidity is common and consultation with a physician or geriatrician is recommended. Patients with co-morbid dementia are at increased risk of post-ECT delirium and should be monitored for this. However, this is not an absolute contraindication for ECT.

ECT can be given safely to very old people, including those over 85 years of age.

12. Cultural considerations

Certain cultural factors will need to be considered in preparing patients for ECT.[20] For example, among the New Zealand Maori, the head is considered sacred and a person's family will need to be closely involved and consulted. In such cases, indications for ECT need to be carefully considered and all aspects of the process carefully explained with sensitivity shown at time of treatment.

13. Medical considerations prior to ECT—history, physical examination and baseline cognitive testing

13.1 Psychiatric examination

The treating psychiatrist must ensure that the person has a condition for which ECT is indicated and has the capacity to provide informed consent. Where there is doubt about either of these, a second psychiatric opinion is recommended.

13.2 Extended assessment

A comprehensive medical history and physical examination are the key components of a pre-ECT work up. These should focus on the neurological, cardiovascular and respiratory systems and include checking dentition and feeling the skull for defects and plates. Consideration of the anaesthetic risk may require referral for an anaesthetic or other specialist consultation.[21]

A cognitive examination is recommended before and after a course of ECT using appropriate cognitive assessment tool(s) as determined by the clinician.

13.3 Investigations

Investigations routinely performed prior to ECT include a full blood count, serum biochemistry and an electrocardiogram (ECG). An ECG and serum potassium test provide important information on the risk of cardiac arrhythmias that is not always available from the person's history and examination. Other investigations, such as a chest X-ray, are generally unnecessary before ECT, unless clinically indicated. The use of screening tests is discouraged; however, clinicians should consider neuroimaging to exclude or characterise intracerebral pathology when neurological symptoms or signs are present.

Suxamethonium increases serum potassium, particularly in patients with pre-existing muscle damage. If the serum potassium level is already elevated, high levels can increase the risk of a potentially fatal cardiac arrhythmia. Low potassium levels potentiate the effect of suxamethonium, possibly causing prolonged apnoea.

Dehydration increases the seizure threshold and hyponatremia predisposes to a lowered seizure threshold and increased seizure duration.

13.4 Consultation with other specialists

Persons with co-morbid psychiatric and medical illnesses have several factors which place them at increased risk for deep vein thrombosis (DVT).[22] Screening for risk factors is recommended prior to ECT and appropriate prophylaxis should be considered if the patient is identified as being at risk.[23] Medical consultation is recommended as the psychiatric treatment setting must be considered. For example, medications which decrease clotting may increase a person's medical risk if aggression (by the person or others) is a factor; and pneumatic devices with cords and elastic stockings could provide a means for self-harm.[24]

As the person's ability to report symptoms may be impaired, clinicians must be alert to the symptoms of DVT and a process to recognise and respond to clinical deterioration. This process must be clearly articulated at the local level.

Other consultations may be requested where indicated, including respiratory, cardiology, ophthalmological and neurology referrals. It is important to be specific in the questions asked of the consultant—the question should not be, 'Is it safe to give this person ECT.' Rather, the better questions to ask are, 'Does the person's medical condition increase the risks involved in giving this person a course of ECT?' (noting that this risk assessment is not within the remit of a cardiologist or anaesthetist), or, 'What interventions could be made to reduce this risk?'

Many non-psychiatric consultants are unfamiliar with modern ECT practice and the physiological changes that occur during the stimulus, seizure and recovery period. It is often necessary to impart this information to ensure that the consultant can offer a completely informed opinion.

13.5 Medications and ECT

There is no need to withhold non-oral medications such as bronchodilators, eye drops and topical medications before or after ECT treatment.

Similarly, oral medications may be given at their usual time as long as it is more than three hours prior to ECT. They may be given with a sip or two of water. Medication that may contribute to the safe administration of ECT should not be withheld, for example, antihypertensives, steroids, anti-oesophageal reflux agents, anti-anginals and anti-arrhythmics.

Medications that will increase the risks of ECT or make it less therapeutic should be avoided as far as possible. Medications which require special consideration include diuretics, hypoglycaemics, long acting benzodiazepines, lithium carbonate, anticonvulsants, supplements with magnesium content and acetylcholinesterase inhibitors, for example donepezil.

It is recommended that psychotropic medications be minimised and consideration be given to ceasing an antidepressant or mood stabiliser that is not working.

Medication considerations surrounding ECT are listed as Appendix 2, and clinically specific drug interactions are listed as Appendix 3.

13.6 Cardiac pacemakers

Cardiac pacemakers protect against the marked changes in heart rate that usually occur with the administration of the ECT stimulus and the subsequent seizure. The person's cardiologist and the device manufacturer should be consulted to determine whether the pacemaker needs to be switched to 'fixed rate' from 'demand mode', although this is usually unnecessary with modern devices. Case reports suggest that pacemakers do not create any special risks during the administration of ECT.

13.7 Implanted cardiac defibrillators

Having an implanted defibrillator does not preclude a person from having ECT. Appropriate consultation, e.g. with a cardiologist and/or the device manufacturer, should occur to check whether the defibrillator may be triggered by the changes in heart rate that occur with ECT, although this is unlikely with modern devices. Older

devices might need to be turned off just prior to each treatment, and reprogrammed following the seizure.

13.8 Cochlear implants

Concerns have been noted that cochlear implants may be damaged by ECT and it is recommended that ECT be avoided in persons with cochlear implants. Conversely, there is now a case report of safe contralateral unilateral ECT for a person with a cochlear implant[25] and a study suggesting that ECT is safe and can be applied ispilaterally or contralaterally if necessary.[26] It is recommended that an Ear Nose and Throat (ENT) specialist be consulted.

14. Equipment and staffing

14.1 Location of ECT administration

It is recommended that ECT be administered in an area which takes into account the person's comfort and privacy as well as providing for medical care. The site may be a dedicated ECT suite, an operating suite, a multi-purpose treatment suite or recovery suite. This area should have a waiting room, a treatment room and a recovery room. All rooms must be of sufficient size to accommodate the person and staff and there must be access to an emergency trolley, oxygen supply, suction, telephone, and emergency lighting. Toilet facilities should be available near the waiting area.

ECT may need to be performed in an operating suite when a person has a serious medical condition necessitating access to superior resuscitation and emergency treatment options.

14.2 ECT equipment

All sites where ECT is performed must be equipped with the following:

- a modern ECT device with the following features:
    - a constant current, bi-directional brief pulse square wave output
    - capable of delivering a charge of up to at least 1000 millicoulombs
    - capable of delivering a variety of stimulus parameters, including brief pulse widths.
    - an electroencephalography (EEG) monitor with at least two channels of monitoring and a paper print
    - a method of measuring circuit impedance
    - a safety mechanism for the treatment button to prevent accidental discharge
    - a maintenance program conducted by authorised personnel for medical equipment
- disposable EEG recording electrodes
- treating electrodes with a minimum diameter of five centimetres to avoid skin burns – these may be metal or disposable adherent electrodes
- appropriate conductive gel or solution

- cardiovascular and other monitoring equipment.

Though not a mandatory requirement, some services use a method of measuring muscle relaxation prior to delivering the stimulus, such as a patellar hammer for detecting the abolition of the patellar reflex or an electronic nerve stimulator.

14.3 Anaesthetic and resuscitation equipment

Anaesthetic equipment, resuscitation equipment and emergency medication supplies must meet standards as specified by ANZCA. The resuscitation equipment must be tested and checked regularly.

14.4 Staffing of the ECT suite

Waiting room

Appropriately trained staff under the guidance and supervision of a registered nurse (RN) trained in both ECT and anaesthetic preparation should be present to physically and psychologically prepare the person for the procedure and ensure that all documentation is in order.

Treatment room

There must be a minimum of three staff members: an ECT operator, an anaesthetic doctor and at least one specialised RN to assist both the anaesthetist and the ECT operator. It is recommended that this nurse be a Senior Clinical Nurse for ECT or ECT coordinator.

ECT operator

Consultant psychiatrists performing ECT or supervising it must be credentialed. If not currently credentialed, along with trainees and non-training medical officers, they must receive supervision appropriate to their training and experience by a psychiatrist who is credentialed.

Anaesthetic doctor

The anaesthetic service for ECT must be under the direction of a qualified consultant anaesthetist with extensive experience. The anaesthetic should be given by a consultant anaesthetist, or an anaesthetic trainee or other appropriately trained and/or supervised staff under supervision of a consultant anaesthetist. [27] Trainees must be supervised at a level consistent with their experience, and exposure to a significant number of sessions is necessary if they are to acquire the knowledge and skills specific to ECT.[1]

Registered nurse

There must be at least one registered nurse (RN) who is appropriately trained to be identified as the Senior Clinical Nurse for ECT/ECT Coordinator.

Recovery room

A RN with annual competency-based training in recovery, basic life support and resuscitation procedures must be in constant attendance for the person in the recovery area. The ratio of nurses to persons should comply with ANZCA's recommendations of one nurse to a maximum of three persons; the ratio may increase depending on the number of unconscious persons at any given time.

15. The ECT procedure

Careful planning needs to be undertaken for the transfer to the ECT suite of the person who is to receive ECT, and also their transfer back to the inpatient unit or to home if they are an outpatient. A transport plan that defines how the person is to be transported, who will provide psychological support, and the transport details and support for returning home should be established as part of the treatment plan. A plan for support and supervision at home needs to be in place with service contact numbers during and after business hours provided to the individual, their families or carers should they be required to manage any complications. If the service requires people to travel long distances to receive ECT treatment, supportive accommodation arrangements should be put in place to minimise pre- and post-ECT travel and allow for safe recovery.

The person is to be received calmly and courteously in the treatment area.

15.1 Patient identification and procedure matching

Correct patient identification is vital to the provision of safe health care across the healthcare continuum. At least three approved patient identifiers are used when providing care, therapy or services. Use of an intervention safety checklist (similar to those used for surgery) is recommended—designed to maximise patient safety by promoting consistent communication and teamwork.[28]

The treatment room staff are to confirm that the consent form has been signed by the patient in the case of voluntary consent, or that the documentation is fully compliant with the *Mental Health Act 2016* and that there is a treatment order signed and dated by the patient's treating doctor. Final checks are made, including confirmation of recent voiding of urine and fasting.

Before the procedure commences, a pause should be taken by the perioperative team in order to confirm several essential safety checks are undertaken in this 'time out' period. Any anticipated procedural or possible clinical difficulties and the operative plan is specified and discussed with every operative team member present.

Some procedures may be done before the anaesthetic is administered. If so, all procedures are to be explained to the patient in a reassuring manner as they are performed.

15.2 During the procedure

Supporting the patient's chin and using an effective mouthguard is essential during the procedure as the jaw clench resulting from the seizure is not abolished by the muscle relaxant.[1] It is dangerous for a Guedel airway to be in place while stimulus is applied since it concentrates the force of the jaw clench over a limited number of anterior teeth. An effective mouthguard distributes most of the pressure over the posterior teeth which are better able to cope with the force.

Prestimulus ventilation with oxygen will reduce the risk of cardiovascular complications and may also reduce adverse effects. Hyperventilation that concurrently increases oxygenation and reduces carbon dioxide levels is a useful technique that augments seizure activity.[2]

If using the isolated limb technique to monitor motor movement, the sphygmomanometer cuff should be applied and not inflated until the anaesthetic induction agent has been given. This technique is recommended when performing a stimulus titration procedure to assist in the detection of a motor seizure, but is optional under other circumstances.

To ensure the quality of the EEG recording, the skin beneath the recording electrodes must be adequately prepared. This can be achieved using a folded gauze swab moistened with normal saline to clean surface oils and debris from the recording sites. An alcohol wipe is a satisfactory alternative to moistened gauze. Care must be taken on elderly skin to avoid abrasion damage.

A standardised approach for applying the EEG recording electrodes should be used to facilitate the comparison of EEG recordings across the course of treatment.

A useful convention for 2–channel EEG recording is to:

- apply channel 1 electrodes to the left hemisphere
- apply channel 2 electrodes to the right hemisphere
- place positive electrodes on the forehead
- place negative electrodes on the mastoid.

The recording electrodes are to be applied as follows:

- anterior electrodes are placed on the forehead, 2.5 centimetres above the midpoint of the eyebrow (mid-pupillary line) except when bi-frontal treatments are being given, in which case the anterior recording electrodes are moved medially, either side of the midline (see below).
- posterior recording electrodes are placed over the mastoid process, over bone, high enough to avoid being placed over the sternomastoid muscle. This will avoid both muscle artefact and any cardiac artefact that is transmitted along the carotid artery.

Staff should be aware that the grounding electrode on the chest may be covered by clothing and, if it becomes detached, the EEG trace will be lost.

15.3 Sign out—before the patient leaves the ECT suite

The aim is to facilitate the transfer of important information to the care teams responsible for the patient after a procedure. These checks involve all team members.

A member of the ECT treating team should confirm with the administering psychiatrist and the operative team that the procedure was complete noting any variations to the schedule.

16. Post ECT care

16.1 Recovery

Following the administration of ECT, the patient should be recovered in an appropriately equipped recovery room. A RN trained in recovery techniques should be present at all times. The RN should monitor the patient's airway as well as their pulse rate, blood pressure, any tardive seizures, oxygen saturation and their level of consciousness and orientation should also be assessed. All observations must be

documented in an appropriate ECT chart or clinical record. As an inpatient the person should stay in the recovery room until alert and orientated, and observations are within the person's pre-ECT parameters (refer Section 26.2 for outpatients).

16.2 Management of adverse effects

Headache, myalgia, nausea and drowsiness are self-limiting and require symptomatic and supportive treatment. The person should be advised not to exercise vigorously following ECT.

16.3 Post-ECT delirium

If post-ECT delirium is mild, close nursing supervision and support may be the only measures required.

If it is severe, there should be consultation with the anaesthetist and medication given, this may include psychotropic medication.

If it is persistent, physical investigations should be considered, and status epilepticus needs to be excluded by an EEG.

The intravenous access should be left in situ until recovery is achieved.

Means of reducing the risk of delirium should be considered, including altered electrode placement, ultra-brief pulse width, a reduction in ECT frequency and minimising the use of psychotropic medications.

17. Treating electrodes

It is recommended that the skin beneath the treating electrodes be prepared in the same way as described above for the recording electrodes. The use of abrasive materials to clean the skin is not recommended because of the possibility of skin damage.

Depending on the technique used, the treating electrodes may be applied either before the anaesthetic is administered—with appropriate reassurance to the person—or after.

Acceptable techniques are:

- metal electrodes secured by a rubber headband
- metal electrodes attached to hand-held electrodes
- disposable adherent non-metal electrodes with some insulated means of ensuring good pressure contact with the skin
- a combination of the above.

To ensure low impedance at the skin–electrode interface and avoid skin burns, the electrodes must be at least five centimetres in diameter, and adequate conducting gel must be applied between the electrode and the skin.

Care must be taken to ensure firm contact with the skin with all types of electrodes.

When using metal electrodes, in order to avoid burns due to inadequate skin contact, it is essential to:

- use a flat electrode on a flat surface (temporal placement)

- use a concave electrode on a rounded surface (vertex and bi-frontal placements).

The static impedance level should be below the machine's maximum limit (Mecta 5000 ohms, Thymatron 3000 ohms). If it is too high, the following steps must be taken:

- ensure that the treatment cable is connected to the treatment electrodes and to the ECT device
- ensure that electrodes are applied firmly against the skin and there must be sufficient conductive gel—more gel or saline must be added if needed
- if using disposable adhesive electrodes, a small amount of conductive solution may need to be placed in the centre of the electrode which is then replaced and held firmly with a 'dummy' hand held electrode if necessary.

If using the Mecta device and the impedance cannot be reduced below the machine's maximum limit, the machine will not discharge and treatment cannot proceed.

If using the Thymatron device treatment can safely proceed but the dose delivered will be less than the dose required as the voltage increase needed to overcome the high impedance is capped for safety reasons

17.1 Electrode placement options

Three types of electrode placement are used, depending on the person's circumstances.

Unilateral placement

This is the preferred placement for most persons. The available evidence suggests that, provided the dose is at least three times the seizure threshold, the efficacy of unilateral ECT is acceptable and is associated with less cognitive impairment than bi-temporal placement. The evidence suggests that, at dosage levels approaching six times the seizure threshold, the efficacy is increased and may equal the efficacy of bi-temporal ECT, although at very high doses the cognitive side-effect advantage may be diminished. More recent studies indicate that the cognitive effects of very high dose unilateral ECT are reduced by utilising a very brief pulse width (0.3 milliseconds) although efficacy may be reduced; this is still under investigation (see Figure 1 Unilateral and bilateral placement Section 17.3).

Bilateral (bi-temporal) placement

Bilateral placement is generally regarded as the most effective form of ECT, but it is also associated with the greatest degree of cognitive impairment, particularly retrograde memory loss, which may not be fully reversible. It is recommended that its use be restricted to situations where other electrode placements have been ineffective, when there is some urgency to achieve a rapid response (for example, in a life-threatening situation) or when the person's history indicates a previous poor response to unilateral ECT and a good response to bilateral ECT. For bilateral ECT, the effective dose is one and a half to two times the seizure threshold. Doses higher than this may produce excessive cognitive side effects and should only be considered when an urgent clinical response is needed or where the treatment response is inadequate at the lower dosage.

Bi-frontal placement

Bi-frontal placement has not been as well studied as the other electrode placements, but the available evidence suggests that its efficacy may be approximately equal to that

of bi-temporal ECT with less cognitive impairment. Further research is needed to establish its therapeutic role as individuals may benefit from using this electrode placement. For example, a person who has not responded to unilateral ECT, who has been switched to bi-temporal ECT and who is having unacceptable cognitive side effects may well achieve recovery with bi-frontal placement and experience less cognitive problems. When using bi-frontal ECT, accurate placement of the electrodes is important to ensure appropriate stimulus delivery. (see Figure 2 Bi-frontal placement Section 17.3).

17.2 Electrode placement recommendations

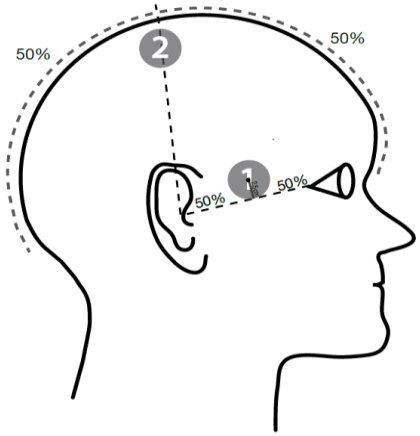
Generally bitemporal and unilateral ECT are effective when dosed adequately (Semkovska et al., 2016) but cognitive side effects are greater with bitemporal placement and with higher stimulus doses. Doses up to six times threshold can maximise the efficacy of unilateral ECT, while for bilateral ECT, doses at 1.5 times seizure threshold are usually sufficient. In some clinical circumstances higher doses may be required. If there is an inadequate response after six treatments (may need up to eight treatments if using ultra brief therapy) of an adequate dose, options are:

- The dose relative to the seizure threshold may be increased. Note that some persons may not respond to treatment with unilateral ECT and will require bilateral ECT.
- Electrode placement should be changed to bilateral ECT or if there is concern about excessive cognitive impairment with bi-temporal placement, bi-frontal placement should be considered. Given that a high proportion of left-handed people have either left-sided or bilateral cerebral dominance, right unilateral should be used initially. If this is associated with an unusual degree of cognitive impairment, especially early in the treatment course, the electrode position should be changed to either bi-frontal or left unilateral placement, thereby avoiding stimulation of both temporal lobes.

If, after switching from unilateral to bilateral placement, there is excessive cognitive impairment, it is not appropriate to return to unilateral treatment as it has already proven to be ineffective. Reducing the frequency of ECT sessions—for example, from three times weekly to twice weekly—or switching to bi-frontal ECT are options in this situation[4].

17.3 Electrode placement—positions

Figure 1: Unilateral and bilateral placement[29]



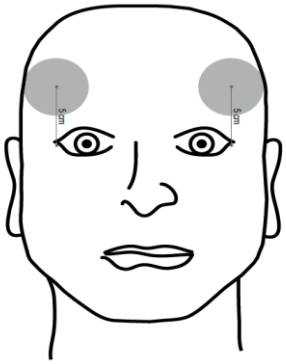
Right unilateral ECT

The correct position is the D'Elia position as shown in Figure 1. The temporal electrode (flat) is placed over the right temporal fossa, with the centre of the electrode 2.5 centimetres above the midpoint of a line drawn between the tragus and the outer canthus of the eye. The centre of the second electrode (concave) is placed slightly (one centimetre) to the right of the vertex, which is at the intersection of the line drawn between the nasion and the inion (occipital process), and the line drawn between the tragus of each ear. Note that the vertex is not the crown, which is more posterior. The D'Elia position directs the current across the motor cortex, the area of the cortex with the lowest seizure threshold. For left unilateral ECT, the same positions are used, but on the left side of the head.

Bilateral (bi-temporal) placement

Each electrode (flat) is placed in the temporal fossa bilaterally, as for the unilateral placement.

Figure 2: Bi-frontal placement



Bi-frontal ECT

The anterior EEG recording electrodes should be moved medially to approximately one centimetre either side of the midline to allow room for placement of the treating electrodes. Concave metal electrodes or adherent disposable electrodes must be used. The midpoint of each treating electrode is placed five centimetres above the outer canthus of each eye, in a parasagittal plane (Figure 2). Correct placement is essential to avoid high seizure thresholds and missed seizures.

It is recommended that the correct site be identified by measuring the distance above the outer canthus rather than estimating the distance. A small mark made with a washable marker can be placed at the correct site to guide the electrode placement. Care must be taken to avoid any contact between the treating electrodes and the EEG recording electrodes, and that there is no excess conductive gel creating a short circuit of the current across the forehead. Note that skin burns may occur if the electrodes are placed too closely together.

18. Dosage

The required dosage above the seizure threshold for bi-frontal ECT has not been established, but it appears to be similar to bi-temporal ECT. In particular, it has been shown that for unilateral ECT doses close to the seizure threshold are ineffective even when an observed seizure of apparently adequate duration has occurred. This means that the person's seizure threshold needs to be known to be certain that the person is receiving an adequate dose.

The preferred technique is therefore to establish the individual seizure threshold by titration at the first session with subsequent treatments being given at above the seizure threshold doses, up to six times threshold can maximise the efficacy of unilateral ECT, while for bilateral ECT, doses at 1.5 times seizure threshold are usually sufficient[4].

The main disadvantage of the titration procedure is that the person may receive one, two or three sub-convulsive stimuli with the risk of bradycardia or even asystole (more likely with RUL electrode placement). This can be prevented by pre-medication with atropine or glycopyrrolate. If the risks of bradyarrythmia are known, consideration should be given to avoid titration for that person.

The other generally accepted method of dosing is a fixed dose for all persons, regardless of individual seizure thresholds. This is a simpler technique which may be more suitable than the titration technique in some facilities.

One approach is to estimate the dose according to the age of the person. This means in a Thymatron system that the dose (percentage of output, where 100 percent = approximately 500mC) is set to either the person's age (unilateral) or half the person's age (bilateral). The main disadvantage of this approach is that it is not possible to determine the person's seizure threshold and to ensure that the dose is sufficiently above that threshold to ensure adequate efficacy, especially for unilateral ECT.

18.1 Dosage increases during treatment

For most persons, the seizure threshold rises during a course of ECT treatments, and the rate at which it rises varies considerably between individuals.

In order to ensure that the dose remains adequately supra-threshold, it is usually necessary to increase the dose during the course.

The decision to increase the dose is based on changes in the quality of the EEG during the course.

As the seizure threshold rises, continuing with the same dose means that treatment is occurring at a lower dose relative to the threshold and the EEG quality deteriorates. This is an indication to increase the dose by approximately 50 percent of the failed dose.

Prior to each treatment, it is necessary for the ECT practitioner to examine the previous EEG tracings in order to detect changes in the quality and adjust the dose. Note that ictal EEG appearances can vary considerably between individuals. Older individuals, in particular, may have ictal EEGs of poor quality, even at high supra-threshold doses.

The decision to increase the dose may also be based on an assessment of the person's clinical progress, independent of or in conjunction with the EEG morphology. This may be the preferred method in those situations where EEG morphology is poor,

despite dose increases, or is otherwise unreliable as an indicator of dose adjustments because of poor morphology.

19. Pulse width

The ECT device used should allow for the electrical stimulus to be delivered at varying pulse widths. The device may allow for the operator to set the individual treatment parameters (for example, some Mecta models) or the parameters may be pre-programmed (for example, Thymatron).

The most commonly recommended standard pulse width for all electrode placements has traditionally been one millisecond and most published efficacy studies have utilised one millisecond or higher. However, some studies have examined ultra-brief pulse widths of 0.3 milliseconds and have demonstrated that, for unilateral ECT, the associated cognitive impairment is significantly reduced compared to one millisecond pulse widths. Efficacy outcomes are less consistent between studies.[12,15,16,30] Whether there is some loss of efficacy needs to be clarified with further research.

For bilateral placements, the studies have been less conclusive. One study of bi-temporal ultra-brief pulse width ECT showed reduced efficacy compared with one millisecond pulse width stimulation, while others show equivalent efficacy. Another study of bi-frontal ultra-brief ECT suggested clinically meaningful efficacy.[31] Until further studies are available that show acceptable clinical efficacy, ultra-brief bi-temporal and bi-frontal ECT should only be used with the limited evidence base in mind.

If unilateral ultra-brief ECT is to be used, it is recommended that the electrical dosage be six times the seizure threshold.

A titration procedure will be necessary to enable accurate calculation of the supra-threshold dose and it is necessary to ensure that the ECT device can deliver small dosage increments in the low dose range, for example, for the Thymatron device, the program needs to be adapted to allow dosage increments of one percent intervals between one percent and ten percent. This is because, unlike one millisecond pulse width, the seizure threshold with ultra-brief unilateral ECT is generally very low for example 10 to 20 millicoulombs (2 to 4 percent in the Thymatron system).

Some units have used a pulse width of 0.5 milliseconds as standard for all electrode placements and it is noted that the manufacturers of the Thymatron Series 4 device recommend that the 0.5 millisecond pulse width program be used for all persons.

There are few published ECT efficacy studies that have evaluated ECT given at 0.5 millisecond pulse width so there is little data available to indicate the efficacy and side effect profile of 0.5 millisecond pulse width relative to other pulse widths.[32]

20. Frequency and spacing of treatments

Usual frequency

ECT is usually given two or three times a week. Treatments should be spaced as evenly as possible across the week. More frequent treatments may increase the occurrence of adverse cognitive effects without affecting the speed of clinical response, so are usually contraindicated.

Evidence is limited on the relative benefits of twice compared to three times per week treatments. Twice weekly ECT has less cognitive side-effects and may require fewer treatments. However, the response to treatment may be delayed requiring longer time period of treatment course.

In persons who are particularly susceptible to cognitive side effects, for example those with pre-existing cognitive impairment or where significant cognitive impairment or a rapidly rising seizure threshold becomes evident during the treatment course, slowing ECT sessions to twice weekly is often beneficial.

Twice weekly for older persons

Twice weekly treatments are advised for older persons with prior cognitive deficits.

Continuation ECT

The treating psychiatrist may consider reducing the treatment frequency in an acute course to avoid abrupt cessation of treatment.

21. Number of treatments

Number of treatments determined clinically

The number of treatments required depends on the individual case and requires continuing review. A course of ECT is up to 12 treatments in Queensland.

A renewed consent and clinical review is required after:

- more than 12 treatments or 3 months for acute treatment, or
- after 12 treatments or after 6 months for maintenance ECT.

There should be a clearly identified clinical basis on which to continue ECT beyond the 12 treatments allowed on a current consent agreement.

The MHRT may approve more than 12 treatments in response to a treatment application for an involuntary person. A clinical review is required to consider and document the decision to extend treatment to a further course, and this should involve a second psychiatric opinion.

Course may be fewer than 12

If a good clinical response is achieved before all 12 treatment sessions of the course have occurred, the clinical team with primary responsibility may consider the course completed.

Prescriptions to be decided upon regularly by treating team

It is recommended that forward treatment prescriptions for each person be decided at regular clinical reviews that include consideration of any alterations to the treatment parameters. These may be weekly in acute index cases. When and how to terminate the course should be considered.

22. Determination of an adequate seizure

It is unclear, based on current evidence, what constitutes an adequate seizure. The presence of a number of the following factors suggests that the seizure is adequate:

- clinical response is the most important consideration

- greater post-ictal suppression index (PSI) by visual analysis of the EEG supported by the numerical readout from the ECT machine. PSI greater than 70 percent is a useful indicator but not always reliable because of various factors including EEG artefact
- high amplitude of EEG recording indicates intensity of the seizure
- inter-hemispheric coherence, which is the observable symmetry between the two EEG traces indicating seizure activity in both cerebral hemispheres, and is a desired outcome
- a seizure of more than 20 seconds. The expected duration of at least 20 seconds is for the EEG trace with a discernible end point. The duration of the motor seizure is less reliable.

Judgement regarding the adequacy of a seizure remains difficult and it is up to individual services to assist their practitioners about whether to re-stimulate. Sometimes the dose and parameter settings which produce an inadequate seizure in one treatment session can give an acceptable response at the next.

22.1 Criteria for re-stimulation

If there was no evidence that a seizure occurred, the clinician needs to ensure that the electrical connection was not at fault and that there was sufficient electrode contact.

The operator should wait for at least 30 seconds before re-stimulation at a higher dose to avoid missing a seizure with an unusually slow onset.

Re-stimulation may be done after a 60 to 90 second interval at a higher dose if the seizure was considered inadequate. This re-stimulation would usually be done at an increment of 50 percent of the previous dose according to local protocol. The anaesthetist should give the patient extra oxygen in the interval and be satisfied with their physiological status.

If the seizure is missed again, the treatment session should end. Prior to the next scheduled treatment, the person should be assessed for potential causes of the missed seizure, such as the inappropriate administration of anti-convulsant medications.

If the person has repeatedly missed seizures or shown persistently poor EEG recordings despite adequate dose increases, consideration should be given to enhancing seizure production. This includes hyper-ventilation, changing the type or dose of the anaesthetic agent or augmenting the anaesthetic with remifentanil or alfentanil to further reduce the dose of the main anaesthetic induction agent.

The use of augmentation strategies such as theophylline or caffeine is not recommended because of medical risk.

22.2 Prolonged seizures

It is recommended that motor and/or EEG seizures lasting more than 120 seconds be terminated pharmacologically by a benzodiazepine (for example, diazepam or midazolam) or anaesthetic agent in consultation with the anaesthetist. EEG monitoring and oxygenation must be maintained during and after the seizure and there needs to be EEG confirmation that the seizure has been terminated.

It is recommended that, prior to the next scheduled session, the person's neurological status, medical history, and current medications, be reviewed to eliminate any potential cause for a prolonged seizure. It should be noted that healthy, young individuals will sometimes have prolonged seizures.

If a person has more than one prolonged seizure, treatment should be suspended until there has been a thorough neurological review. Provided that no neurological or other cause has been found, the appropriate procedure at the following treatment session is to increase the dose and continue treatment. The higher dose is most likely to prevent a prolonged seizure, as the most common cause of prolonged seizure is the generation of an insufficiently suprathreshold seizure. It is not appropriate to reduce the dose in subsequent treatments as this may produce a missed seizure, another prolonged seizure, or a reduction of efficacy.

The risk of prolonged cerebral seizure activity is greatest during the first treatment if the charge delivered is not sufficiently supra-threshold to activate an efficient switch-off neuro-inhibitory response.[33]

23. Titration technique

If a titration procedure is being performed, the initial dose should be determined by the titration chart which is appropriate for the pulse width program being used.

If a seizure (defined as a generalised motor seizure or definite EEG seizure of any length or quality, with or without visible motor seizure) does not occur, the dose should be increased as per protocol, and the patient re-stimulated.

This should be repeated until a seizure occurs, provided that no more than four stimuli are delivered at one session and that there are no anaesthetic or medical issues which would place the patient at unreasonable risk by continuing.

If a threshold seizure occurs at the first, second or third stimulus, a further treatment stimulus at the appropriate supra-threshold dose may be given depending on the risk–benefit analysis taking into account the severity of the person's psychiatric condition, co-morbid medical issues and the anaesthetist's assessment of the person's suitability to proceed.

24. Documentation

Each service should have processes and documentation consistent with the National Safety and Quality Health Service Standards 2012 to ensure that safety and quality performance information is regularly monitored in order to maintain reliable and safe, quality patient care.[34]

Maintaining appropriate documentation and registers can assist the organisation to demonstrate evidence in support of the following five key elements for achieving the Governance for safety and quality in health services standard;

Governance and quality improvement systems

Governance systems are integrated to actively manage patient safety and quality. Evidence can be demonstrated in ECT Management Committee meeting minutes.

Clinical practice

Current best practice guides the care provided by the clinical workforce. Evidence can be demonstrated in guidelines, policy and protocols.

Performance and skills management

Managers and the clinical workforce have the right qualifications, skills and approach to provide safe, high quality health care. Evidence can be demonstrated in credentialing records and professional development attendance.

Incidents and complaint management

Patient safety and quality incidents are recognised, reported and anlysed, and this information is updated to improve safety systems. Evidence can be demonstrated in the incident and complaint management policy.

Patient rights and engagement

Patient rights are respected and their engagement in care is supported. Evidence can be sourced from incident and complaints management records.

24.1 Clinical monitoring over the treatment course

The effects of ECT on psychiatric symptoms, such as mood and psychotic symptoms, and side effects (cognitive and non-cognitive) should be carefully monitored over the ECT treatment course to allow adjustments of the treatment and an objective assessment of outcomes. As well as frequent clinical assessments (at least twice per week by in-house staff during an acute course of ECT), the use of structured rating scales is recommended and should be administered prior to commencing ECT and at the end of the treatment course.

24.2 ECT treatment record

Each person receiving ECT must have all the following information recorded on a Treatment Record Form:

- name, UR number, CIMHA number, sex and date of birth (DOB)
- diagnosis for which ECT is prescribed
- nature of the consent given
- MHA status
- presence of an advance health directive
- medical and surgical history
- blood pressure, physical examination and investigation results
- the initial stimulus dose and electrode placement
- the required frequency of prescribed ECT, with each treatment to be signed and dated by the treating doctor.

For each treatment received, the following details must be recorded:

- names of the doctors giving the anaesthetic and the ECT
- placement of electrodes
- doses of anaesthetic and relaxant medications given

- stimulus dose (including, where relevant, pulse width, frequency, duration and current)
- duration of the seizure
- description of the motor response/movement and EEG seizure
- recommendation of dosing for the next treatment/s
- the signature of the ECT operator and the anaesthetist
- additional space for recording of any untoward events.

24.3 Clinical record

It is recommended that each person who has received an ECT treatment be reviewed by the referring doctor or clinically responsible team after each treatment if possible, or at least after every few treatments. This assessment should be recorded in the hospital clinical records as well as being documented in the clinical record.

24.4 Post-ECT follow up and monitoring

It is recommended that the person receiving ECT be monitored regularly by a psychiatrist or community treatment team in conjunction with their general practitioner for a minimum of six months after the course of treatment. The person should be monitored for any return of symptoms in order to detect any relapse at an early stage. The progress of any ECT-related cognitive impairment should also be monitored.

It is recommended that the treatment team ensure that, at the time of cessation of ECT, follow-up clinicians are informed of the person's response to treatment, the presence of any persisting symptoms of illness, an assessment of any ECT-related cognitive impairment and the post-ECT management plan. In the case of adolescents, monitoring should also include an ongoing assessment of academic performance.

The treating doctor should document in the clinical record at the end of treatment (in QH facilities where this is the Consumer Integrated Mental Health Application (CIMHA), use the Medical Review clinical note type)

This record should include ECT details such as the number, electrode placement, and dosages, as well as an outcome statement, and any problems, follow-up treatment and other information likely to be helpful if further ECT is considered in the future. A summary of a course of treatment, the effectiveness of the treatment and considerations for future treatment should be included in relevant case summaries. If CIMHA is used this is in the Case Review and/or Transfer Summary forms. If CIMHA is used these will be available through The Viewer to facilitate continuity of care by by other treating health professionals including emergency departments and general medical wards.

24.5 ECT register

Each service must keep an ECT register which records each day that ECT was provided by the service, the names of the ECT operator, anaesthetist and details of the persons who received ECT that day, and any untoward events which occurred. A summary of the register including the number of persons receiving treatment, number of treatments and

age ranges is to be made available to the Chief Psychiatrist at six monthly intervals (the end of the calendar year and the end of the financial year).

25. Continuation (C–ECT) and maintenance ECT (M–ECT) defined and explained

C–ECT is defined as treatment administered weekly up to monthly following a successful course of ECT for up to six months after remission from an acute illness is achieved. C–ECT aims to prevent the relapse of symptoms and is sometimes administered at the same time as medication, until it is apparent that medication will provide effective prophylaxis. If the person stays well during this phase, the period of time between treatments should be extended as much as possible.[1]

M–ECT is administered at weekly to monthly intervals (and occasionally less frequently) for more than six months after treatment of the acute illness. The objective is to prevent another episode or recurrence of illness.

Both C–ECT and M–ECT are generally administered as outpatient treatment.

Consent for M–ECT needs to be reviewed at least every six months or every twelve treatments, whichever occurs first.

26. Outpatient ECT

ECT may be given on an outpatient basis either as an acute treatment or as maintenance if a person has responded to ECT during the acute phase of their illness, but the response cannot be maintained with pharmacotherapy or the person has experienced intolerable side effects.

The decision to use outpatient ECT should conform to the person's preference and not compromise safety or reduce the treatment's potential efficacy.

26.1 Indications for outpatient ECT

Persons who meet the following criteria may be suitable to receive ECT as outpatients:

- low risk of suicide
- relatively less severe illness
- no impairment of nutrition or hydration
- no significant medical illnesses
- low anaesthetic risk
- adequate family/carer support with the ability to provide transport to and from the hospital
- ability to comply with preparations for ECT such as fasting
- no evidence of cognitive impairment during the course of ECT.

26.2 Care after outpatient ECT

It is recommended that persons be advised to not drive a vehicle, operate machinery, sign any legal documents or have sole responsibility for children for a minimum of 24 hours after receiving ECT.

Persons receiving acute treatment should be advised not to work or drive until the course is completed.

The person should be observed for a period as required using either a structured criteria based discharge process or a time based discharge process according to local discharge protocol. It is desirable that the patient undergo a clinical review prior to discharge. This should be discussed with the anaesthetic department.

Persons should be reviewed by the treating psychiatrist at appropriate intervals between treatments. If the treating psychiatrist is unable to do this, the responsibility should be formally taken over by another psychiatrist, such as the Clinical Director of ECT.

There should be adequate communication between the treating psychiatrist and the ECT operator. This is particularly important when the treating psychiatrist works at a different facility from that at which the ECT is administered.

Approval and Implementation

Policy Custodian:

Director, Clinical Governance, Mental Health Alcohol and Other Drugs Branch, Clinical Excellence Division, Department of Health

Responsible Executive Team Member:

Executive Director, Mental Health Alcohol and Other Drugs Branch, Clinical Excellence Division, Department of Health

Approving Officer:

Chief Psychiatrist, Mental Health Alcohol and Other Drugs Branch, Clinical Excellence Division, Department of Health

Approval date: 14 July 2017

Effective from: 5 March 2017

Version Control

Version	Date	Prepared by	Comments
V0.1		J Martin	Reviewed by the QLD ECT Committee. Queensland Psychotropic Medications Advisory Committee and amendments inserted as required.
V0.2	Dec 2015	A Dacey	Reviewed by the QLD ECT Committee
V0.3	Aug 2016	A Dacey	Reviewed by Office of the Chief Psychiatrist, Clinical Governance Team
V0.4	Nov 2016	P Sheehy	Mental Health Act Review Implementation Team, Department of Health
V0.5	July 2017	B Fitzgerald	Amendments to item 8.2 to align with amendments made to the Chief Psychiatrist Practice Guidelines – Electroconvulsive Therapy
V0.6	April 2018	Dr J Reilly	QLD ECT Committee focused section review; governance, training, credentialing, electrode placement and dosage, sign out and care of outpatient
V0.7	Aug 2018	Dr J Reilly	Inclusion of disclaimer specific to ECT. Updates to dosage.
V0.8	June 2022	Dr J Reilly	Amendments to items 8.1 and 8.2 to align with legislative updates to the MHA-2016.

Appendix 1

ECT Competence – Practical Technique Guide

Date:	
ECT Practitioner	
Supervisor	**Signature:**

Knowledge of ECT Dosing Protocol		
Capability	Adequate	Comments
Titration		
Dose relative to seizure threshold		
Criteria for increasing dose		
Interpretation of ictal EEGs		
Capability	Adequate	Comments
Identify seizure activity		
Quality of EEG seizure		
EEG Monitoring		
Capability	Adequate	Comments
Skin preparation		
Electrode placement		
Quality of recording/managing artefact		
Setting parameters—gain etc.		

Treatment Electrodes		
Capability	Adequate	Comments
Alternative techniques (hand held, thymapads, rubber bands)		
Impedance		
Skin–electrode contact		
Identification of treatment sites		
Setting of treatment parameters		

Appendix 2

Medications by class: Considerations/advice relevant to ECT practice

Class of Medication	Recommendation/advice relevant to ECT practice
Antidepressants and antipsychotics	• The majority of persons with a major depressive episode who respond to ECT will relapse within six months without continuation pharmacotherapy.[35] • It is standard practice to commence an antidepressant, usually from a different class from that used prior to the first ECT course. This is usually initiated during the ECT course. • There have been reports of the safe use of selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants and monoamine oxidase inhibitors with ECT. • There are also reports of prolonged asystole and hypotension in persons taking higher dose venlafaxine during the administration of ECT. The risks and benefits of this combination should be considered and discussed with the anaesthetist. • The use of antipsychotics during a course of ECT is common. Provided appropriate precautions are taken, it should be a safe combination. There have been many reports of the safe use of clozapine with ECT. • In persons with schizophrenia, antipsychotics and ECT may have a synergistic effect. • There is one report of quetiapine having anticonvulsant properties however other antipsychotics do not seem to share this problem.
Lithium carbonate	• There are reports of prolonged confusion when ECT has been administered to persons taking lithium carbonate, particularly when serum levels are at the higher end of the therapeutic range, and in the elderly. • Where possible, it is advised to suspend lithium carbonate prior to an index episode course of ECT. This is usually practical when lithium carbonate is being used to augment an antidepressant. • The risks and benefits of suspending lithium carbonate in a person with bipolar disorder, where there is a risk of a manic swing or destabilisation of illness and possible subsequent lithium carbonate resistance if withdrawn, are more complex and need careful consideration. • If the decision is to maintain the person on lithium carbonate during the ECT course, the evening dose prior to each ECT treatment should be omitted and the morning dose delayed until the person has recovered from that treatment.

Class of Medication	Recommendation/advice relevant to ECT practice
Anticonvulsant mood stabilisers	• Anticonvulsants increase the seizure threshold and reduce seizure expression and duration which may reduce the efficacy of ECT. • Where possible, an anticonvulsant augmenting an antidepressant should be withdrawn prior to the ECT course. • In bipolar disorder, the clinical decision on whether to withdraw the anticonvulsant must consider the balance between the risk of manic relapse and the potential adverse effects on the seizure. • If the anticonvulsant is continued, the evening dose prior to each ECT treatment should be withheld and the morning dose delayed until after recovery from the treatment. This approach should also be taken when an anticonvulsant is being used for a seizure disorder. • As ECT has a potent anticonvulsant effect, the dose of anticonvulsant may be reduced as the course proceeds.
Benzodiazepines and Z class drugs	• The use of benzodiazepines during a course of ECT, particularly those with a longer half-life, may increase the seizure threshold and the risk of cognitive impairment, and reduce the seizure length and efficacy. • The concurrent use of long acting benzodiazepines may result in failure of treatment and should be avoided. Z class drugs such as zolpidem and zopiclone may also inhibit seizure activity. • Studies suggest that the short acting benzodiazepine lorazepam, at low dose, may not interfere with ECT: “Lorazepam, in the range of 0–3 mg/day and withheld at least 10 hours before ECT, has no relation to seizure threshold”.[36]
Hypoglycaemics and diabetes management	• Depression, particularly with melancholic symptoms, can destabilise diabetic control. As depression improves through the course of ECT, the dose of diabetic medication may need to be reduced to prevent hypoglycaemic episodes. • Diabetes should be monitored closely during an ECT course. • On the morning of each treatment, oral hypoglycaemics should be withheld until after treatment. • For persons using insulin, it is advisable to consult an endocrinologist about management of their treatment on the morning of ECT. The person should be placed first on the list and returned to the ward as soon as practical to have breakfast and their diabetic medication.
Theophylline and bupropion	• Theophylline and bupropion can increase seizure duration. Where possible, they should be ceased prior to the ECT course commencing.

Class of Medication	Recommendation/advice relevant to ECT practice
Diuretics	• Diuretics should be avoided on the morning of ECT to avoid post-ictal urinary incontinence.
Acetylcholinesterase inhibitors	• Acetylcholinesterase inhibitors may potentiate the bradycardia from the electrical stimulus and suxamethonium. In addition, they can potentiate the muscle relaxant effect of suxamethonium, particularly with rivastigmine which also inhibits butyryl cholinesterase, the enzyme which metabolises suxamethonium. • There are case reports of the safe use of donepezil and rivastigmine during ECT. • The continued use of these drugs should be discussed with the anaesthetist. • However, there are also case reports of acetyl cholinesterase inhibitors having a protective effect against ECT-induced cognitive impairment, but the usefulness of this approach remains uncertain.

Appendix 3

Clinically significant drug interactions[37,38]

Class of Drug	Example	Interaction effects
Anaesthetic	Propofol	• Decreased seizure duration—may be very substantial • May increase seizure threshold
Anticonvulsant	Carbamazepine, valproate	• Increased seizure threshold with potential adverse effects of sub convulsive stimuli—it is possible to override the anticonvulsant effect with a modest increase in energy/charge of electric stimulus
Antidepressant		
Irreversible MAOI	Phenelzine	• Possible need for a pressor agent for resuscitation requires that this combination be avoided
SARI, NDRI, SSRI	Trazodone, Bupropion, Fluoxetine	• Prolonged seizures reported—clinical significance unknown • Concurrent administration not contraindicated
	Trazodone	• Rare case reports of cardiovascular complications in persons with and without cardiac disease—more likely to occur at high dosages—>300 mg per day
Antihypertensive	β blockers e.g. Propranolol	• May potentiate bradycardia and hypotension with sub convulsive stimuli • Confusion reported with combined use
Antipsychotic	Clozapine	• Increased seizure durations reported in 16.6% of persons—spontaneous (tardive) seizures reported following ECT • Delirium reported with concurrent or shortly following clozapine treatment; however, there are many case reports of uncomplicated concurrent use
Benzodiazepines	Lorazepam, Diazepam	• Increased seizure threshold with potential adverse effects of sub convulsive stimuli or abbreviated seizure
Caffeine		• Increased seizure duration • Reports of hypertension, tachycardia and cardiac dysrhythmia
Lithium		• Lithium toxicity may occur, perhaps due to an increased permeability of the blood brain barrier; decrease or discontinue lithium and monitor the person • Concurrent administration not contraindicated if lithium level within the therapeutic range
L-Tryptophan		• Increased seizure duration
Theophylline		• Increased seizure duration, status epilepticus • Concurrent administration not contraindicated if serum level within the therapeutic range

Appendix 4

Glossary

Term	Definition/Explanation/Details	Source
Adverse drug reaction	A response to a drug or medicine which is noxious and unintended, and which occurs at doses normally used or tested in humans for the prophylaxis, diagnosis, or therapy of disease, or modification of physiological function.	National safety priorities in mental health: a national plan for reducing harm
Assessment	Process by which the characteristics and needs of the person, groups or situations are evaluated or determined so they can be addressed. The assessment forms the basis of a plan for services or action.	National standards for mental health services 2010
Authorised mental health service	A health service, or part of a health service, declared under section 329 to be an authorised mental health service; or	*Mental Health Act 2016*
Capacity	Capacity is defined in accordance with the matter, or the particular decision that is to be made. Capacity, for a person, means the person is capable of: '(a) understanding the nature and effect of decisions about the matter; and (b) freely and voluntarily making decisions about the matter; and (c) communicating the decisions in some way.' It also includes the patient's ability to retain the information and process it to reach a decision.	Schedule 3 *Powers of Attorney Act 1998* (Qld) Schedule 4 *Guardianship and Administration Act 2000* (Qld)
Carers	A person who voluntarily provides ongoing care or assistance to another person who, because of disability, age, frailty, chronic illness or pain, requires assistance with everyday tasks. Carers include, for example, parents, partners, children, grandparents, aunts, uncles, siblings and/or friends of the person.	Queensland Health consumer, carer and family participation framework
Clinical governance	The framework through which health organisations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish.	National safety priorities in mental health: a national plan for reducing harm
Consent	Agreement based on an understanding of the implications of a particular activity or decision and the likely consequences for the person.	National standards for mental health services 2010
Credentialing and clinical privileging	Credentialing is the formal process used to verify the qualifications, experience, professional standing and other relevant professional attributes of medical practitioners for the purpose of forming a view about their competence, performance and professional suitability to provide safe, high quality health care services within specific organisational environments.	QH standards

Term	Definition/Explanation/Details	Source
Diagnosis	A decision based on the recognition of clinically relevant symptomatology, the consideration of causes that may exclude a diagnosis of another condition and the application of clinical judgment.	National standards for mental health services 2010
Evidence-based practice	A process through which professionals use the best available evidence integrated with professional expertise to make decisions regarding the care of an individual. Consultation with the client is implicit in the process.	Promotion, Prevention and Early Intervention for Mental Health
Informed consent	In the context of mental health, the client provides permission for a specific treatment to occur based on their understanding of the nature of the procedure, the risks involved, the consequences of withholding permission and their knowledge of available alternative treatments.	National standards for mental health services 2010
Involuntary	Where persons are detained in hospital or compulsorily treated in the community under mental health legislation for the purpose of assessment or provision of appropriate treatment or care.	Queensland *Mental Health Act 2016*
Medicine	The term medicine includes prescription, non-prescription and complementary medicines.	National safety priorities in mental health: a national plan for reducing harm
Procedure	A health related procedure including any course of action by a healthcare provider that involves the placement or insertion of an instrument, appliance or other object (including imaging exposures) into or onto human tissue, organs, body cavities or body orifices for diagnosis or treatment.	Adapted from section 147 *Public Health Act 2005* Qld)
Relapse	A subsequent episode of mental illness. It is a recurrence of symptoms of mental illness similar to those that have previously been experienced. Relapse is generally agreed to have occurred when the person experiencing the symptoms is not able to cope using their usual supports and requires a greater intensity of intervention.	National standards for mental health services 2010
Safety	Avoidance or reduction to acceptable levels of actual or potential harm from mental health care delivery or the environment in which mental health care is delivered.	National safety priorities in mental health: a national plan for reducing harm

Appendix 5

References

1. NSW Ministry of Health 2011, *Electroconvulsive therapy: ECT minimum standards of practice in NSW*, NSW Ministry of Health, Sydney.
2. Victorian Department of Human Services 2009, *Electroconvulsive therapy manual: Licensing, legal requirements and clinical guidelines*, Victorian Department of Human Services, Melbourne.
3. South Australia Health 2014, *Electroconvulsive therapy policy guideline*, SA Health, Adelaide.
4. The Royal Australian & New Zealand College of Psychiatrists 2014, Position Statement 74 Electroconvulsive Therapy (ECT), RANZCP, Melbourne.
5. National Institute for Health Care Excellence 2009, Guidance on the use of electroconvulsive therapy, NICE, London.
6. Pompili, M, Lester, D, Dominici, G, Longo, L, Marconi, G, Forte, A, Serafini, G, Amore, M & Girardi, P 2013, 'Indications for electroconvulsive treatment in schizophrenia: a systematic review', *Schizophrenia Research*, vol. 146, no. 1, pp. 1-9.
7. American Psychological Association 2000, *Report of the Task Force on Test User Qualifications*, APA, Washington DC.
8. Donahue, A 2008, 'Electroconvulsive therapy and memory loss: a personal journey', *Journal of ECT*, vol. 16, no.2, pp. 133–43.
9. Porter, RJ, Bourke, C & Gallagher, P 2007, 'Neuropsychological impairment in major depression: its nature, origin and clinical significance', *Australian and New Zealand Journal of Psychiatry*, vol. 41, no. 2. pp. 115–28.
10. Reichenberg, A & Harvey, P 2007, 'Neuropsychological impairments in schizophrenia: Integration of performance-based and brain imaging findings'. *Psychology Bulletin*, vol. 133, no. 5, pp. 833–58.
11. Ingram A, Saling, MM, & Schweitzer, I 2008, 'Cognitive side-effects of brief pulse electroconvulsive therapy: a review', *Journal of ECT*, vol. 24, no. 1, pp. 3–9.
12. Loo, CK, Schweitzer, I, & Pratt, C 2006, 'Recent advances in optimising electroconvulsive therapy', *Australian and New Zealand Journal of Psychiatry*, vol. 40, no. 8, pp. 632–38.
13. Legendre, SA 2003, 'The influence of cognitive reserve on memory following electroconvulsive therapy', *Journal of Neuropsychiatry and Clinical Neuroscience*, vol. 15, no. 3, pp. 333–39.
14. Gardner, BK & O'Conner, DW 2008, 'A Review of the cognitive effects of electroconvulsive therapy in older adults', *Journal of ECT*, vol. 24, no. 1, pp. 68–80.
15. Loo, CK, Sainsbury, K, Sheehan, P, & Lyndon, B 2008, 'A comparison of RUL ultrabrief pulse (0.3 ms) ECT and standard RUL ECT', *International Journal of Neuropsychopharmacology*, vol. 11, no. 7, pp. 883–90.
16. Sackeim, HA, Prudic, J, Nobler, MS, Fitzsimons, L, Lisanby, SH, Payne, N, Berman, RM, Brakemeier, EL, Perera, T, & Devanand, DP 2008, 'Effects of pulse width and

electrode placement on the efficacy and cognitive effects of electroconvulsive therapy', *Brain Stimulation*, vol. 1, no. 2, pp. 71-83.

17. Queensland Health 2014, *Health Service Directive Patient Safety, Directive #QH-HSD-032:2014*, Queensland Health, Brisbane.
18. Australian Commission on Safety and Quality in Health Care 2012, *National Safety and Quality Health Service Standards*, ACSQHC, Sydney.
19. Walter, G & Rey, JM 2003, 'How fixed are child psychiatrists' views about ECT in the young', *Journal of ECT*, vol. 19, no. 2, pp. 88-92.
20. Royal Australian and New Zealand College of Psychiatrists 2006, *Clinical Memorandum #12 Electroconvulsive Therapy*, RANZCP, Melbourne.
21. Tess, AV & Smetana, GW 2009, 'Medical evaluation of consumers undergoing electroconvulsive therapy', *New England Journal of Medicine*, vol. 360, no. 14, pp. 1437–444.
22. Ignatowski, M, Sidhu, S, & Rueve, M 2007, 'Pulmonary embolism as a complication of major depressive disorder with catatonic features: a case report', *Psychiatry (Edgmont)*, vol. 4, no. 6, pp. 51-6.
23. National Health and Medical Research Council 2009, *Clinical practice guideline for the prevention of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in consumers admitted to Australian hospitals*, National Health and Medical Research Council, Canberra.
24. Singh, G & Wahi, S 2008, 'Pulmonary embolism in the ECT consumer: a case report and discussion', *General Hospital Psychiatry*, vol. 30, no. 1, pp. 87–9.
25. Labadie, RF, Clark, NK, Cobb, CM, Benningfield, MM, & Fuchs, C 2010, 'Electroconvulsive therapy in a cochlear implant consumer', *Otology and Neurotology*, vol. 31, no. 1, pp. 64–6.
26. Rivas, A, Hedley-Williams, A, Raj, V, Clark, N, McRackan, TR, & Labadie, RF 2011, 'Electroconvulsive therapy and cochlear implantation'. *Otolaryngology–Head Neck Surgery*, vol. 145, no. 2, pp. 92–3.
27. Australian and New Zealand College of Anaesthetists 2010, *Recommendations on Essential Training for Rural General Practitioners in Australia Proposing to Administer Anaesthesia*, ANZCA, Melbourne.
28. Queensland Health 2013, *Guideline Surgical Safety Checklist*, Queensland Health, Brisbane.
29. American Psychiatric Association, Coffey, CE, & Weiner, RD 2001, *The Practice of Electroconvulsive Therapy Recommendations for Treatment, Training, and Privileging (A Task Force Report of the American Psychiatric Association)*, 2nd edn, American Psychiatric Publishing, Washington DC.
30. Sienaert, P, Vansteelandt, K, Demyttenaere, K, & Peuskens, J 2009, 'Randomized comparison of ultra-brief bifrontal and unilateral electroconvulsive therapy for major depression: clinical efficacy', *Journal of Affective Disorders*, vol. 116, no. 1-2, pp. 106–12.
31. Niemantsverdriet, L, Birkenhäger, T, & van den Broek, W 2011, 'The efficacy of ultrabrief-pulse (0.25 millisecond) versus brief-pulse (0.50 millisecond) bilateral electroconvulsive therapy in major depression', *The Journal of ECT*, vol. 27, no. 1, pp. 55-8.

32. Peterchev, AV, Rosa, MA, Deng, Z, Prudic, J, & Lisanby, SH 2010, 'Electroconvulsive therapy stimulus parameters: rethinking dosage', *Journal of ECT*, vol. 26, no. 3, pp. 159-74.

33. Scott, AIF 2007, 'Monitoring electroconvulsive therapy by electroencephalogram: an update for ECT practitioners', *Advances in Psychiatric Treatment*, vol. 13, no.4, pp. 298–304.

34. Australian Commission on Safety and Quality in Health Care 2012, *National Safety and Quality Health Service Standards*, ACSQHC, Sydney.

35. Sackeim, HA, Haskett, RF, Mulsant, BH, Thase, ME, Mann, JJ, Pettinati, HM, Greenberg, RM, Crowe, RR, Cooper, TB, & Prudic, J 2001, 'Continuation pharmacotherapy in the prevention of relapse following electroconvulsive therapy: a randomised controlled trial', *Journal of the American Medical Association*, vol. 285, no.10, pp. 1299–307.

36. Boylan, LS, Haskett, RF, Mulsant, BH, Greenberg, RM, Prudic, J, Spicknall, K, Lisanby, SH, & Sackeim, HA 2000, 'Determinants of seizure threshold in ECT: benzodiazepine use, anaesthetic dosage, and other factors', *Journal of ECT*, vol. 16, no. 1, pp. 3–18.

37. Virani, AS, Bezchlibnyk-Butler, KZ, Jeffries, JJ, & Procyshyn, RM 2012, *Clinical handbook of psychotropic drugs*, 19th edn, Hogrefe Publishing, Boston, US.

38. Bazire, S 2014, *Psychotropic drug directory*, Lloyd-Reynold Communications LLP, Stratford Upon Avon.

Appendix 6

Suggested reading

Abrams, R 2002, *Electroconvulsive Therapy* (4th Edition), Oxford University Press, New York.

Crowley, K, Pickle, J, Dale, R and Fattal, O 2008, A Critical Examination of Bifrontal Electroconvulsive Therapy: Clinical Efficacy, Cognitive Side Effects and Directions for Future Research, *Journal of ECT*, December 2008; 24(4): 268–271.

Dunne, RA and McLoughlin DM 2012, Systematic review and meta-analysis of bifrontal electroconvulsive therapy versus bilateral and unilateral electroconvulsive therapy in depression, *World Journal of Biological Psychiatry* 2012; 13: 248-258.

Fink, M 2010, The Intimate Relationship between Catatonia and Convulsive Therapy, *Journal of ECT*, December 2010; 26(4).

Greenhalgh, J, Knight, C, Hind, D, Beverley, C and Walters, S 2005, Clinical and cost-effectiveness of electroconvulsive therapy for depressive illness, schizophrenia, catatonia and mania: systematic reviews and economic modelling studies, *Health Technology Assessment*, 2005; 9(9): 1–156, iii–iv.

Kellner, CH, Knapp, RG, Petrides G, et al 2006, Continuation electroconvulsive therapy vs pharmacotherapy for relapse prevention in major depression: a multi-site study from the Consortium for Research in Electroconvulsive Therapy (CORE), *Arch Gen Psychiatry* 2006; 63: 1337–44.

Lisanby, SH 2007, Electroconvulsive therapy for depression, *NEJM* 2007, 357: 1939-45.

Loo, CK, Katalinic, N, Martin, D and Schweitzer, I https://www.youtube.com/watch ?v=kB6W3RhwM8c2012, A review of ultra-brief pulse width electroconvulsive therapy, *Therapeutic Advances in Chronic Disease* 2012; 3: 69-85.

Mankad, MV, Beyer, JL, Weiner, RD and Krystal, A 2010, Clinical Manual of Electroconvulsive Therapy, *American Psychiatric Publishing*, Washington DC.

Murugesan, G 1994, Electrode placement, stimulus dosing and seizure monitoring during ECT, *Australian and New Zealand Journal of Psychiatry* 1994; 28: 675–683.

Navarro, V, Gasto, C, Torres, X et al 2008, Continuation/maintenance treatment with nortriptyline versus combined nortriptyline and ECT in late-life psychotic depression: a two year randomized study, *American Journal of Geriatric Psychiatry* 2008; 16: 498-505.

Ottosson, J-O and Fink, M 2004, *Ethics in Electroconvulsive Therapy*, Brunner-Routledge, New York**.**

Semkovska, M and McLoughlin, DM 2010, Objective cognitive performance associated with electroconvulsive therapy for depression: a systematic review and meta-analysis, *Biological Psychiatry* 2010;68:568–577.

Semkovska, M, Landau, S, Dunne, R, Kolshus, E, Kavanagh, A, Jelovac, A, Noone, M, Carton, M, Lambe, S, McHugh, C, & McLoughlin, D M., 2016, 'Bitemporal Versus High-Dose Unilateral Twice-Weekly Electroconvulsive Therapy for Depression (EFFECT-Dep): A Pragmatic, Randomized, Non-Inferiority Trial', *American Journal of Psychiatry*, no. 4, p. 408.

Department of Health

The Administration of Electroconvulsive Therapy

www.health.qld.gov.au