

**The Scope of ECT Practice in South Africa**

by

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## Abstract

### Introduction

Electroconvulsive therapy (ECT) involves the administration of an electrical current to the brain in order to produce a tonic-clonic seizure which is deemed therapeutic. It is an effective and safe procedure for the treatment of severe mental illnesses such as major depression, mania and schizophrenia.

### Purpose and Objectives

Currently little is known about the characteristics of ECT practice in South Africa. This study aims to determine current electroconvulsive therapy (ECT) practice and to compare it with reported ECT practice internationally.

### Methods

This is a retrospective, descriptive study, to determine the characteristics of ECT practice in South Africa; data was collected using a self-report questionnaire. The study population consisted of doctors and nurses who practiced ECT in any 12 month period between 2011 and 2012. Both private and state facilities were included in the study. Initially contact was made with hospital mental health facilities to ascertain whether an ECT machine was present on site. Once formal approval was obtained from the appropriate designated bodies, questionnaires were sent to clinical staff involved in ECT at active sites. The 36-item questionnaire covered relevant questions on: utilization rates, equipment, staffing, practice and monitoring parameters, and indications for use.

### Results

Forty two institutions had an ECT machine on site, of which thirteen institutions reported non-use. Questionnaires were sent to the 29 active ECT sites. Facilities responding to the questionnaire amounted to 83% (n=24), but of these, 21 units responded to the ECT utilization questions. ECT is performed as a modified procedure in six provinces by psychiatrists, registrars, medical officers and general practitioners. In-and outpatient ECT is offered in 79% (n=19) of hospitals. The number of persons treated with ECT/10 000 population per year (ppy) is 0.22 while the number of ECT procedures/10 000 ppy is 1.19. More patients in the private sector receive ECT as a treatment modality than in the public sector ( $U = 22, p = 0.045$ ). ECT is performed in a minor theatre/operating room in 79% of units, while the rest is performed in a treatment room. All but one unit had a separate recovery room. Informed consent or assent was used in all institutions. Pre-ECT work-up most commonly involved a physical examination (95.5%, n = 21) and basic blood work investigations (87%, n=20). Bilateral, unilateral and bifrontal electrode placements are used,

while various dosage- determination and monitoring methods are employed. The vast majority of patients (89.22%, n=869) receiving ECT are between the ages of 18 and 59. The most common indication for ECT is depression (84.77%, n=796).

### **Conclusion**

The utilization rate in South Africa is similar to that of countries like Bulgaria, Poland and India, but less than that of some high-income countries. Even though ECT practices in South Africa generally follow international guidelines, standardisation of practice is still recommended.

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## List of Abbreviations and Acronyms

APA: American Psychiatric Association  
BLS: Basic Life Support  
ECT: Electroconvulsive therapy  
ECTAS: ECT Accreditation Service  
CPD: Continuing Professional Development  
CEO: Chief Executive Officer  
CMSA: College of Medicine of South Africa  
CI: Confidence Interval  
CSIR: Council for Scientific and Industrial Research  
DA: Diploma in Anaesthetics from the College of Medicine of South Africa  
DBSA: Development Bank of Southern Africa  
DOH: Department of Health  
EAR: ECT Administration Rate  
FBC: Full Blood Count  
GP: General Practitioner  
HOD: Head of Department  
HOH: Head of Health Establishment  
HREC: Human Research Ethics Committee  
IUSS: Infrastructure Unit Systems Support  
MHU: Mental Health User  
MO: Medical Officer  
NICE: National Institute for Health and Care Excellence  
OPD: Outpatient Department  
OR: Operating Room  
PACU: Post Anaesthetic Recovery Unit  
ppy: population per year  
RCP: Royal College of Psychiatrists  
SANECT: Southern African Network for ECT  
SEAN: Scottish ECT Accreditation Network Standards  
TPR: Treatment Person Rate  
UCT: University of Cape Town

# 1 Introduction

## 1.1 Introduction

Electroconvulsive therapy (ECT) involves the administration of an electrical current to the brain in order to produce a tonic-clonic seizure. This procedure is performed under controlled circumstances and most often involves the specialised skill of a psychiatrist, an anaesthetist and specialised nurses. The patient is anaesthetised and muscle relaxants are administered, so neither the pain of the stimulus nor the discomfort associated with a spontaneous seizure is experienced. This procedure is called modified ECT (Fink, 2009).

The therapeutic effect of ECT appears to be as a result of many factors, including modulation of the monoaminergic system, its dopamine enhancing properties, as well as its ability to promote neurogenesis (Perera, Coplan et al., 2007; Payne & Prudic, 2009).

ECT is an effective and safe procedure used in the treatment of severe mental illnesses such as major depression, mania and schizophrenia (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001; Scott, 2005). It is clinically recognised as a valid psychiatric treatment and both the American Psychiatric Association (APA) (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001) and the Royal College of Psychiatrists (RCP) (Scott, 2005) endorse it and present clinical guidelines pertaining to its application. Despite this, the practice of ECT varies widely both between and within countries.

Most research about the scope of practice of ECT stems from Europe, more specifically the United Kingdom (UK). Early in the 1980s scathing criticism was levelled against UK psychiatrists for their poor monitoring and supervision of ECT and its effects on patients. The editor of the *Lancet* chastised the profession and stated that:

“It is not ECT which has brought psychiatry into disrepute. Psychiatry has done just that for ECT” (Lancet, 1981)

## 1.2 Aim

This study aims to determine the characteristics of ECT practice in South Africa and to compare it with reported ECT practice in other parts of the world. A comprehensive review of ECT practice also provides an opportunity to make recommendations for the practice of electroconvulsive therapy in South Africa.

## 1.3 Objectives

The objectives of the study are:

1. to determine the characteristics of local ECT practice in South Africa

2. to review international ECT practice literature in both the developed and developing world
3. to compare international practice to current local practice
4. to make appropriate recommendations to improve local practice.

#### **1.4 Implementation Objectives**

The implementation objectives are:

1. to present the data and recommendations in a publishable format for publication in a peer reviewed journal
2. to inform planning for standardisation of ECT practice in South Africa
3. to formulate suggestions for further research based on the data elicited from this study

## 2 Literature Review

### 2.1 Objectives of Literature Review

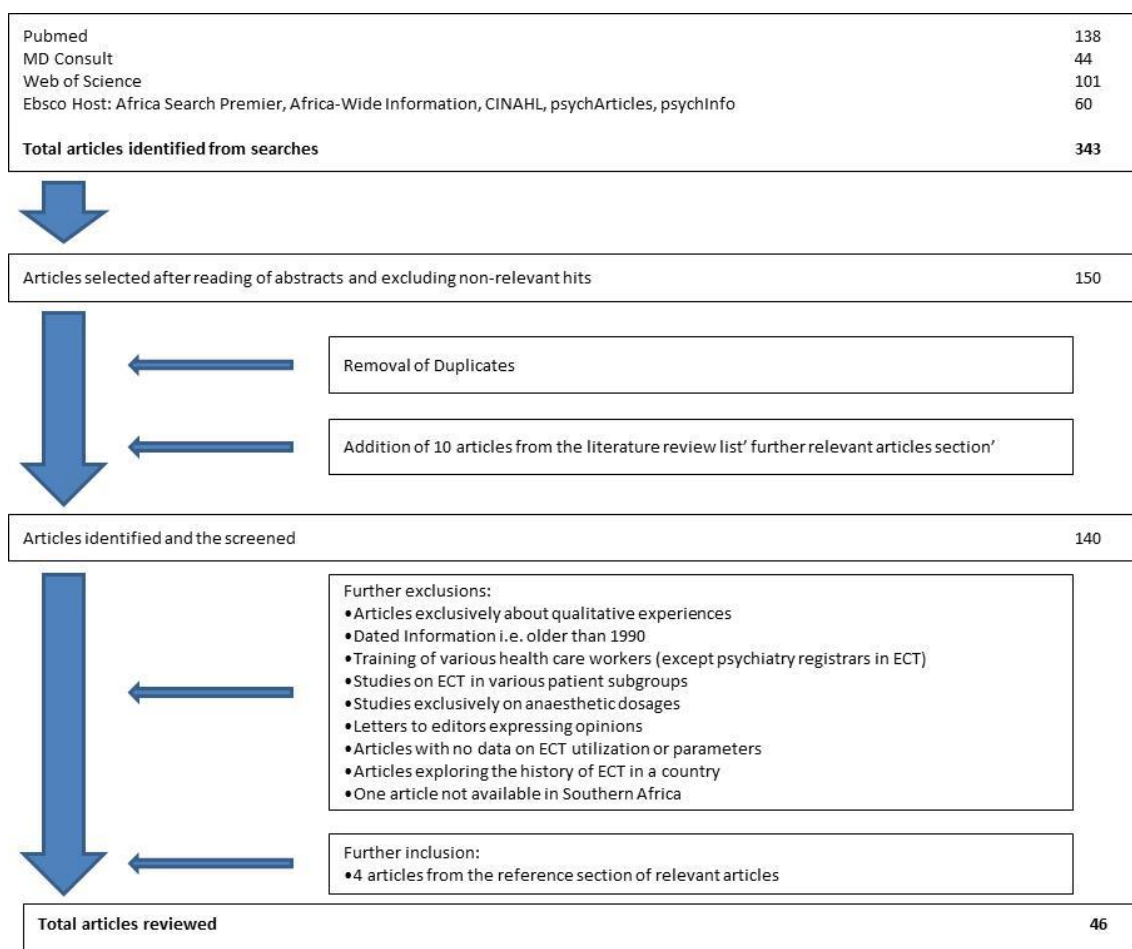
1. To review and analyse the existing knowledge on global ECT practice
2. To determine what is known of ECT practice in Africa and South Africa and to contextualize this specialised treatment within the current health system

### 2.2 Literature Search Strategy

The keywords used in the search were “electroconvulsive therapy” or ECT combined with survey and practice. The limitations were studies performed on human subjects and studies only in English language journals. The following databases were used: Pubmed (137 hits); MD Consult (44), Web of Science (101), as well as the following databases via Ebsco host: Academic Search Premier, Africa-Wide Information, CINAHL, PsycArticles and PsychInfo (60). After reading of abstracts, and excluding non-relevant hits, the articles were reduced to 150. A further ten articles were added to the literature review list from the ‘further relevant articles section’ of each database search and one from the reference section of an article.

After removal of the duplicates, 140 articles were identified and the abstracts were screened. Further exclusion criteria at the abstract level were as follows: articles prior to 1990; articles exclusively about qualitative experiences (knowledge, views, opinions and attitudes) and training of various health care workers (except psychiatry registrars in ECT); studies on ECT practice in an exclusive patient subgroups (e.g. the elderly, adolescents, ethnic groups, intellectually disabled or medically ill patients); studies exclusively on anaesthetic doses or prescribing practices for ECT; letters to the editor expressing opinions about surveys; articles where there was no data on ECT utilization and parameters; and articles exploring the history of ECT in a country. When the same authors published the same study in multiple journals, only the first publication was incorporated. A further four articles were extracted from the reference section of relevant articles. Forty seven appropriate articles were finally identified, however one was not available in Southern Africa resulting in forty six articles being analysed. The literature search did not include information from government statistical databases or accreditation services, which was not published in an academic journal.

Figure 1 below summarises the literature search.



**Figure 1: Flow diagram literature review**

### 2.3 Quality Criteria

Original articles were included if they were based on a reliable research study (this was most commonly surveys) with a clear description of the sampling methods and the sample size was adequate. Articles where the methods of data analysis were reasonably clearly described and valid, was another important criteria. Further, it was important that the discussion section included relevant issues such as the exploration of results as well as the presence or absence of bias in the data. Lastly, review articles were included if they explicitly showed a systematic search strategy, and were published in a peer reviewed journal.

### 2.4 Data Extraction and Data Analyses

The data extraction categories used and expanded on in this literature review is based on the categories used in a recent extensive literature review (Leiknes, Jarosh-von Schweder et al., 2012). The body of research was categorised according to continent of origin. Within each continent all relevant studies pertaining to ECT practice were reviewed whether hospital-

region-, or country- wide .The categories analysed and critically discussed in this literature review are as follows:

- Study design: study population, study tool, response rate, time period over which study occurred and response rates
- Infrastructure
- ECT supervision/ training and staffing parameters
- Format of information given pre-ECT
- Consent
- ECT utilization rates
- ECT parameters: modified versus unmodified
- Main indications for ECT, gender & age factors

## **2.5 Study Design: study population, study tool & response rates**

### **2.5.1 Europe**

Nineteen papers were identified with eight originating in the UK (Robertson, Freeman et al., 1997; Benbow, 1998; Duffett & Lelliott, 1998; Glen & Scott, 1999; Fergusson, Cullen et al., 2004; Blaj, Worrall et al., 2007; Okagbue, McIntosh et al., 2008; Eranti, Thirthalli et al., 2011), two publications originated from Norway (Jarosch-von Schweder, Lydersen et al., 2011; Jarosch-von Schweder, Wahlund et al., 2011) and from Belgium (Sienaert, Filip et al., 2005; Sienaert, Dierick et al., 2006) and one each from Hungary (Gazdag, Kocsis et al., 2004), Poland (Gazdag, Palinska et al., 2009), Bulgaria (Hranov, Hranov et al., 2012), Russia (Nelson, 2005), Turkey (Saatcioglu & Tomruk, 2008), Spain (Bertolin-Guillen, Peiro-Moreno et al., 2006) and the Netherlands (van Waarde, Verwey et al., 2009).

Information for the surveys was most commonly obtained via mailed questionnaires, but in some instances case note reviews and hospital visits were included. Response rates varied widely from 7.90% in Russia, 54% in Norway to 100% in Poland and Bulgaria.

### **2.5.2 North America:**

The review of North American literature on ECT utilization was limited to seven papers (McCall, Weiner et al., 1992; Farah & McCall, 1993; Creed, Froimson et al., 1995; Hermann, Dorwart et al., 1995; Scarano, Felthous et al., 2000; Sylvester, Mulsant et al., 2000; Prudic, Olfson et al., 2001). The studies were US state-localized, making it difficult to generalize findings to the entire United States. Only two studies attempted to survey the entire United States (Farah & McCall, 1993; Hermann, Dorwart et al., 1995) one of which included questionnaires to over 40 000 psychiatrists (Hermann, Dorwart et al., 1995).

### **2.5.3 Asia:**

Thirteen studies from Asia were identified for inclusion in this literature review. Much has been written about ECT in Asia, with the last survey being done by Chanpattana et al (2010). Questionnaires were posted to the appropriate clinician in hospitals in 45 countries where they were asked to discuss ECT practice in the preceding 24 months. Unfortunately the response rate was low at 34.20%, and it was thought that this was due to complex factors such as conflict in certain areas, limited use of the English language, and poor postal services in some regions. Another study (Little, 2003) sent questionnaires to 23 out of 34 identified (no contact details were available for 10 countries) countries in the Asia Pacific Region. The response rate to the questionnaire was less than 1%; questionnaires were sent to: Australia, Brunei, Cambodia, China, Fiji, Guam, Hong Kong, India, Kiribati, Japan, Malaysia, Marshall Islands, Micronesia, Nepal, New Caledonia, New Zealand, Palau, Papua New Guinea, Philippines, Singapore, Solomon Island, Thailand, and Vietnam. No contact details were found for Bangladesh, Bhutan, Burma, East Timor, Laos, Pakistan, Sri Lanka, Taiwan, Tonga, or Vanuatu. It was found that no ECT services were available in Brunei, Cambodia, Micronesia and Palau. Thirteen years prior, in 1990, Kramer et al surveyed Asia, where the author posted questionnaires to 100 physicians in 13 countries. It is not clear from the article how long the survey period was, but the response rate was 36% (Kramer & Pi, 1990).

Other countries where ECT practice was surveyed were India (Andrade, Agarwal et al., 1993), Japan (Ishimoto, Imakura et al., 2000; Motohashi, Awata et al., 2004; Chanpattana, Kojima et al., 2005), Thailand (Chanpattana & Kramer, 2004), Hong Kong (Chung, 2003; Chung, Ng et al., 2003) and Pakistan (Naqvi & Khan, 2005; Minhas & Ostroff, 2012). The study tools ranged from survey questionnaires to retrospective case reviews, the longest of which was 23 years at the Tokushima University Hospital in Japan (Ishimoto, Imakura et al., 2000). The response rates were high per individual country ranging from 42% to 100%. The case note reviews also produced a high yield of information, in that often more than 90% of case notes were recovered and reviewed.

### **2.5.4 Australia and New Zealand**

The three studies from Australia and one from New Zealand, involved both posted questionnaires as well as a review of a government database on ECT; questionnaires were posted not only to doctors, but also to ECT nurses. The studies looked at ECT in the entire Australia (Chanpattana, 2007), Western Australia (Teh, Xiao et al., 2005), Sydney (Lamont, Brunero et al., 2011), as well as in the country of New Zealand (Strachan, 2001). The response rates to the questionnaires were high ranging from 60-80% which is beneficial to the generalisation of results.

### **2.5.5 Africa**

Two papers were identified from Africa. The most relevant articles on ECT scope of practice came from South Africa and Malawi. In fact, the last ECT survey in South Africa was published in 1991; this study was a case note review of patients admitted for ECT in one hospital between 1976 and 1982 (Mugisha & Ovuga, 1991). The more recent published article from the continent of Africa looked at ECT practice in Malawi prior to the introduction of modified ECT (Selis, Kauye et al., 2008). It was a naturalistic prospective study where the author interviewed all patients receiving ECT and used the Clinical Global Impression of Change (CGI) to assess patient outcomes.

So to summarise, the most common study tools used were posted or e-mailed semi-structured survey questionnaires and retrospective case note reviews but there were two studies that based their findings or at least part thereof, on actual clinic visits (Duffett & Lelliott, 1998; Fergusson, Cullen et al., 2004). It is surprising that not more regions had used central data bases such as was the case in the USA (Scarano, Felthous et al., 2000) and Australia (Teh, Xiao et al., 2005), and the most likely explanation is that at the time of the study none existed.

In most cases, the responders were clinicians who lead ECT services, or at least administer ECT but there was an instance where a study directed the questionnaire to other members of the ECT team such as the ECT nursing staff (Creed, Froimson et al., 1995).

The response rates ranged significantly both within countries and between countries, with the lowest response rate (< 1%) for a study that attempted to survey the entire Asia Pacific region (Little, 2003), to 100% information recovery for some case note reviews.

## **2.6 Infrastructure**

The APA and the RCP guidelines generally state that ECT should be administered in a space where there is at least a treatment room and a separate recovery room (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001; Scott, 2005).

### **2.6.1 Europe**

In an audit done by Duffett and Elliot (1998), four private clinics in England and Wales were performing ECT in the patients' rooms as these clinics had no treatment or recovery room. Only 46% of facilities had recovery rooms. The researchers report in the conclusion to the article that only one third of units audited had actually met the requirements of the RCP. An earlier paper reviewing services in Scotland reported that 28 out of 31 units had ECT suites, with the 'vast majority' having separate recovery rooms (Robertson, Freeman et al., 1997).

The information from Bulgaria was limited, merely stating that there was a lack of ECT suites, but no clear comment on what type of facility was actually used (Hranov, Hranov et al., 2012). In Norway, the authors report that ECT was administered in operating theatres, treatment rooms at psychiatric wards, as well as in outpatient (OPD) departments of anaesthetics, surgery and ophthalmology. All facilities had recovery rooms (Jarosch-von Schweder, Wahlund et al., 2011). In the Flanders and Brussels Capital area of Belgium, most of the psychiatric hospitals that offered ECT had a separate ECT unit, however at two psychiatric hospitals ECT was performed in the patient's rooms (Sienaert, Filip et al., 2005). In Spain 45.67 % ( 95% CI 43.81-47.77%, n=108) of the units in a survey had ECT suites, but the authors made no comment on the presence of recovery rooms (Bertolin-Guillen, Peiro-Moreno et al., 2006). A paper from the Netherlands (van Waarde, Verwey et al., 2009) reported that 20 hospitals used operating rooms (61%), three used 'holding operating rooms' (9%), four units had a designated ECT suite (12%), and six units (18%) administered ECT in the recovery room ( i.e. the treatment room and recovery room was in the same space).

### **2.6.2 North America**

One paper from North America studied the infrastructure of ECT facilities. Of the 24 hospitals that offered ECT in North Carolina in 1992, there were 18 (75%) that used rooms in, or immediately adjacent to the operating room (OR) or the post-anaesthetic recovery unit (PACU), for both treatment and recovery (Creed, Froimson et al., 1995).

### **2.6.3 Asia**

A study surveying 66 units in India showed that 34 units had ECT suites, 12 used a "psychiatric unit" for ECT, nine units used an operating theatre, while one hospital reported using "any room" in a ward. Only 10 units reported having a recovery room (Chanpattana, Kunigiri et al., 2005). Two studies from Japan (Motohashi, Awata et al., 2004; Chanpattana, Kojima et al., 2005) and one from Thailand (Chanpattana & Kramer, 2004) report various venues being used for performing ECT, which included ECT suites, operating theatres, treatment rooms in the ward, the outpatient department of anaesthesiology, the patient's own room, as well as in the recovery room. In Hong Kong four of the eight public sector units surveyed, used a room that was partitioned with a wooden or plastic structure to provide a recovery space, while in 50% of private hospitals surveyed, ECT was administered in patients' rooms (Chung, Ng et al., 2003).

### **2.6.4 Australia**

Of the 113 hospitals surveyed by Chanpattana in Australia (2007), 49.5% had an ECT suite, 23.26% used an operating theatre, 15.17% had a recovery room and 1% used an anaesthetics

unit/day surgery to perform ECT. A study from a training hospital in Sydney reported that all ECT was performed in an operating theatre (Lamont, Brunero et al., 2011).

### **2.6.5 Africa**

The only relevant research pertaining to infrastructure came from Malawi where the author reported ECT being performed in a room where the treatment and recovery room was separated by a curtain (Selis, Kauye et al., 2008).

It would therefore appear that around the world, ECT infrastructure is not standardised. The trend appears to be that ECT is used in multiple-use spaces such as operating theatres, and even patients' own rooms in hospital. The concern in the latter would be the availability of resuscitation or other emergency equipment, if a medical emergency should arise.

## **2.7 ECT Supervision/ Training & Staffing Parameters**

### **2.7.1 Europe**

In 1998 Duffet and colleagues published a survey which included both posted questionnaires and audit visits (1998). They found that a consultant psychiatrist attended an ECT session on average every two to six months. It was noted that anaesthetics staff was always present and that in 42% (n=23) of the units, the senior nursing staff were "dual-trained". A study from Scotland reported in 1997, that 90% of clinics offered an ECT lecture of which 77% included a practical demonstration of ECT administration. At 74% of clinics new junior doctors had at least one supervised session of ECT administration prior to giving treatment on their own. Furthermore when nursing staff parameters were assessed, clinical staff at 45% of units were rotated from the ward to administer ECT, while 80% of clinics had dedicated ECT nurses (Robertson, Freeman et al., 1997). Fergusson and colleagues (2004) did bi-annual audits of 36 ECT sites in Scotland over three years, as part of their national audit system. They also assessed supervision of junior staff by questionnaire and direct interview: 81% of trainees that responded stated that they received initial supervision by a psychiatrist, and 98% received an induction demonstration of ECT. ECT nursing staff standards were deemed adequate since 52% of units had ECT nurses with protected time for ECT. There was a sufficient presence of nurses at all units during preparation (100%), during treatment (100%) and in the recovery unit (94%).

In Poland, the authors of a survey questionnaire study posted to all polish inpatient psychiatric facilities, stated that the training was poor and that the only educational material available at the time of the survey was a single text-book (Gazdag, Palinska et al., 2009). Similarly in Bulgaria, it was reported that training was lacking and that the only information

available in 2010 on ECT was from a textbook printed in 1985 (Hranov, Hranov et al., 2012).

Two studies originating from Norway reported that in 2010 no formal ECT training existed, but that ECT was performed by trainee psychiatrists under regular or occasional supervision in 94% of institutions (n=15). Of note is that ECT was also administered by a nurse in one institution (Jarosch-von Schweder, Lydersen et al., 2011; Jarosch-von Schweder, Wahlund et al., 2011). In the Netherlands, ECT was supervised by a consultant psychiatrist in 75% of institutions surveyed (van Waarde, Verwey et al., 2009).

### **2.7.2 North America**

The studies from North America (McCall, Weiner et al., 1992; Hermann, Dorwart et al., 1995; Scarano, Felthous et al., 2000; Sylvester, Mulsant et al., 2000) did not comment on training and supervision or staffing parameters.

### **2.7.3 Asia**

In India a 12-month survey of 66 units revealed that 61 units had a teaching programme for medical students and 44 units did so for psychiatry residents. However psychiatry residents were supervised by a consultant in four institutions and senior residents in three institutions. Anaesthetic doctors were present in 46 units and were assisted by various staff members, ranging from nurses, psychiatry technicians, to “ward boys” (Chanpattana, Kunigiri et al., 2005). An Asia-wide survey of 45 countries reported that there was no formal training in any of the hospitals that responded and that ECT was often unsupervised and sometimes performed by nursing staff (Chanpattana, Kramer et al., 2010). Further reports state that anaesthetic doctors were often not present and that in some institutions the anaesthetic component was performed by the psychiatrist (Kramer & Pi, 1990; Chanpattana, Kramer et al., 2010).

In Japan, none of the institutions surveyed required specific training for psychiatrists prior to them performing ECT. In terms of teaching, 63 of the 83 units provided teaching to medical students, while 65 hospitals reported teaching modules for psychiatry residents. All institutions (n=83) reported the presence of a psychiatric consultant at all ECT sessions. Anaesthetists were present at 77% (n=64) of institutions. With regard to nursing needs, once again various ranks of nursing staff were used and this included registered nurses, nursing aids, anaesthetists unit nurses and psychiatry technicians (Chanpattana, Kojima et al., 2005). In a study done in Thailand, teaching was limited in that only five out of 26 units had an acceptable teaching programme (i.e. instructing another resident or senior resident on how to operate the ECT machine) for psychiatry residents; none had a training syllabus and two institutions had a teaching schedule for medical students (Chanpattana & Kramer, 2004).

In Hong Kong 25% of institutions (n=8) provided ECT training which was described as “informal briefing”. Thereafter the trainee was given one supervised session and then allowed to give treatment on his/her own (Chung, Ng et al., 2003). In the surveys from Pakistan, no comment was made about training, but public sector ECT was administered by post graduate trainees (assisted by a house officer), and in the private sector by consultant psychiatrists. (Naqvi & Khan, 2005; Minhas & Ostroff, 2012).

#### **2.7.4 Australia**

The studies from Australia indicate that training for ECT was present, with more than 70% of units providing teaching to both undergraduate and postgraduate students (Chanpattana, 2007; Lamont, Brunero et al., 2011). In fact, in a teaching hospital in Sydney all registrars received a two day induction for ECT, with six monthly orientations thereafter (Lamont, Brunero et al., 2011).

#### **2.7.5 Africa**

The only relevant article on staffing came from Malawi, where the authors reported that ECT was performed by a psychiatric clinical officer, assisted by a nurse (Selis, Kauye et al., 2008). The training requirements were not studied or discussed.

### **2.8 Format of Information given pre-ECT**

The provision of information is a vital part of the informed consent process (UN General Assembly, 1966). It is used as a basis for the patient and/or the family or others, to make his/her decision about the potential treatment he/she is about to receive. Information can be given in various formats: mainly written, visual or oral. Five of the 46 studies included in this literature review, commented on form of information delivery.

One study from the UK (Blaj, Worrall et al., 2007) reported that 68% of the psychiatrists that responded (n=187) gave written information about ECT while the rest gave oral information to the patient and their families. In a training hospital in Turkey, an explanation on the risks and benefits of the procedure was part of the consent process (Saatcioglu & Tomruk, 2008). In Norway (Jarosch-von Schweder, Wahlund et al., 2011) 94% (n=15) of units gave written information, while oral information was given in all hospitals (n=16) surveyed. A study done in Belgium revealed that brochures were given to patients and their family members in 40.8% (n=13) of cases, while four hospitals (12.5%) made use of video material (Sienaert, Dierick et al., 2006).

In New Zealand (Strachan, 2001) 90% (n=166) of doctors at the institutions gave written information to the patient, while 66% (n=121) gave written information to the family.

## **2.9 Consent**

Consent is an integral part of preparing patients for a medical procedure (UN General Assembly, 1966) and ECT is no different. Informed consent refers to the idea that the individual is fully informed of a procedure, including the risks, benefits and alternative treatments if available (National Health Act No 61 of 2003, 2004). This will allow the patient, if he/she has capacity, to make an informed decision about having a procedure. If a patient is incapacitated, the decision for a procedure would default to the next-of-kin, the head of a health establishment (HOH), or the courts subject to the requirements of the legal system of the country (Kaliski, 2006).

### **2.9.1 Europe**

In two studies from the UK, ECT was administered to capacitated and incapacitated patients. It was reported that consent processes were followed appropriately (Duffett & Lelliott, 1998; Fergusson, Cullen et al., 2004). In Poland the authors of a paper noted that patients gave written informed consent; however, when an incapacitated patient needed ECT, the courts gave approval (Gazdag, Palinska et al., 2009). In Bulgaria, the same rule of informed consent applied, but if a patient was incapacitated the relatives were allowed to give consent (Hranov, Hranov et al., 2012). In Norway oral consent was legally sufficient, but a survey reported that written informed consent was obtained in 8 (50%) of institutions, occasional written consent in three institutions (19%), while oral consent was obtained in the rest (Jarosch-von Schweder, Wahlund et al., 2011). In a retrospective case note review done in a hospital in Turkey, the authors reported that all patients or their families signed informed consent with the consent process involving an explanation of all the risks and benefits associated with ECT (Saatcioglu & Tomruk, 2008). Despite the fact that the use of informed consent is a legal obligation in Belgium, a survey in 2006 reported that only 43.8% of institutions used an “informed consent document”, while 53.1% did not (Sienaert, Dierick et al., 2006). A survey from Spain reported that informed consent was obtained in 98.73 % (95% CI 98.46-99.01%) of institutions (n=108) (Bertolin-Guillen, Peiro-Moreno et al., 2006).

### **2.9.2 North America**

A study from North Carolina in the USA reported that all patients’ ability to give informed consent was assessed appropriately (McCall, Weiner et al., 1992). No further information was available.

### **2.9.3 Asia**

Nine studies from Asia reported on informed consent issues: the majority of studies reported that informed consent was sought (Kramer & Pi, 1990; Ishimoto, Imakura et al., 2000;

Chung, 2003; Chanpattana & Kramer, 2004; Motohashi, Awata et al., 2004; Chanpattana, Kojima et al., 2005; Chanpattana, Kunigiri et al., 2005; Naqvi & Khan, 2005; Chanpattana, Kramer et al., 2010), however a survey in 2010 of 45 Asian countries reported that no informed consent was obtained from patients in China, India, Iran, Thailand or Vietnam (Chanpattana, Kramer et al., 2010).

#### **2.9.4 Australia**

Studies from Australia and New Zealand report the norm of obtaining written informed consent from the patient with capacity; alternatively consent from the family was obtained when the patient was incapacitated (Strachan, 2001; Chanpattana, 2007; Lamont, Brunero et al., 2011).

#### **2.9.5 Africa**

In Malawi, the authors reported that in 2006 consent was not routinely asked, and most patients were given ECT without written consent (Selis, Kauye et al., 2008).

In summary, informed consent is reasonably formalised and adhered to in Europe, North America and Australia, but still needed firmer establishment in some countries in Asia and Africa. The exception would be Norway, where oral consent is reported as being sufficient, as well as Belgium where written informed consent was not obtained in the majority of units surveyed.

#### **2.10 ECT Utilization Rates**

The number of persons treated with ECT in a population is an important figure in that it gives the reader an idea of how frequently ECT is administered by health services. Studies from across the globe have used various methods of reporting utilization (i.e. rate of ECT use), and are therefore often difficult to compare. So for example, some authors have used the term Treatment Person Rate or TPR to describe the number of patients that have received ECT over a specific time period usually a 12 month period (Leiknes, Jarosh-von Schweder et al., 2012). The frequency of use of ECT can however also refer to the number of ECT procedures performed in a unit or a geographical area over a 12 month period, called the ECT Administration Rate (EAR) (Leiknes, Jarosh-von Schweder et al., 2012). Studies have used the denominator 'per 10 000 population per year (ppy)' or 'per 100 000 ppy', and have thus attempted to provide a means of comparison. The difficulty though lies in the fact that this nomenclature is used irrespective of whether ECT rates were measured in one particular hospital, in one or two provinces, or an entire country, so therefore one would appropriately question the validity of such a comparison. However, as this is the only data available, it

would need to suffice but one should keep this shortcoming in mind when viewing comparative treatment rates.

Please note below the formulas used when calculating the ‘per 10 000 population per year’ (ppy) figures.

**Treatment Persons Rate (TPR):**

$$\frac{\text{The number of person treated with ECT in 12 months X 10 000}}{\text{population at time of survey}}$$

**ECT Administration Rate (EAR):**

$$\frac{\text{The number of ECT procedures in 12 months X 10 000}}{\text{population at time of survey}}$$

**2.10.1 Europe**

In a study that compared ECT treatment for depression in university hospitals in Bengaluru, India and London, UK, the authors noted that the rate of ECT referral was 8.2% and 0.9% of the total annual general admissions respectively (Eranti, Thirthalli et al., 2011). The authors concluded that the substantial difference in ECT use may have been due to the stricter guidelines from the UK regulatory boards, thereby restricting its use (National Institute for Health and Care Excellence, 2003; Scott, 2005), and possibly also the on-going public stigma associated with ECT. However they recommended that more research be done to understand the possible cultural and socio-economic context.

Four important studies had come from Scotland (Robertson, Freeman et al., 1997; Glen & Scott, 1999; Fergusson, Cullen et al., 2004; Okagbue, McIntosh et al., 2008). Figures from a 1997 paper show the TPR to be at 4.84 persons per 10 000 population per year (ppy) and EAR at 2.9 ECT treatments per 1 000 ppy (or 29 ECT treatments per 10 000 ppy) (Robertson, Freeman et al.). In 1999, researchers based at the Royal Edinburgh hospital published their findings of a five-year retrospective case note review (Glen & Scott, 1999). They found a substantial difference in the ECT administration rate in both the elderly and the adult population between 1992 and 1997. In 1992 and 1997 the older persons (> 65 years) TPR were 10.26 per 10 000 ppy and 6.11 per 10 000 ppy respectively. A similar trend was seen in the adult population (a reduction from 3.44 per 10 000 ppy to 1.33 per 10 000 ppy in the same time period). The authors also reported on the drop in the EAR from 28.5 procedures per 10 000 ppy in 1992 to 16.5 per 10 000 ppy in 1997. They stated that this

study served to confirm the impression that the rate of ECT had fallen, and that ECT was nevertheless still used more frequently in the older person population. It must be noted that the results were based only on the findings in one hospital in Edinburgh. Fergusson et al did a country-wide study visiting 36 clinics in Scotland bi-annually for three years as part of a national audit, and reported that ECT was given at a rate of 142 treatments per 100 000 ppy (i.e. an EAR of 14.2 treatments per 10 000 ppy) (2004).

A 13-year case note review of hospitals in the City of Edinburgh from 1993 to 2005 show that the usage of ECT had declined by 40% over this time period (Okagbue, McIntosh et al., 2008). The impetus for the study was to determine whether the introduction of the National Institute for Health and Care Excellence (NICE) guidelines in 2003 (National Institute for Health and Care Excellence, 2003) had affected the administration of ECT. The authors concluded that the downswing was not directly related to the guidelines; nevertheless a longer time of assessment would be needed before a trend could be noticed.

In central Europe the trends appear to be different, with far fewer people receiving ECT as a treatment modality. Gazdag and colleagues did a nationwide questionnaire survey of Hungary, the land of origin of convulsive therapy (Gazdag, Bitter et al., 2009) and found a TPR of 0.31 (Gazdag, Kocsis et al., 2004). Similarly the rates of ECT in countries like Russia (Nelson, 2005), Poland (Gazdag, Palinska et al., 2009), Spain (Bertolin-Guillen, Peiro-Moreno et al., 2006), and Bulgaria (Hranov, Hranov et al., 2012) are all under 1 person per 10 000 ppy. The authors cited various reasons for this low rate, which ranged from changes in legislation making anaesthetic support compulsory and thus incurring extra costs (Gazdag, Kocsis et al., 2004; Gazdag, Palinska et al., 2009; Hranov, Hranov et al., 2012); lack of provision of ECT as a medical procedure (Gazdag, Palinska et al., 2009); poor accessibility to service (Hranov, Hranov et al., 2012); negative attitudes (Gazdag, Kocsis et al., 2004; Gazdag, Palinska et al., 2009; Hranov, Hranov et al., 2012); lack of funding (Hranov, Hranov et al., 2012); lack of ECT suites (Hranov, Hranov et al., 2012), lack of ECT training (Hranov, Hranov et al., 2012), to lack of awareness of modern ECT techniques (Nelson, 2005).

The ECT use in a hospital in Istanbul, Turkey - as reported from an 18-month retrospective case note review - was that 12.4% of psychiatric inpatients received the treatment and that 13618 sessions were given to 1531 patients. The authors stated that the rate had decreased over the last few years, but was still higher than in the USA or certain Asia Pacific countries. The reasons given for the high rates were inadequate use of beds, treatment resistance conditions and excessive psychiatric admissions (Saatcioglu & Tomruk, 2008).

The two studies originating in Belgium reported that 43% of twenty-three ECT-administering hospitals in the Flanders-Brussels Capital Region administered fewer than 10 ECT procedures per month (Sienaert, Filip et al., 2005), while the EAR for the country of Belgium was 4.37 treatments per 10 000 ppy (Sienaert, Dierick et al., 2006). The authors concluded that ECT is widely available in Belgium but despite this, remained underutilised. A questionnaire survey sent to all lead ECT psychiatrists in the Netherlands revealed a modest EAR of 8.5 per 10 000 population per year, but gave no measure of persons treated per year (van Waarde, Verwey et al., 2009).

In 2011 Jarosch-Von Schweder and colleagues sent out a 43-item questionnaire to all heads of departments (HODs) of Psychiatric Hospitals, District Psychiatric Hospitals and Child & Adolescent units. The TPR was measured at 2.4 persons per 10 000 ppy (varying from 1.83 to 3.44 between regions), more than two-fold higher than the rest of Europe (with the exception of the UK) (Jarosch-von Schweder, Lydersen et al., 2011). The researchers concluded that where ECT is available, it was used frequently, but that the capacity to provide ECT was still low with patients often having to wait for one month or more for treatment.

### **2.10.2 North America**

A 1988 USA study once again showed a huge variance in the frequency of ECT treatment ranging from 0.4 to 81.2 per 10 000 ppy with the mean nationwide rate reported as 4.9 per 10 000 ppy (Hermann, Dorwart et al., 1995). As mentioned in a previous section, the rest of the studies from the USA were either hospital- or state-based and reported actual patient numbers per hospital and so are difficult to generalise (McCall, Weiner et al., 1992; Creed, Froimson et al., 1995; Scarano, Felthous et al., 2000; Prudic, Olfson et al., 2001). A retrospective 10-year case note review of ECT at a hospital in south western Pennsylvania showed a surprisingly low rate of 21 persons treated with ECT in 10 years, representing 0.4% of all admissions to this state hospital (Sylvester, Mulsant et al., 2000).

### **2.10.3 Asia**

A posted survey questionnaire to teaching hospitals in India (Chanpattana, Kunigiri et al., 2005) showed in 2001, that 19 632 patients received ECT treatments in the 12-month survey period of 60 institutions. The calculated TPR was 0.2 per 10 000 ppy while the EAR was 1.03 per 10 000 ppy. The same author surveyed Japan and found that 1 210 patients received ECT in 24 months with 11 146 treatments given in that time period (Chanpattana, Kojima et al., 2005). The 12 month TPR and EAR was thus calculated at 0.1 per 10 000 ppy and 0.44 per 10 000 ppy respectively. In 2001 the TPR for Thailand was 1.115 per 10 000 ppy (Chanpattana & Kramer, 2004) while in Hong Kong (Chung, 2003) it was 0.27 per 10 000

ppy. A 13-year retrospective case review from 1990 to 2003 at the Aga Khan University Hospital in Pakistan (Naqvi & Khan, 2005) showed that 136 patients received ECT resulting in a yearly rate of 10.5 patients per year.

#### 2.10.4 Australia and New Zealand

In 2007 a country-wide Australian survey reported a TPR of 3.9 per 10 000 ppy. This survey (Chanpattana, 2007) had a good response rate of 83% making it more likely to be a reasonable estimation of the rate of use of ECT in Australia.

#### 2.10.5 Africa

Most of the studies from Africa were excluded as they were either too dated (Ihezue & Ebigbo, 1981), or were based on qualitative data investigating attitudes and knowledge about ECT (James, Omoaregba et al., 2009; James, Lawani et al., 2010; James, Morakinyo et al., 2010). A two-month audit at Zomba Hospital in Malawi indicated that 47 patients had received ECT in that time period (Selis, Kauye et al., 2008). The only study from South Africa was from a psychiatric hospital in the province of the Eastern Cape (Mugisha & Ovuga, 1991). The authors reported that during the 6 years of the hospitals existence 387 patients had received ECT. The treatment trend was downward with 32 % of inpatients receiving ECT in 1976 and only 6 % at the time of hospital's closure in 1982.

Table 1 and Table 2 summarise the global TPR and EAR where available.

It can reasonably be concluded that high-income countries are treating patients with ECT more frequently. Thailand is noted to have a higher rate of ECT use compared to other Asian countries- the author reported that the explanation for this was a limited budget for mental health care and psychotropic medication thus using ECT as a more cost-effective treatment (Chanpattana & Kramer, 2004).

**Table 1: Treated Persons per 10 000 ppy (TPR)**

Country	Author	Period of Data Collection	TPR
USA	Hermann et al	1988/1989	4.9
Scotland	Robertson et al	Not stated in study	4.8
Australia	Chanpattana et al	2002-2004	3.9
Norway	Jarosch-Von Schweder et al	2005	2.4
Thailand	Chanpattana et al	2001/2002	1.1
Spain	Bertolin-Guillen et al	2000/2001	0.6
Russia	Nelson	2004	0.5
Hungary	Gazdag et al	2002	0.3
Hong Kong	Chung et al	2001/2002	0.3
India	Chanpattana et al	2001/2002	0.2*
Bulgaria	Hranov et al	2010	0.2

Malawi	Selis et al	2006	0.2*
Poland	Gazdag et al	2005	0.1
Japan	Chanpattana et al	2001-2003	0.1*

\* Author's calculation from available data

**Table 2: Number of ECT procedures per 10 000 ppy (EAR)**

Country	Author	Period of Data Collection	EAR
Scotland	Robertson et al	not stated in the study	29.2
Scotland	Fergusson et al	1997-1999	14.2
Netherlands	Van Waarde et al	2008	8.5
Belgium	Sinaert et al	2003/2004	4.4
Hong Kong	Chung et al	2001/2002	2.05
India	Chanpattana et al	2001/2002	1.03*
Japan	Chanpattana et al	2001-2003	0.44*

\* Author's calculation from available data

### 2.11 Modified versus Unmodified ECT

ECT in its more modern form involves the patient being anaesthetised, oxygenated and muscle relaxants administered, so neither the pain of the stimulus nor the discomfort associated with a spontaneous seizure is experienced (Fink, 2009). The use of modified ECT is recommended by most guidelines (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001; National Institute for Health and Care Excellence, 2003; Scott, 2005; Department of Health Republic of South Africa, 2009) however some studies have shown that ECT is still administered in an unmodified way (i.e. without anaesthesia and/or muscle relaxant).

Most countries offer modified treatment with a few exceptions: In Europe, Russia uses modified ECT in less than 20% of their units. In some institutions an anaesthetist is on stand-by to manage the complications of unmodified ECT rather than to anaesthetise the patient. The author suggests that the on-going use of unmodified ECT is related to 'traditionalism' and poor education on the part of the psychiatric fraternity (Nelson, 2005). In Spain 2.29 % of patients did not receive muscle relaxants and 0.6% did not receive general anaesthetic (Bertolin-Guillen, Peiro-Moreno et al., 2006). No clear reason was given for this.

Surveys in India show that unmodified ECT had been administered to the vast majority of patients (68%) in 1993 (Andrade, Agarwal et al., 1993), but by 2001 this number reduced to 54% (Chanpattana, Kunigiri et al., 2005). In an Asian survey only 45.1% of institutions used modified ECT (Chanpattana, Kramer et al., 2010). More specifically Japanese psychiatric units only offered modified ECT to 55.4% of its patients in 2003 (Chanpattana, Kojima et

al., 2005), while in Thailand 61,5 % of public units still used unmodified methods (Chanpattana & Kramer, 2004). Results from a tertiary university hospital in Pakistan reflect that unmodified ECT is used most of the time except when a medical complication makes the procedure too risky (Minhas & Ostroff, 2012). In both studies from Africa, unmodified ECT was administered as matter of routine (Mugisha & Ovuga, 1991; Selis, Kauye et al., 2008). However Selis et al (Selis, Kauye et al., 2008) stated that by 2008, all unmodified ECT was stopped in Malawi.

The reasons for application of unmodified ECT are usually cited as being due to lack of anaesthetic staff, poor education, and lack of equipment, and quicker mode of administration.

### **2.12 Indications, Gender & Age**

Table 3 below is a summary of the most frequent diagnosis, gender and age groups from publications that reported on this.

University of Cape Town

Table 3: Most frequent diagnosis, gender &amp; age

Country/City	Author	Year	Most frequent diagnosis for ECT	Most frequent gender	Most frequent mean age
NW England	Benbow et al	1998	Depression	n/s	n/s
Bengaluru & London	Erranti et al	2011	Bengaluru: Schizophrenia 40.7%, London: Depression 89.1%	Bengaluru: males 48.8%, London: females 69.6%	Bengaluru: 30.3±10.4 yrs. London site: 62.8±16.0 yrs
Scotland	Fergusson et al	1997-1999	Depression 87%	Female 70%	67-74 years: 13.6%
Hungary	Gazdag et al	2002	Schizophrenia & psychosis 40.4%	Female 59%	n/s
Poland	Gazdag et al	2005	Depression	Female 65%	n/s
Bulgaria	Hranov et al	2010	Depression	Female 63%	n/s
Norway	Jarosch-von Schweder et al	2005	Depression 70%	Female 66%	> 64 years 55%
Turkey	Saatcioglu et al	2006/2007	BPAD Mania 30.3%	Male 55.8%	25-55 years: 64.7%
Belgium	Sinaert et al	2003/2004	Depression 80.9%	n/s	n/s
Spain	Bertolin-Guillen et al	2000/2001	Depression 90.2%	n/s	n/s
New York City, USA	Prudic et al	1996	Depression 85 %	n/s	> 60 years: 54.3%
Texas, USA	Scarano et al	1993-1997	Depression 93%	Female 68.7%	66-80 years 32.5%
Hospital: Pennsylvania, USA	Sylvester et al	1986-1995	Depression	Female 71%	> 60 years 59%
Hospital: North Carolina, USA	McCall	1989-1990	Depression	Females 60.98%	mean age 44.3 ± 15 yrs range 19-75
India	Chanpattana et al	2001/2002	Schizophrenia 36.5%	M:F ratio = 1.56:1	45-64 years 43.9%
Asia	Chanpattana et al	2001-2003	Schizophrenia 41.8%	M:F ratio = 1.56:1	25-44 years 43.6%
Asia Pacific Region	Little	2000	Schizophrenia 68%	n/s	n/s
Japan	Chanpattana et al	2001-2003	Schizophrenia 48.9%	Female 53.7%	45-64 years 40.4%, > 65 years 39.3%
Hospital: Japan	Ishimoto et al	1975-1997	Schizophrenia	Females 51.4%	mean age 27.53 ± 8.8 years range 18-59
Japan	Motohashi et al	1997-1999	Depression	n/s	n/s
Thailand	Chanpattana et al	2001/2002	Schizophrenia 74%	Males 72.4%	25-44 years 53.1%
Hong Kong	Chung et al	1997-2002	Depression 40%	Females 68%	25-44 years 44%
Hospital: Pakistan	Minhaus et al	2000-2008	Depression 60.8%	Males 53.3%	mean age 34.89 SD 14.27 range 15-89
Hospital: Pakistan	Naqvi et al	1990-2003	Depression 69%	Females 56%	20-40 years 48%
Australia	Chanpattana et al	1997- 2001	Depression 82.4%	Females 63.4%	> 65 years 38.4%
Western Australia	TEH et al	1997- 2001	Affective psychosis 42.90%	Females 64.9%	19-64 years 70.7%
Hospital: Australia	Lamont et al	2008	Depression 67.4%	Females 71%	n/s
Hospital: South africa	Mugisha et al	1976-1982	Schizophrenia 64%	n/s	mean age 30.7 ± 9.9 years
Hospital: Malawi	Selis et al	2 months in 2006	Postpartum psychosis 22%	Males 51.1%	age range from 17-37 years

A summary of what authors report as the most frequent indication for ECT is depicted below in Table 4. Of the publications that reported on indications for ECT: eight in Europe, four in North America, four in Asia and two in Australia state that depression is the most frequent indication. One in Europe, seven in Asia, one in Australia and two publications in Africa report that psychosis is the main indication. Mania is reported as the main indication for ECT in one study from Europe. Because of the varied method of reporting on indications by the authors, and because some studies reported on hospital based indications rather than country-wide indications, it was not possible to tabulate numbers or percentages of patients per diagnosis.

Six publications from Europe, three from the USA, four from Asia, and three from Australia reported that more women received ECT than men. One publication from Europe, five from Asia and one from Malawi, Africa indicated that more males received ECT than females. See Table 5 below.

It was difficult to categorise the age data as different researchers used different categories. However there was a trend towards older people (i.e. more than 60 years old) receiving ECT as a treatment in Europe, North America and Australia as compared to a younger population in Africa and Asia.

**Table 4: Most frequent indication for ECT by study**

	Continent				
	Europe	North America	Asia	Australia	Africa
<b>Depression</b>	(Benbow, 1998; Fergusson, Cullen et al., 2004; Bertolin-Guillen, Peiro-Moreno et al., 2006; Sienaert, Dierick et al., 2006; Gazdag, Palinska et al., 2009; Eranti, Thirthalli et al., 2011; Jarosch-von Schweder, Lydersen et al., 2011; Hranov, Hranov et al., 2012)	(McCall, Weiner et al., 1992; Scarano, Felthous et al., 2000; Sylvester, Mulsant et al., 2000; Prudic, Olfson et al., 2001)	(Chung, 2003; Motohashi, Awata et al., 2004; Naqvi & Khan, 2005; Minhas & Ostroff, 2012)	(Chanpattana, 2007; Lamont, Brunero et al., 2011)	
<b>Schizophrenia &amp; Psychosis</b>	(Gazdag, Kocsis et al., 2004)		(Ishimoto, Imakura et al., 2000; Little, 2003; Chanpattana & Kramer, 2004; Chanpattana, Kojima et al., 2005; Chanpattana, Kunigiri et al., 2005; Chanpattana, Kramer et al., 2010; Eranti, Thirthalli et al., 2011)	(Teh, Xiao et al., 2005)	(Mugisha & Ovuga, 1991; Selis, Kauye et al., 2008)
<b>Mania</b>	(Saatcioglu & Tomruk, 2008)				

**Table 5: Most frequent gender by study**

	Continent				
	Europe	North America	Asia	Australia	Africa
<b>Female</b>	(Fergusson, Cullen et al., 2004; Gazdag, Kocsis et al., 2004; Gazdag, Palinska et al., 2009; Eranti, Thirthalli et al., 2011; Jarosch-von Schweder, Lydersen et al., 2011; Hranov, Hranov et al., 2012)	(McCall, Weiner et al., 1992; Scarano, Felthous et al., 2000; Sylvester, Mulsant et al., 2000)	(Ishimoto, Imakura et al., 2000; Chung, 2003; Chanpattana, Kojima et al., 2005; Naqvi & Khan, 2005)	(Teh, Xiao et al., 2005; Chanpattana, 2007; Lamont, Brunero et al., 2011)	
<b>Male</b>	(Saatcioglu & Tomruk, 2008)		(Chanpattana & Kramer, 2004; Chanpattana, Kunigiri et al., 2005; Chanpattana, Kramer et al., 2010; Eranti, Thirthalli et al., 2011; Minhas & Ostroff, 2012)		(Selis, Kauye et al., 2008)

### 2.13 Areas for Further Study

In 2011 South Africa had a population of 52 million, and is divided into nine provinces (Statistics South Africa, 2011). Based on the 2011 World Bank criteria, South Africa is an 'upper middle -income country' with a gross domestic product (GDP) per capita of \$3.689 (The World Bank, 2011). According to the recent South African Survey on Health (SASH) study, the lifetime prevalence for any common mental disorder (defined as depression, anxiety and substance abuse) is 30.3%, while the 12 month prevalence is at 16.5% (Herman, Stein et al., 2009). A study by Lund et al documenting current state mental health services in

South Africa, showed 0.28 psychiatrists per 100 000 population, and huge variations in mental health service provision between provinces (Lund, Kleintjes et al., 2009). Unpublished data from a survey of psychiatrists in South Africa report the total number of psychiatrists registered with the Health Professions Council of South Africa (HPCSA) at 1.29 per 100 000 population (Bentley, 2010).

In 2009, the department of Health compiled a set of basic guidelines which was intended to guide ECT practice in South Africa (Department of Health Republic of South Africa, 2009). To date there has been no published survey of ECT practice in South Africa. As discussed in the previous section, a retrospective study of ECT practice was conducted at a local psychiatric hospital in the Eastern Cape 22 years ago (Mugisha & Ovuga, 1991). Other local ECT-related literature is limited to a case report of ECT in an adolescent patient (Segal, Szabo et al., 2004), literature reviews (Prinsloo & Pretorius, 2004; Segal, 2004), and a review about ECT consent procedures (Segal & Thom, 2006). There is therefore a significant absence of information on the extent of ECT practice and its characteristics in South Africa compared to other parts of the world.

### **3 Research Design and Methodology**

#### **3.1 Study Design**

This is a quantitative descriptive study using a survey questionnaire to determine and describe the characteristics of ECT practice in South Africa. Descriptive studies are a type of quantitative, epidemiological research design in which the researcher acquires information or characteristics about a specific field of study or situation (Leedy & Ormrod, 2005). This study design is most suited for this research, as very little is known about the characteristics of ECT practice in South Africa currently.

#### **3.2 Population and Sampling**

##### **3.2.1 Population**

The population consisted of psychiatrists and psychiatric nurses who were affiliated to the ECT service of each hospital. Because the target population in this field of expertise was known to be small, it was decided that the entire population was to be included in the survey. The sampling frame therefore consisted of all ECT-affiliated psychiatrists and nurses of all public psychiatric and tertiary hospitals in the nine provinces of South Africa, as well as all private facilities where ECT is performed. Military hospitals and mining hospitals were not included in the sample.

##### **3.2.2 Sampling Method**

A purposive sampling method was used in that specific people (i.e. ECT-related staff) were targeted for this study. As is common in some developing countries, no accessible pre-set sampling frame (i.e. central database of ECT-affiliated facilities) was available in South Africa (Rossouw, 2000).

A list of all public sector tertiary hospitals and specialised psychiatric hospitals was obtained from the appropriate Government Notice (National Health Care Act No 61 of 2003 Regulation, 2012). Furthermore a list of all private sector hospitals offering a mental health service was obtained by searching the Internet. Either telephone or e-mail contact was made with these hospitals to ascertain if an ECT service is offered. An inventory was made of all public and private psychiatric services in South Africa offering ECT as a treatment modality.

##### **3.2.2.1 Phase 1: Authorisation for the Study**

Public sector:

Authorisation was requested from all provincial HODs/ Provincial Health research committees.

Private sector:

Permission was sought from all the large private hospital groups known to offer psychiatric services. Furthermore, CEOs of individual psychiatric hospitals were approached for formal permission.

### 3.2.2.2 Phase 2: Establishment of Inventory

Public sector:

Once permission at provincial level was obtained, contact was made with academic psychiatric HODs of all medical schools, to inquire about where ECT was performed at the academic hospitals. Once guidance was given on where ECT services were based, all specialised psychiatric hospitals, and academic hospitals affiliated with psychiatric service were contacted, and asked to confirm whether or not there was an ECT machine on site. If there was an ECT machine on site, it was further established whether the machine had been actively used in the last 12 months. Subsequently the identified lead ECT clinician was contacted via e-mail requesting completion of the survey questionnaire.

Private sector:

Once authorisation was given, contact was made with each hospital offering psychiatric services to ascertain whether an ECT machine was on site or not, and whether ECT services have been active in the last 12 months. Thereafter, questionnaires were sent to the ECT doctors involved, and if applicable, to the relevant ECT nursing staff member.

### **3.3 Survey Questionnaire- Phase 3**

Survey questionnaires are a useful research instrument in descriptive studies to assess knowledge, attitudes and views of a specific population (Leedy & Ormrod, 2005). The information gathered can ultimately inform service provision and planning. This form of data collection was chosen for this study as it is cost effective, easy to administer and eliminated the cost of stationary, administration and postage. The distribution mechanism was via the Internet e-mail system .which was chosen by the researcher as it was reasonable to assume that all potential respondents had Internet access and e-mailing facilities, either at their residence or at the hospital to which the respondent was affiliated. Furthermore, it presented the respondent with the ease of completing the document on-line and directly returning it to the researcher, rather than the tedious method of posting back the questionnaire via postal mail services. Some clinicians however chose to return the response via fax, while one completed the questionnaire telephonically, and another requested a face-to-face interview.

The survey was sent out over a 6-month period from June 2012 to November 2012 and included a question asking respondents to report on the number of patients treated in the

previous 12 months. During this time period, non-responders were sent reminders by e-mail after four weeks; at least three such reminders were sent out. If after the reminder still no response was forthcoming, an alternative clinician was invited to participate.

The 36-item questionnaire consisted of various sections that provided information on the: (refer to Appendix A):

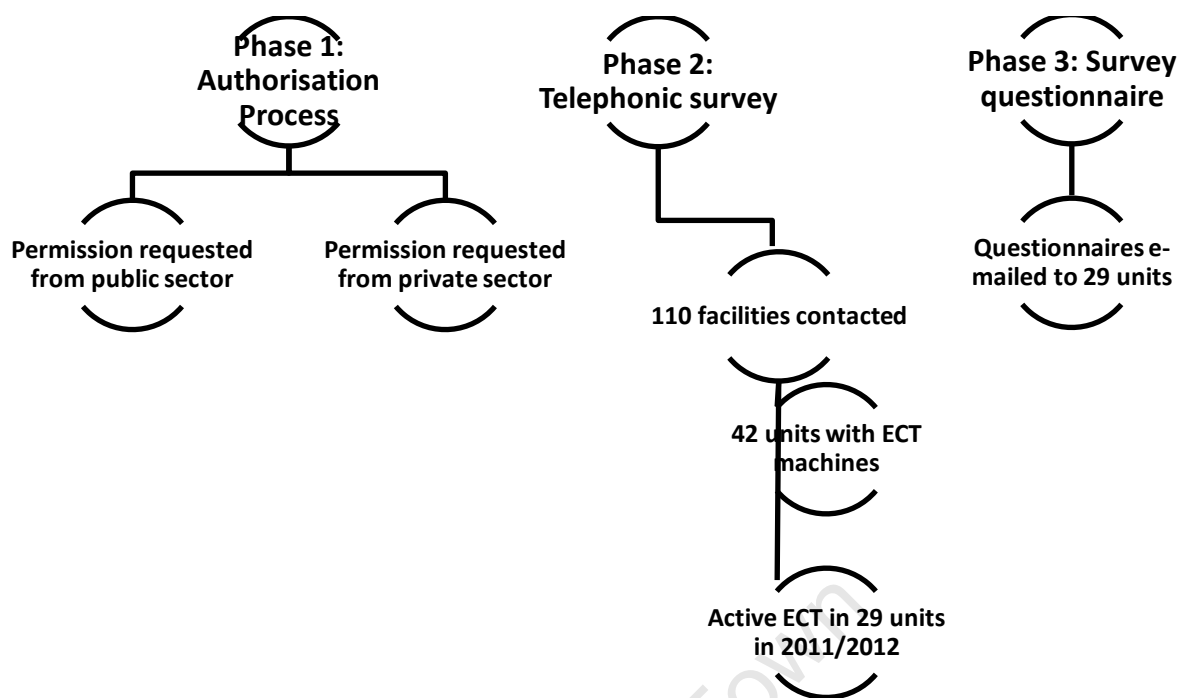
- characteristics of the institution and ECT practitioner (use and level of expertise).
- ECT utilization rates: Each unit would report on the number of patients treated in the previous 12 months.
- support and services available (infrastructure, staffing, inpatient and outpatient services)
- technical aspects of ECT (characteristics of the ECT device, use of dose strategies, frequency of ECT, use of anaesthesia, electrode placement)
- clinical practice of ECT (anaesthetic and clinical work up, indications for use, monitoring tools)

An introduction letter (Appendix B) and information sheet (Appendix C) accompanied the questionnaire to explain the goals and objectives of the research project. As per international guidelines (World Medical Association, 2008), a consent document (Appendix D) was also part of the electronic dossier.

In summary then, the study consisted of three phases:

- The initial phase involved obtaining permission from various regulatory bodies to conduct the study.
- Phase 2 involved making telephonic contact with each tertiary and specialist psychiatric hospital- both public and private- to ascertain whether an ECT machine was present on site (this was regardless of whether the machine was actively used or not).
- In Phase 3 a survey questionnaire was sent out and the data was collected.

A diagram of the process involving the three phases is shown in Figure 2 below



**Figure 2: Methodology**

### 3.4 Data Analysis

The analysis of any data “entails categorising, ordering, manipulating and summarising the data and describing them in meaningful terms” (Brink, Van der Walt et al., 2006). Once the completed questionnaires were returned, the answers were captured and coded. Statistical analysis was performed using the Statistical Package for the Social Sciences for Windows SPSS version 21 (IBM Corp., 2012).

This study used descriptive statistics such as frequency distributions to describe and summarise the data. Assessment of linearity was done to assess normality of some data using G-Q plots and the Kolmogorov–Smirnov (K-S) test. Comparison of non-normal data was made using the Mann-Whitney U test. Use was made of tables, bar and pie charts to present some of the data.

### 3.5 Reliability and Validity

Validity and reliability are complex issues in research and have a huge influence on the research process. Instrument validity, in terms of data-collection instruments, indicates whether the instrument accurately measures what it was supposed to measure (Brink, Van der Walt et al., 2006). More specifically, content validity and face validity are noted. Content validity is an assessment of how well the questions cover the components of the variables to be measured (Brink, Van der Walt et al., 2006). In this study, the measurable variables were identified from, and based on, an extensive literature review. Additionally the measurable

variables were reviewed by an epidemiological expert. The instrument thus represented all the essential aspects that needed to be researched in order to comment on characteristics of ECT practice in South Africa. Face validity, which is the weakest kind of instrument validity, assesses whether the instrument appears to measure what it is supposed to measure (Brink, Van der Walt et al., 2006). In this study face validity was useful only in the instrument development phase when readability and clarity of content was determined.

Reliability of a measuring instrument refers to whether the instrument would elicit the equivalent results consistently (Brink, Van der Walt et al., 2006). Before the survey began, the questionnaire was tested on on-site medical colleagues to determine if respondents would understand the questions properly and answer questions with the same consistency. The exercise ensured that bias and influence from the researcher be reduced to a minimum.

### **3.6 Introduction letter and Information Sheet**

All participants received an Introduction Letter (see Appendix B) which included information about the purpose of the study, instructions for the respondent, the name and contact details of the researcher, as well as what would happen to the information provided. The Information Sheet (Appendix C) gave more details on the rationale of the study and assured the respondents of university's ethical approval as well as confidentiality.

### **3.7 Ethical Considerations**

The study was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2008) and was submitted for approval to the psychiatry department's research committee, and the University of Cape Town (UCT) Human Research Ethics Committee (HREC). A letter requesting permission to conduct the study was also written to the nine provincial Departments of Health (DOH), as well as to the various regulatory bodies in the private sector. Furthermore, permission was obtained from the appropriate Head of Health (HOH) or Chief Executive Officers (CEOs) of each establishment.

Consent (see Appendix D) was obtained from each respondent before completion of the questionnaire. To ensure confidentiality, no data of the person or the establishment was reported on. Participation was voluntary and no remuneration was offered for participation.

### **3.8 Conclusion**

A detailed description of the research design and methods used in this study was given in this section. In summary, a quantitative design using a questionnaire was sent to the target population of ECT-staff in order to ascertain aspects of ECT practice in South Africa.

## 4 Results

### 4.1 Introduction

In this section, the data analysis and summary of the data will be presented.

### 4.2 Response Rate

During the initial telephonic enquiry, it was ascertained that 42 institutions in South Africa had an ECT machine on site, of which 31% (n = 13) reported non-use of machines in 2011/2012. The various reasons are tabulated in Table 6.

Reasons for not giving ECT in a 12 month survey period in hospitals with ECT machines on site (2011/2012)	n (%)
Problems with anaesthesia	3 (23 %)
Licensing not granted from health authorities	2 (15.4 %)
No indications for ECT	1 (7.7 %)
No expertise	1 (7.7 %)
Clinicians do not agree with the procedure of ECT	2 (15.4 %)
Machine broken	3 (23 %)
No infrastructural facility	1 (7.7 %)

**Table 6: Reasons for not prescribing ECT (n=13)**

Twenty-nine facilities had actively performed ECT in the 12 months preceding distribution of the questionnaire. Three private hospitals and 2 public hospitals did not respond despite approaching alternative staff. Twenty-four hospitals responded to the questionnaire making the response rate 82.8% when considering those institutions that were actively involved in ECT (n=29). Of these, 21 institutions responded to the ECT utilization questions -see Figure 3 below.

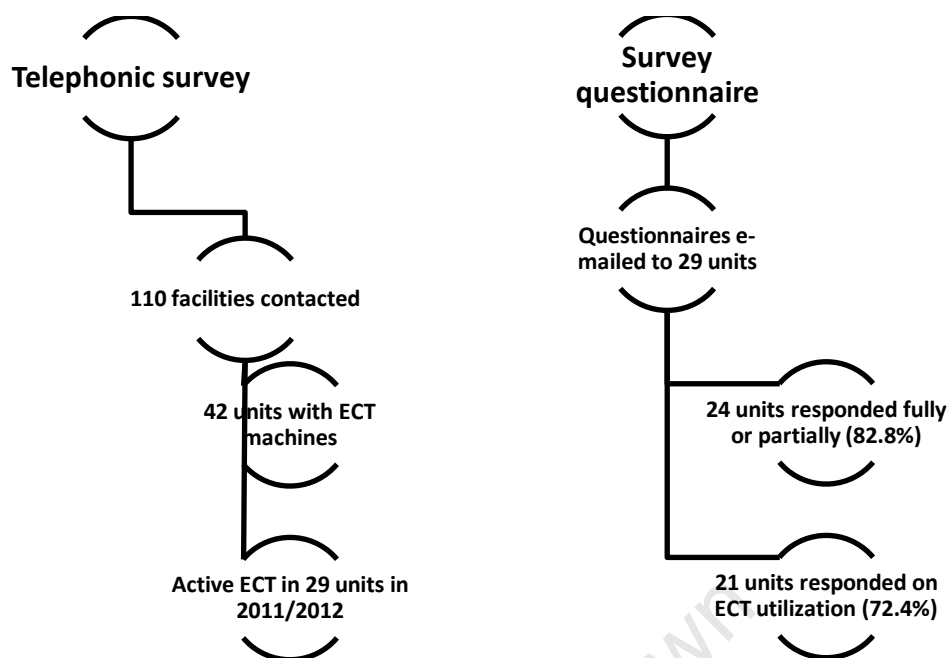


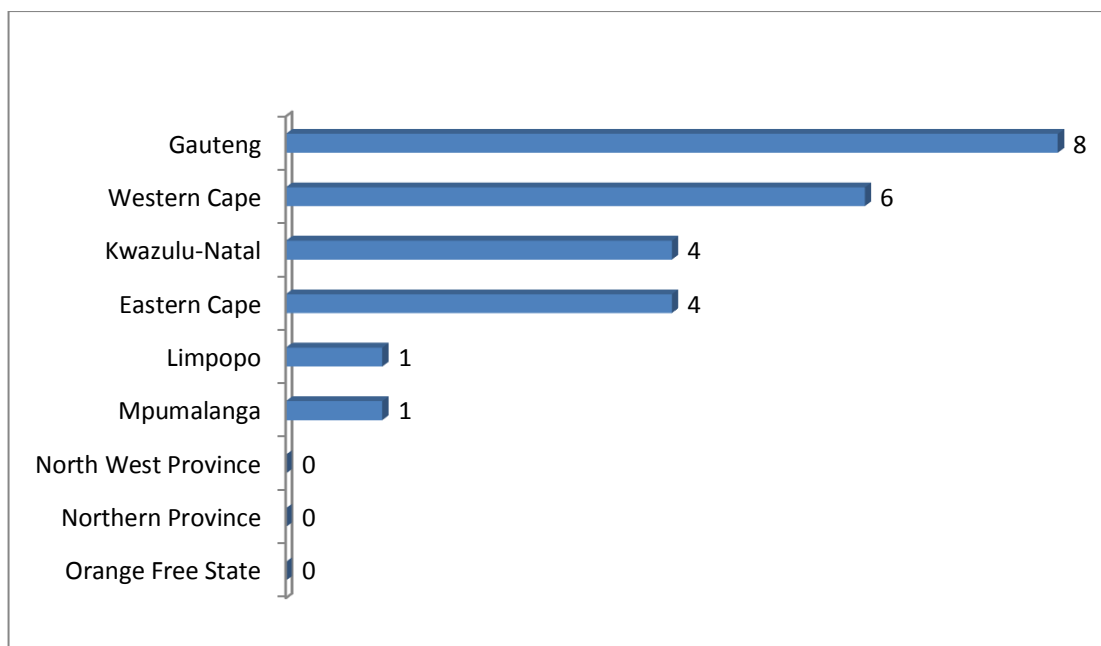
Figure 3: Response data

### 4.3 Findings

#### 4.3.1 Characteristics of the Institution and ECT practitioner

##### 4.3.1.1 Provincial distribution

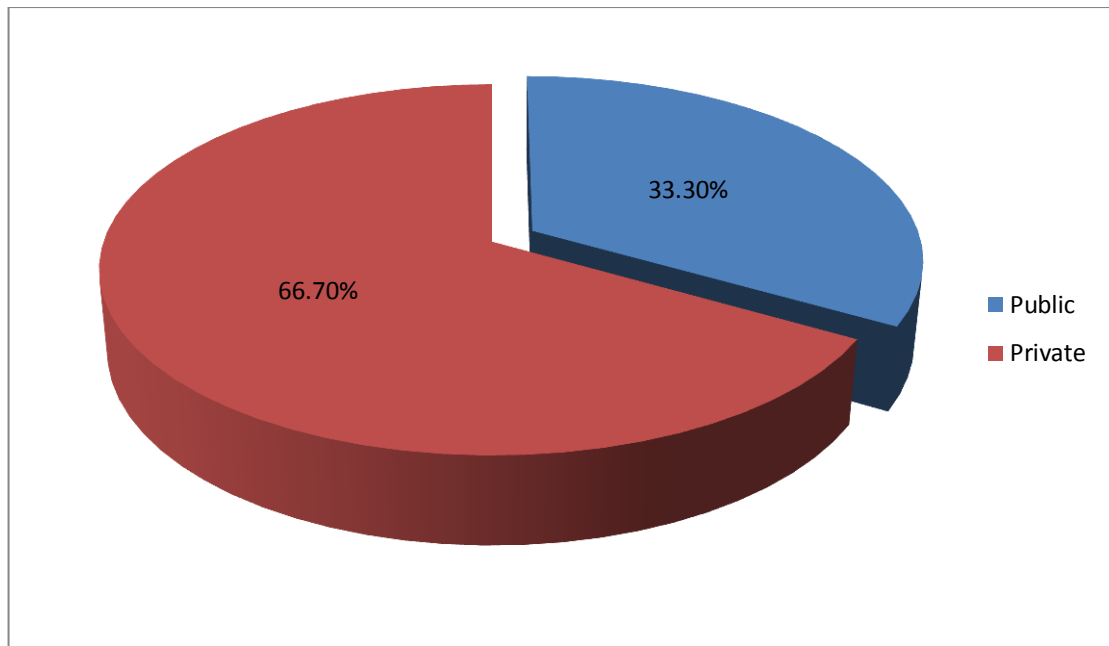
South Africa is divided into nine provinces. Responses for the survey questionnaire were received from six of the nine provinces. However, it was ascertained from the initial telephonic survey that 1 province had no machine, and 2 provinces did not offer ECT in either its private or public sector during the time of the survey. Figure 4 summarises the number of hospitals with an active ECT programme, which responded in each province. According to this survey, no active ECT has been performed in the Free State, Northern Province or North West Province in the selected time period.



**Figure 4: Number of hospitals with active ECT over 12 months in 2011/2012 (n=24)**

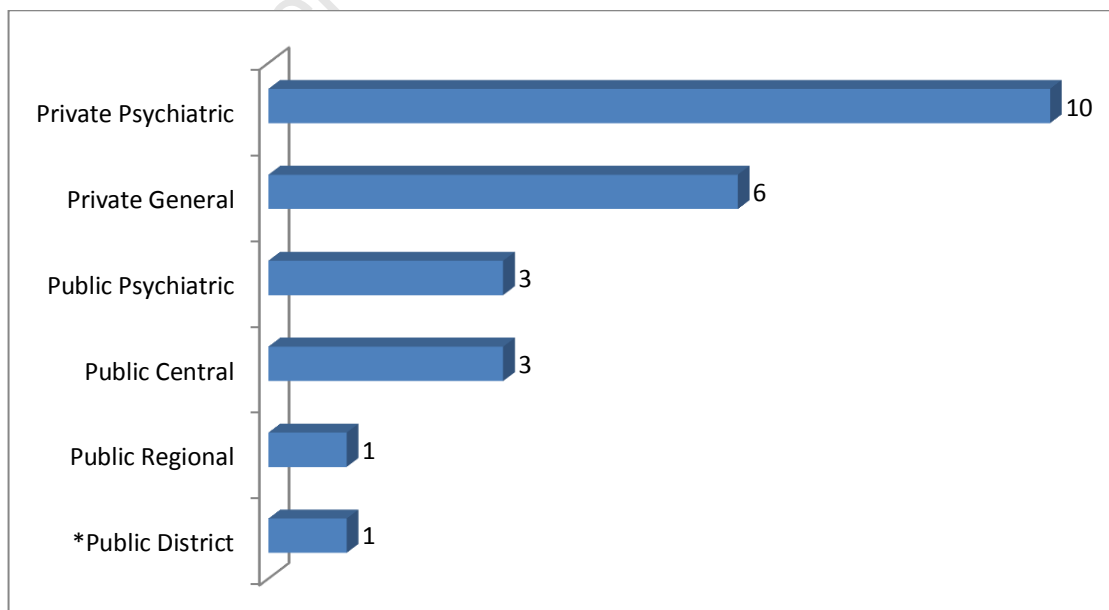
#### 4.3.1.2 Hospital Setting

South Africa has two sectors of health care, government-funded healthcare (public sector) and the private sector healthcare. The private sector is managed commercially and caters for higher-income earners who often are members of medical aid schemes. In South Africa there is huge inequality between the private and the public sector in that only 15% of the population belong to medical aid schemes, yet 46% of all South African health-care expenditure is attributed to members belonging to these schemes (Coovadia, Jewkes et al., 2009). From the research data obtained, 16 private hospitals (66.7%) had an active ECT service, while 8 (33.3%) public sector hospitals offered ECT in 2011/2011, see Figure 5 below.



**Figure 5: Private versus public sector institutions with ECT services (n = 24)**

The National Health Care Act of 2003 determines and defines the different type of hospitals in South Africa (National Health Care Act No 61 of 2003 Regulation, 2012). Most ECT units are positioned in private hospitals, catering exclusively for mental health (n = 10), and six units were based at general private hospitals. Three units each were at public psychiatric hospitals and central general hospitals while one unit each was at a regional and district hospital. This is depicted in Figure 6 below.



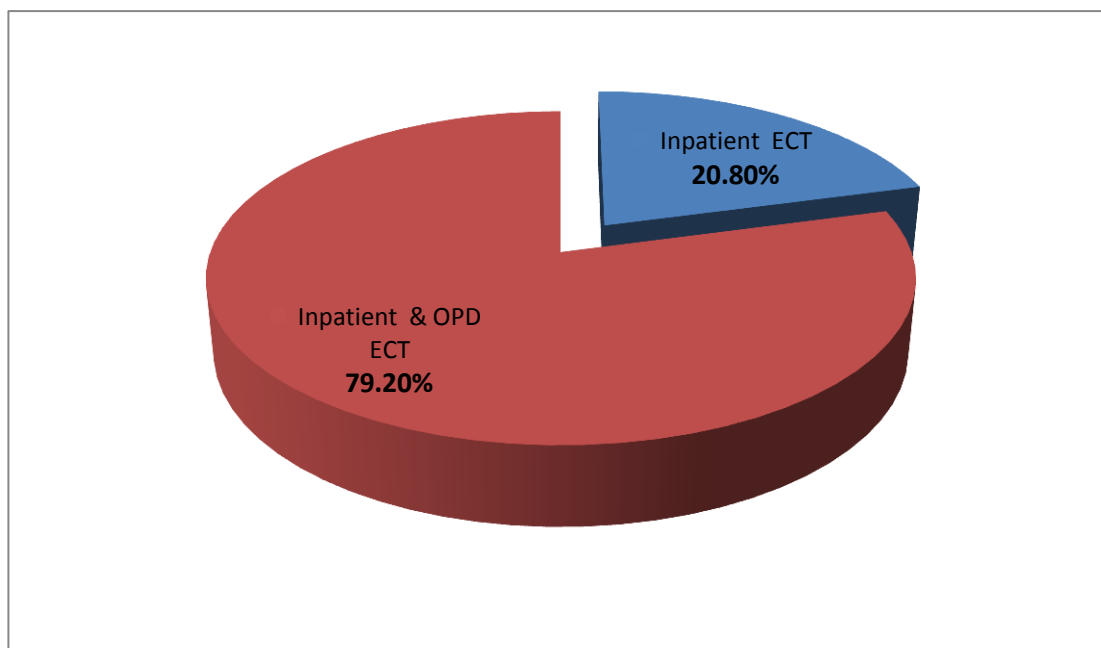
**Figure 6: Hospital type (n = 24)**

\*public psychiatric hospital used theatre facilities of a public district hospital

#### 4.3.1.3 Inpatient and outpatient services

ECT can be offered as an inpatient procedure, i.e. where the patient is admitted and stays overnight in a hospital bed. It can also be offered as an outpatient procedure where the patient attends for the treatment and returns home afterwards.

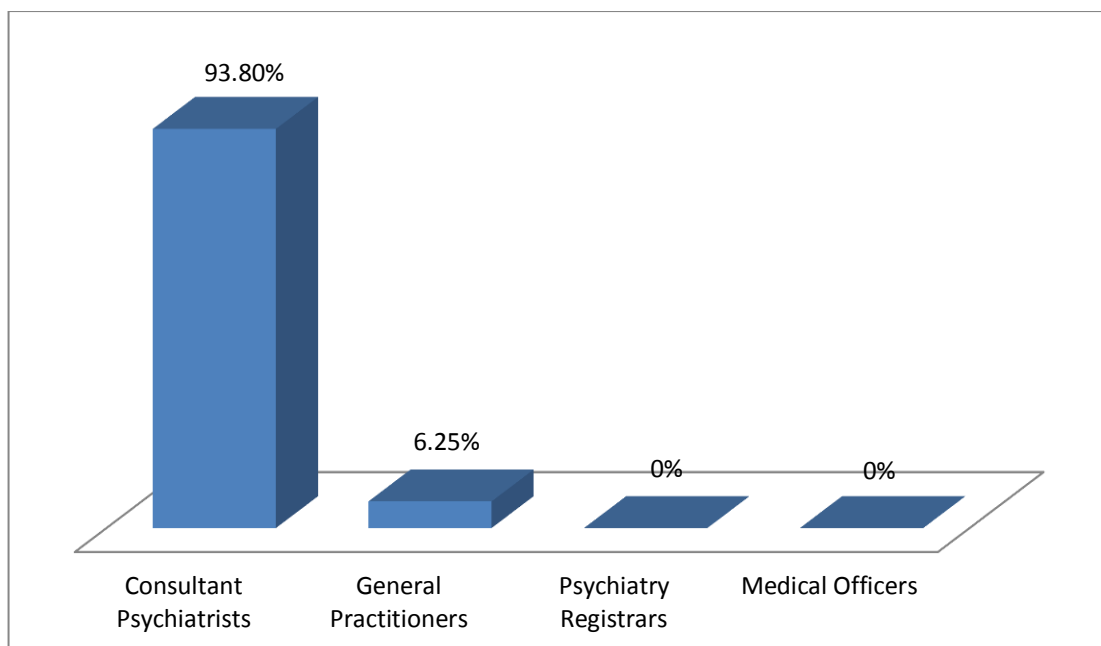
As depicted below in Figure 7, 79.2% (n = 19) of hospitals with ECT services offer both in- and outpatient services, while the rest (20.8%, n = 5) offer ECT only as an inpatient service.



**Figure 7: Outpatient versus inpatient services (n = 24)**

#### 4.3.1.4 Rank of the doctor performing ECT

ECT was performed by psychiatrists, psychiatry doctors-in-training (psychiatry registrars), medical officers (MOs) and general practitioners (GPs). In 93.8% (n = 15) of private hospitals ECT was performed exclusively by consultant psychiatrists, with one hospital reporting performance of the procedure by a GP. See Figure 8 below.



**Figure 8: Rank of ECT clinician- private sector (n = 16)**

Psychiatric registrars are doctors who are training to become consultant psychiatrists. Only state hospitals affiliated to a medical school can provide such training (National Health Act No 61 of 2003, 2004). In the public sector ECT is performed by a range of doctors; at times by consultant psychiatrists (50 %, n = 4 units), supervised registrars (75%, n = 6 units), unsupervised registrars (75%, n = 6 units), or medical officers (50%, n = 4 units).

#### 4.3.1.5 ECT Nursing

In the procedure room, nursing staff were always present to assist during the ECT procedure in all institutions (n = 24); in the recovery rooms their presence was 95.8% (n = 23). The rank of nursing staff varied amongst the institutions especially when there was no dedicated, nominated ECT staff member. The staff rank would therefore vary according to who was on-duty during the ECT process; thus some hospitals gave multiple answers to the ranking of the nursing staff on duty during and after ECT.

Table 7 displays the rank of nursing staff available for ECT at the 24 institutions surveyed.

**Table 7: Nurse rank (n = 24)**

<b>Nursing staff used in ECT</b>	<b>*Institutions</b>	<b>%</b>
Professional nurse-anaesthesia	10	41.7
Professional nurse-psychiatry	15	62.5
Professional nurse general	9	37.5
Enrolled nurse	8	33.3
Enrolled nurse assistant	6	25

\* Some institutions gave more than one answer

#### 4.3.1.6 ECT anaesthetics staff

All hospitals reported anaesthetising patients for the ECT procedure i.e. that modified ECT is practiced in South Africa. Once again the rank of anaesthetic staff varied, with hospitals using consultants, registrars, MOs and GPs. Eighteen hospitals used anaesthetics consultants; four public sector hospital respondents used anaesthetics registrars and ten hospitals used GPs and MOs. No information was requested about whether the registrars were supervised or not.

#### 4.3.2 **Infrastructure**

ECT was performed in a minor theatre or an operating theatre in 79.2 % (n = 19) of the institutions. Five institutions perform ECT in a ward or treatment room. Twenty-three institutions had a separate recovery room, while one did not.

#### 4.3.3 **ECT Preparation**

##### 4.3.3.1 Information given and informed consent

The presentation of oral information to patients about the procedure was reported as being part of the pre-ECT work-up in all institutions (n = 23) that responded to this question, while written information was offered in 13 institutions (62%). The two procedures were not mutually exclusive. Informed consent or assent was obtained in all (n = 24) institutions.

##### 4.3.3.2 Pre-ECT work-up

All practitioners that responded (n = 22) report that a medical history is enquired into before ECT is initiated, while 77.2% report that a dental history is also taken. Physical examinations

are performed by all practitioners except one (95.5%, n = 21). Only 33.3 % (n = 7) however, report that a dental review is performed prior to ECT

The vast majority of practitioners (87%; n = 20) did basic blood work-ups, which included a full blood count (FBC) 86%; n = 19), renal functions tests (86%; n = 19) and liver function tests (46%; n = 10). More than 50% of respondents reported performing 'other blood investigations', which included investigations such as syphilis serology and retroviral testing. Four practitioners (18%) report routinely requesting chest x-rays (CXRs), while fourteen (61%) routinely perform electrocardiographs (ECGs) as part of their clinical work-up for ECT. Furthermore six respondents (30%) report requesting routine computed tomography (CT) brain scans for their patients.

#### 4.3.3.3 Psychotropic Medication

Sixty-five percent of respondents (n = 15) omit benzodiazepines before ECT. More than half of the respondents opt to omit anticonvulsants (57%; n = 13) and 48% (n = 10) stop lithium prior to ECT. One practitioner reported stopping antidepressants beforehand, while two omitted antipsychotic medication.

Four practitioners (17%) reported not stopping any psychotropic medication before ECT.

### 4.3.4 **Technical aspects of ECT**

#### 4.3.4.1 ECT Machine

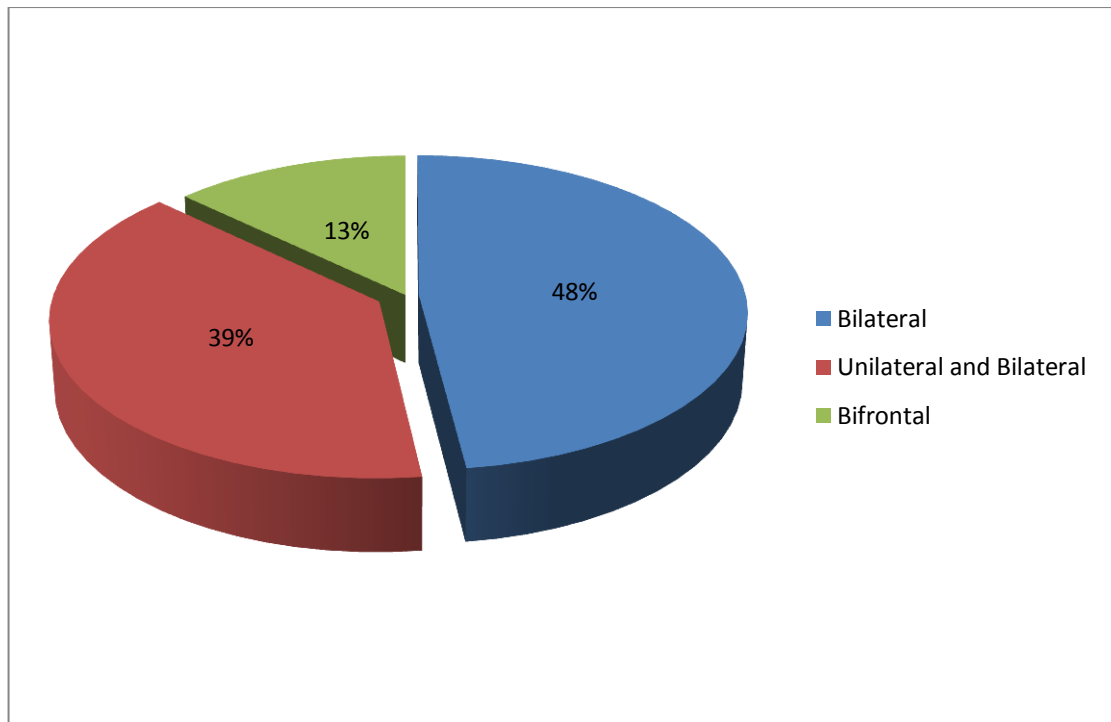
The Thymatron machine is most popular in South Africa with 62% (n = 15) of units using it. The Spectra Mecta machine is used by six units (25%). Three units did not respond to this question.

#### 4.3.4.2 Wave Form

Sine wave machines appear not to be used in South Africa; however four units responded that they did not know the wave form emitted by the ECT machine used at their hospital. Fifteen units (62.5%) reported using brief-pulse stimulation and five units (n = 21.7%) used ultra-brief stimulation. The questionnaire did not specifically ask for details on whether a particular wave form is preferred, or whether one wave form was used exclusively.

#### 4.3.4.3 Types of electrode placement

Eleven units used bilateral electrode placement exclusively (48%); none used unilateral placement exclusively. Nine units (39%) used both unilateral and bilateral electrode placements. Three units reported using bifrontal placements only (13%). See Figure 9 below.



**Figure 9: Type of electrode placement used (n=23)**

#### 4.3.4.4 Determination of electrical dosage

Seventeen practitioners report using a dose titration method (77.3%), six practitioners use the 'age method' (25%), and four report using the 'half-age method' (18.2%). One practitioner reports using a method other to those described above. See Table 8 below.

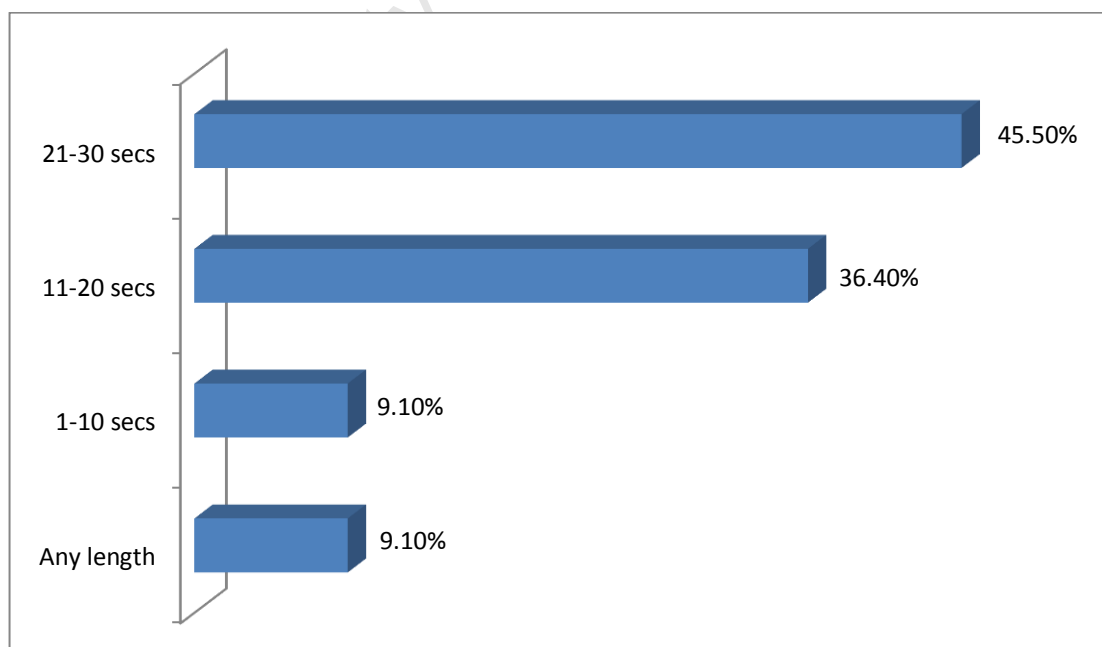
**Table 8: Determination of electrical dosage**

Dose Determination method	*Number of respondents	%
Dose titration method	17	77.3
Age method	6	25
Half-age method	4	18.2
Other	1	4.5

\* Some institutions gave more than one answer

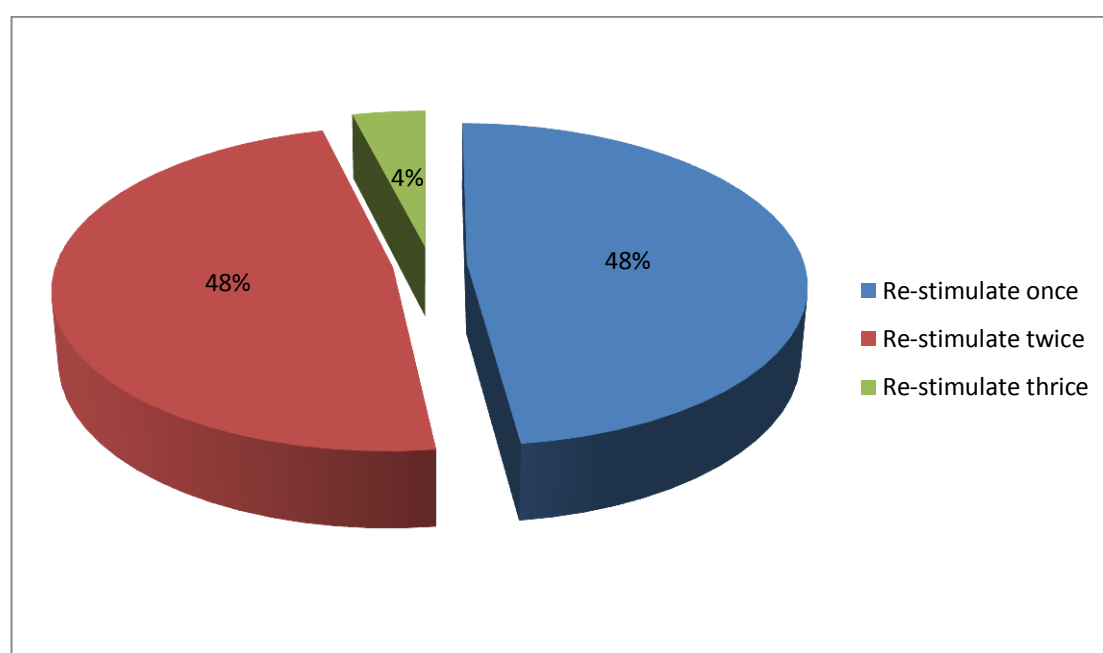
#### 4.3.4.5 Length of seizure

When practitioners were asked what length of seizure they considered adequate for eliciting clinical change, 9.1% (n = 2) reported that any length of seizure is sufficient, while 45.5% (n = 10) reported 21-30 seconds as being adequate. See Figure 10 below which outlines the various responses.



**Figure 10: Adequate length of seizure as reported by respondents (n = 22)**

If the length of seizure is considered inadequate during the ECT procedure, eleven practitioners (47.8%) will re-stimulate once, eleven practitioners will re-stimulate twice, and one practitioner reports that he/she would re-stimulate three times in order to elicit an adequate seizure. No enquiry was made into whether electrical dosages would be altered when re-stimulating. See Figure 11 below.



**Figure 11: Re-stimulation after presumed inadequate seizure (n = 22)**

#### 4.3.4.6 Seizure monitoring

Table 9 below displays how seizure activity is monitored by practitioners. More than one method is often used, however 86% (n = 18) of practitioners report that the team clinically observe the convulsive muscle activity, 50% (n = 10) of those that responded use the cuff method; continuous electroencephalography (EEG) is used by 82% (n = 18) of practitioners, while continuous electromyography monitoring (EMG) is used by 25% (n = 5) of respondents.

**Table 9: Seizure monitoring**

<b>Type of seizure monitoring</b>	<b>*Number of respondents</b>	<b>%</b>
Clinical observation	18	86
Cuff method	10	50
Continuous EEG	18	82
Continuous EMG	5	25

\* Some institutions gave more than one answer

#### 4.3.4.7 Other aspects of ECT service

All respondents (n = 22) reported that six treatments make up a standard course of ECT, with 95.5% (n = 21) stating that administration of ECT three times a week, was the norm.

Continuation ECT is the use of ECT to prevent the early relapse of an index episode of illness. It is defined as the prophylactic use of ECT over the 6 month remission period. Maintenance ECT implies the use of ECT to prevent further episodes or a recurrence of an episode, and so refers to the six months period after the index episode. (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001; Scott, 2005)

Continuation ECT is practiced in 10 institutions (47.6%), while maintenance ECT is available as a service in 16 institutions (69.6%).

### 4.3.5 **Technical aspects of ECT anaesthesia**

#### 4.3.5.1 Anaesthetics assessment

Various levels of anaesthetics assessments were reported: 43% (n = 9) of institutions reported that all patients are assessed by an anaesthetist before the commencement of a course of ECT; eight (39%) institutions report selectively referring patients for pre-ECT assessments; while 63.6% (n = 14) of institutions have patients assessed at the first ECT session. Table 10 summarises these results.

**Table 10: Anaesthetic assessments**

	<b>*Number of respondents</b>	<b>%</b>
All patients assessed prior to ECT	9	43
Selective patients assessed prior to ECT	8	39
All patients assessed at first ECT treatment	14	64

\* Some institutions gave more than one answer

#### 4.3.5.2 Anaesthetics premedication

Regarding anticholinergic medication: 35% (n = 8) of practitioners reported giving every patient an anticholinergic as part of the anaesthetics management for ECT. Of these, 63% (n = 5) of practitioners use glycopyrrolate and 37% (n = 3) use atropine.

#### 4.3.5.3 Induction agents

All practitioners reported the use of an induction agent in anaesthetising a patient for the ECT procedure. The type of agent varied, and more than one answer was often given. Nineteen (90%) practitioners that answered this question report that they use propofol as an induction agent; two practitioners (9%) reported the use of thiopental, and six (26%) reported using etomidate. Methohexital or midazolam was not reported as being used as in induction agent in this survey.

#### 4.3.5.4 Muscle relaxation

All practitioners reported using muscle relaxants in the ECT anaesthetics process. Once again more than one answer was given at times, but the results show that all respondents (n=20) use suxamethonium; one practitioner has used rocuronium; while none had used atracurium, mivacurium or rapacuronium.

#### 4.3.5.5 Anaesthetics monitoring

All respondents stated that some form of anaesthetics monitoring is used during ECT. Almost all respondents utilized blood pressure monitoring (95%, n = 19). Furthermore, all respondents used pulse oximetry (100%, n = 21), 90.5% (n = 19) use continuous ECG monitoring, while 35% (n = 7) utilize capnography routinely.

### 4.3.6 Clinical aspects of ECT

#### 4.3.6.1 Number of persons / 10 000 population per year receiving ECT

As discussed in the review of the literature, the treatment persons rate (TPR) is a gross representation of the number of people in a country who receive ECT in a year. It should be noted that each respondent tabulated their 12 month frequency from the month in which they responded to the questionnaire. The questionnaire was sent out over a 6 month period from June to November 2012, so the calculated figure below represents a general estimation of all the patients reported to have ECT in a 12 month period.

The population size of South Africa during the last census in 2011 (Statistics South Africa, 2011) was 51 770 560. The number of persons tabulated to have received ECT in 2011/2012 was 1116. Therefore the TPR equals 0.22 ppy.

#### 4.3.6.2 Patients receiving ECT in private versus the public sector

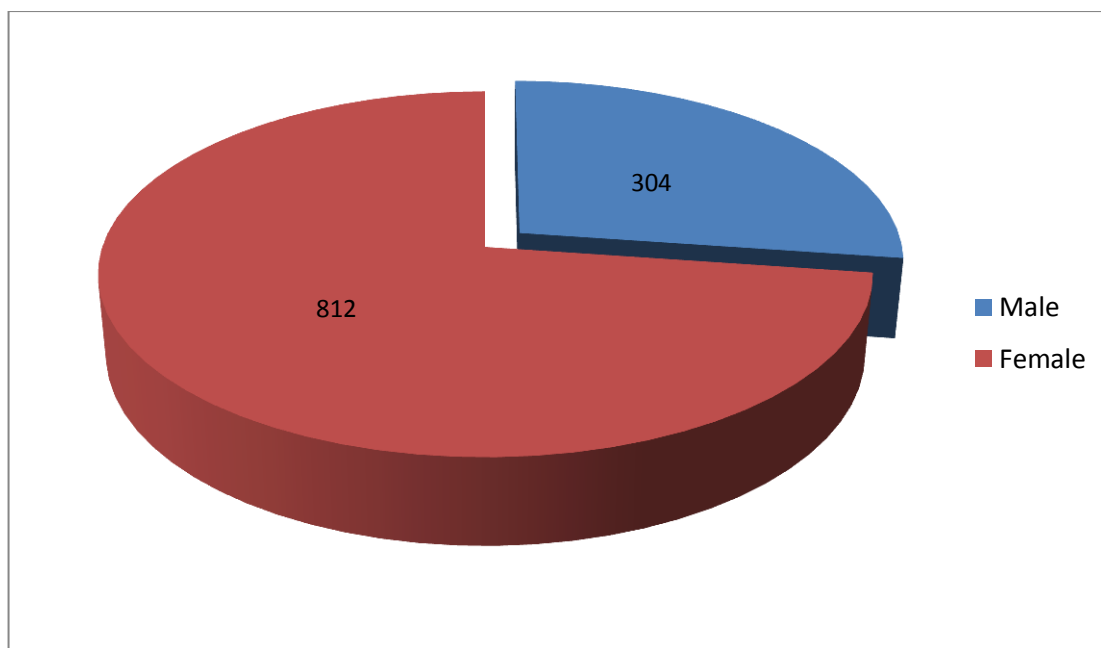
When comparing the two health sectors in South Africa, the Mann-Whitney U test reveals that there is a statistically significant difference between the number of patients treated in private compared to the number of patients treated in the public sector ( $U = 22, p = 0.045$ ) in this time period. From this data sample it can therefore be concluded that in a 12 month period in 2011/2012, more patients in the private sector received ECT than the public sector ( $p = 0.045$ ). Please see Table 11 below.

**Table 11: Number of patients receiving ECT per hospital unit 2011/2012**

	Private	Public
Number of units reporting	12	8
<b>Median number of patients</b>	<b>35.5</b>	<b>9</b>
Minimum number of patients	5	3
Maximum number of patients	415	25

#### 4.3.6.3 Gender data

More than 800 (72.8%) women received ECT treatment in a 12 month treatment period, while in the same period just over 300 (27.2%) men received ECT; see Figure 12 below.

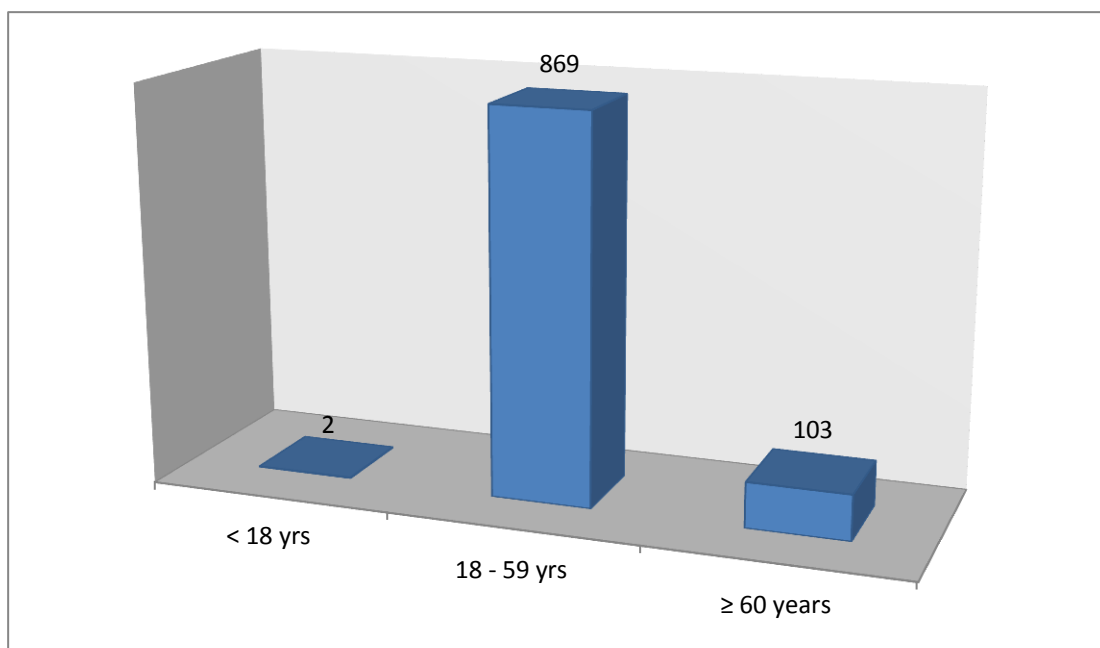


**Figure 12: Gender distribution (n = 1116)**

20 institutions reporting on gender

#### 4.3.6.4 Age data

ECT was prescribed and used to treat 869 (89.2%) people in the age group 18-59 years, while 2 (0.2%) minors and 103 (10.6%) people over the age of 60 received ECT. See below Figure 13.



**Figure 13: Number of patients receiving ECT in each clinical age-range in 2011/2012 (n = 974)**

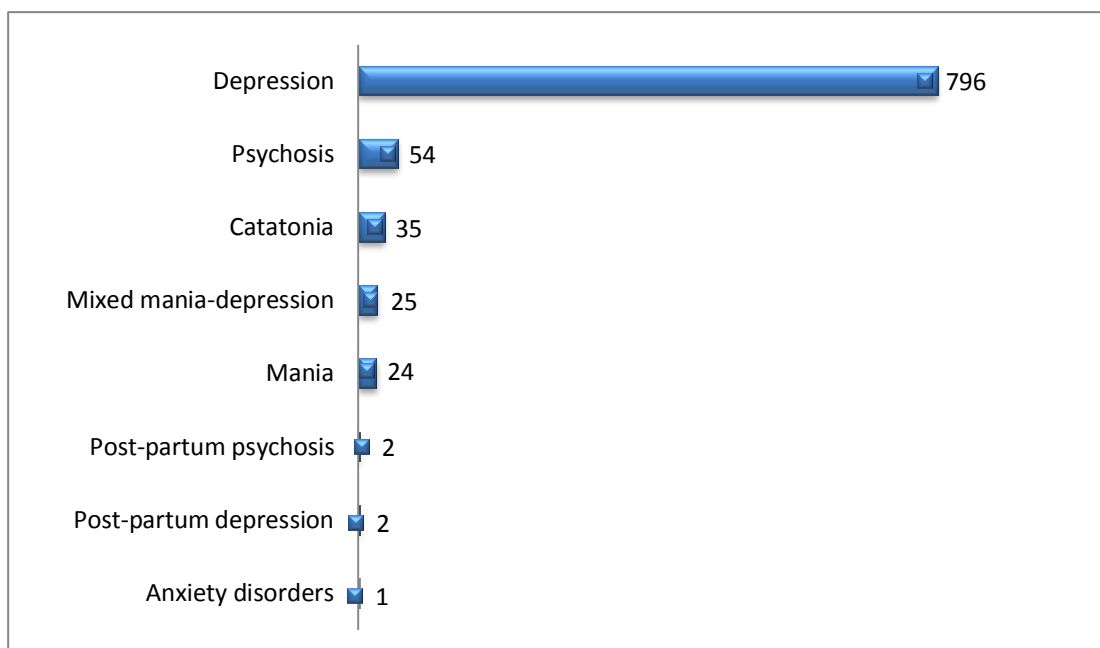
Number of institutions reporting age data = 20

#### 4.3.6.5 Number of ECT procedures / 10 000 population receiving ECT

The total sum of ECT treatments given during the 12 month survey period is 6208 (n = 21 institutions) suggesting an ECT administration rate (EAR) of 1.19.

#### 4.3.6.6 Main indications for ECT

The most common indication for ECT in South Africa in this survey is depression (84.8%, n = 796). Please refer to Figure 14 for a detailed summary.



**Figure 14: Tabulation of reported indications for ECT in 939 patients in 2011/2012**

No. of institutions that reported on indications: 18 institutions reported on depression, psychosis, postpartum depression. 17 institutions reported on mania, post-partum psychosis, post-partum mania anxiety disorders, other disorders and pregnancy-related disorders.

#### 4.4 Conclusion

In conclusion some of the pertinent points are summarised below:

The questionnaire survey had a response rate of 82.8%. From the survey it can be ascertained that there are more ECT units in the private sector; that both inpatient and outpatient ECT services are offered in 79.2% of units and that consultant psychiatrists, psychiatric registrars, MOs and GPs administer ECT.

All respondents reported that ECT preparation involves a formal consent process. A pre-ECT evaluation was invariably performed and all practitioners obtained a medical history, while the majority performed a physical examination. Bilateral, unilateral and bifrontal electrode placements were used; 77.3% of practitioners used a dose titration method, and both seizure monitoring and anaesthetic monitoring was used.

All respondents reported that a minimum of six treatments made up a standard course of ECT, and that ECT was administered three times a week by 95.5% of respondents. Continuation and maintenance ECT was practiced in some institutions.

The TRR and EAR was estimated at 0.22 and 1.19 respectively in 2011/2012. Of note is that more patients received ECT in the private sector than in the public sector. Also notable is that more women received ECT than men, that ECT treatment in minors and the elderly population was not common, and that the main indication for ECT in this study was depression.

## **5 Discussion**

### **5.1 Introduction**

Chapter 5 highlights the interpretation of the results, the limitations, the conclusion and recommendations of this study. The aims and objectives of this study were to determine the characteristics of local ECT practice, to review the international literature on ECT practice, and compare current local practice to international practice and guidelines, and finally, to make appropriate recommendations to improve local practice.

This is the first nationwide study of the characteristics of ECT practice in South Africa. The only other descriptive study originating from South Africa was a retrospective case note review of ECT practice conducted at a local psychiatric hospital in the Eastern Cape province 22 years ago (Mugisha & Ovuga, 1991). The study noted that 378 patients received ECT over the six years that the hospital existed, that the rate of ECT use decreased from 32% in 1976 to 6% in 1982, and that ECT was unmodified and administered daily for 7 days. The vast majority (64%) of patients had a diagnosis of schizophrenia and the mean age of the patient was  $30.7 \pm 9.9$  years. The results from this study in 2011/2012 at the least demonstrate that ECT is delivered in a modified way, and that the main indication for ECT is depression.

The other local ECT-related literature found was a case report of ECT in an adolescent patient (Segal, Szabo et al., 2004), two literature reviews (Prinsloo & Pretorius, 2004; Segal, 2004) and a review about ECT consent procedures (Segal & Thom, 2006).

The section below presents an exploration of the study results, comparing them to international data as discussed in the literature review, as well to international guidelines such as the APA (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001), the RCP ECT Handbook (Scott, 2005), the Scottish ECT Accreditation Network standards (SEAN) (National Services Scotland, 2010) and the RCP's ECT Accreditation Service (ECTAS) standards for ECT (Royal College of Psychiatrists, 2012). Finally, recommendations will be made to improve local practice.

### **5.2 Characteristics of the ECT Staff**

#### **5.2.1 Staff profile**

According to guidelines from the UK and the USA (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001; Scott, 2005; National Services Scotland, 2010; Royal College of Psychiatrists, 2012) an ECT clinic should be led by a psychiatric consultant who has designated time to oversee such a clinic; under supervision however,

responsibilities could be delegated to other senior members. Other members of the ECT treatment team would be an anaesthesia provider, an ECT treatment nurse (registered nurse) and one or more recovery nurses (registered nurse) for each recovering patient. The nurse should have relevant ECT and clinical experience.

The South African guideline on ECT (Department of Health Republic of South Africa, 2009) states that ECT should be conducted by a medical practitioner who is trained in mental health and able to conduct ECT, and also that the patient should be anaesthetised by an anaesthetist. One “psychiatrically trained professional nurse” should be present at all times to “conduct mental health observations before and after ECT in the recovery room”. In addition there should be staff to “take care of the mental health care user”.

This local guideline provides limited detail about the skills of the ECT doctor, and about trainee doctors and their supervision. Furthermore, the nursing requirement is limited to a professional nurse with psychiatric experience only, and no mention is made of the importance of basic anaesthetic training for the nurses monitoring the patient.

International literature reveals that in most cases ECT is performed by consultant psychiatrists or trainee psychiatrists, but there are at least three reports of it being administered by a member of nursing staff (Chanpattana & Kramer, 2004; Chanpattana, Kramer et al., 2010; Jarosch-von Schweder, Wahlund et al., 2011). The rank of nursing staff ranged from registered nurses, nursing aids, ECT technicians to “ward boys”. Where anaesthetics were administered, an anaesthetist was present to do this.

This study shows that at the majority of the institutions ECT was performed by a consultant psychiatrist, but on occasion ECT was performed by MOs, GPs and psychiatry registrars. The anaesthetist doctors ranged from consultants, anaesthetic registrars to MOs.

According to the Nursing Act no. 33 of 2005 (Nursing Act No 33 of 2005, 2005), a professional nurse delivers comprehensive nursing care, an enrolled nurse or staff nurse practices basic nursing, while an auxiliary nurse (also called enrolled nurse) practices elementary nursing care. In this study, it was found that the rank of nursing staff ranged from registered (or professional) nurses, enrolled nurses, to enrolled nurse assistants. However, it could neither be ascertained what type of nurse is primarily responsible for the ECT service at the time of ECT administration, nor was the type of nursing staff present in the recovery room established.

#### 5.2.1.1 Recommendations

The current South African guideline (Department of Health Republic of South Africa, 2009) provides limited guidance on ECT staffing requirements. The author's recommendation is summarised in Figure 15 below.

### Staff Recommendation

- ECT should be performed by an psychiatrist who has been trained in ECT
- ECT can also be performed by psychiatric registrars or psychiatric MOs, who have had a theoretical induction, and at least three supervised sessions before administering ECT independently. (See more detailed recommendations on supervision and training below)
- Nursing should consist at a minimum of registered nurses trained in both treatment room and recovery room procedures. If only one patient is receiving ECT one nurse could oversee the treatment and recovery. The registered nurse can be a speciality psychiatry or general professional nurse who has had a 2-week full-time attachment to an operating theatre recovery unit at a general hospital. Once trained, however, they need to maintain these skills and knowledge by regularly being exposed to recovery room duties
- ECT can also be performed by psychiatric registrars or psychiatric MOs, who have had a theoretical induction, and at least three supervised sessions before administering ECT independently. (See more detailed recommendations on supervision and training below)

**Figure 15: ECT staff recommendation**

### 5.2.2 Training and supervision

According to the UK guidelines, the minimum standard for ECT trainees is a theoretical induction, a practical demonstration and a minimum of three supervised sessions of ECT before administration of the procedure (Scott, 2005; National Services Scotland, 2010; Royal College of Psychiatrists, 2012). The APA recommend a minimum of ten supervised ECT treatments (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001)

Teaching and supervision of ECT was reported as being generally poor, with the exception of a few studies from the UK (Robertson, Freeman et al., 1997; Fergusson, Cullen et al., 2004), Norway (Jarosch-von Schweder, Wahlund et al., 2011), Japan (Chanpattana, Kojima et al., 2005) and Australia (Chanpattana, 2007; Lamont, Brunero et al., 2011).

This study showed that “regular supervision” was performed in only six of the eight state hospitals. Because private hospitals are not designated as training facilities by the national DOH (National Health Act No 61 of 2003, 2004), no training of registrars occurs there.

#### 5.2.2.1 Recommendation

The South African guideline (Department of Health Republic of South Africa, 2009), makes no comment about on-going training. In view of the fact that ECT is a dynamic and active field of psychiatry, the author recommends the development of a CPD-accredited ECT training day, similar to those held by the RCP in the UK, and the APA in the USA. This

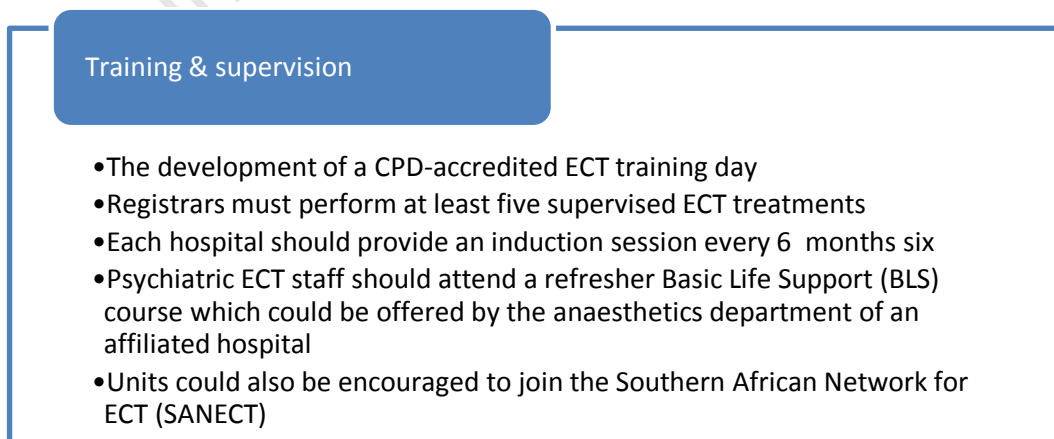
training day course or workshop should be made available to medical staff in both the private and the public sector.

The course would consist of lecture material and workshops reviewing the various facets of ECT administration. The training should be directed at consultant psychiatrists, psychiatric registrars, psychiatric MOs and anaesthetists with an interest in ECT, as well as at professional nurses.

From a psychiatric registrar training perspective, the South African College of Psychiatrists' training guideline states that a registrar must perform at least five supervised ECT treatments, with each session signed off by the supervising consultant (College of Medicine of South Africa (CMSA), 2011). The author concurs with the College's recommendation.

At a local level, each hospital should provide an induction session every six months, which should be led by the ECT consultant; this induction session could also be CPD-accredited. The session should be attended by all staff involved in ECT on site, ranging from consultants, registrars (both psychiatric and anaesthetics), medical officers, to all nursing staff. In addition, all psychiatric ECT staff should attend a refresher Basic Life Support (BLS) course, which could be offered by the anaesthetics department of an affiliated hospital. This would serve to update or improve the resuscitation skills and knowledge of the medical staff.

Units could also be encouraged to join the Southern African Network for ECT (SANECT) which was formed in Malawi in February 2011 under the guidance of the Scotland-Malawi Mental Health Education Network. The aim of this structure is to serve as a platform where ECT clinicians could collaborate on setting standards, training, protocol development, audit and research



#### Training & supervision

- The development of a CPD-accredited ECT training day
- Registrars must perform at least five supervised ECT treatments
- Each hospital should provide an induction session every 6 months six
- Psychiatric ECT staff should attend a refresher Basic Life Support (BLS) course which could be offered by the anaesthetics department of an affiliated hospital
- Units could also be encouraged to join the Southern African Network for ECT (SANECT)

**Figure 16: ECT training & supervision recommendations**

### 5.3 Infrastructure

According to the APA (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001), ECT is to be performed at a site exclusively dedicated to ECT; that the site should have a separate waiting, treatment and recovery room, and the site should be in close proximity to medical emergency facilities. They recommend that the use of a surgical operating theatre for ECT is “suboptimal” and should be avoided. The RCP in the UK (Scott, 2005) state that the ideal area for ECT would be in a designated area in a psychiatric unit, recognizing however, that the site might be a multiple-use site not exclusively for ECT use. The motivation behind this is that their research had shown that the declining number of patients receiving ECT do not justify an exclusive-use area. Nonetheless, the site should at a minimum have a waiting room, a treatment room and a recovery room (Royal College of Psychiatrists, 2012).

International literature on infrastructure varied but it would seem that in practice there was a general lack of formal ECT suites, and that ECT was performed in whatever space was available at the time. Factors that were considered were proximity to the emergency room and/or anaesthetics staff.

This study indicates that locally, in the vast majority of cases, ECT is performed in either a minor theatre or an operating theatre. Five institutions used a ward or treatment room.

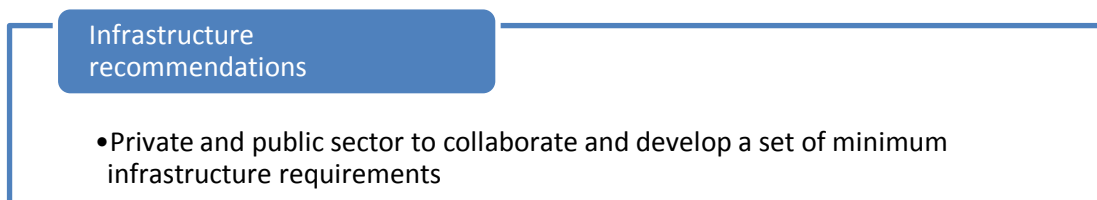
According to the Electroconvulsive Therapy Guidelines of the Department of Health in South Africa, the minimum quality standard is a “minor operating theatre with a recovery room”. Conditions provided by the facility must “ensure safety, be secure and ensure privacy to the mental health user” (MHU) (Department of Health Republic of South Africa, 2009).

According to this guideline, authorisation to perform ECT in state and private hospitals is dependent on an audit process by a provincial health department (Department of Health Republic of South Africa, 2009). No further clarity is given as to what the regulations are that govern the audit process or who the individuals involved are. In the Western Cape province the audit process is governed by legislation pertaining to private hospitals (Province of the Western Cape, 2001) and one questions its general application to a less resource-rich environment such as the public sector.

#### 5.3.1.1 Recommendation

In terms of cost effectiveness, the recommendation would be for the private and public sector to collaborate and develop a set of minimum infrastructure requirements. A useful platform would be the Infrastructure Unit Systems Support (IUSS Online); this is a structured collaboration between the National Department of Health, the Development Bank of Southern Africa (DBSA), the Council for Scientific and Industrial Research (CSIR) and

other stakeholders. The aim of this organisation is to create collaborations, agree on certain norms and standards, thus enabling standardisation of public health infrastructure (IUSS Online, 2012). The infrastructure needs for ECT could be modelled on existing standards as set out by SEAN (National Services Scotland, 2010) or ECTAS (Royal College of Psychiatrists, 2012) which are then modified according to local needs.



**Figure 17: Infrastructure recommendations**

#### **5.4 Informed Consent**

International literature on human rights (UN General Assembly, 1966) and legislation including South African law (National Health Act No 61 of 2003, 2004) describe the importance of consent, more especially informed consent, in any medical procedure.

International ECT guidelines recommend written, signed consent and where the patient is lacking the capacity to provide such consent, local law governing consent to treatment should be followed (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001; Scott, 2005; Department of Health Republic of South Africa, 2009; National Services Scotland, 2010; Royal College of Psychiatrists, 2012).

According to the regulation relating to consent as contained in the Mental Health Care Act 2002 (Mental Health Care Act No 17 of 2002, 2002), MHUs with capacity must decide whether they will receive treatment or not. If the MHU is incapable of giving consent, an appropriate next-of-kin or curator must consent (assent). In the event where none of the persons mentioned is available, the HOH establishment may give consent.

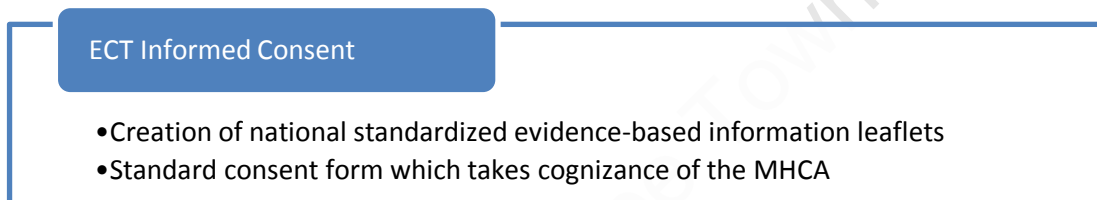
This study revealed that presenting the information to the patient (and their families) as part of the consent process, was an integral part of ECT preparation. Written information is made available in 62% of institutions. Of greater importance is that informed consent or assent is obtained in all institutions in South Africa.

South African ECT providers are well in line with international guidelines when it comes to the concept of informed consent. When compared to international practice, South African ECT consent practice is superior to that of Norway (Jarosch-von Schweder, Wahlund et al.,

2011) where oral consent is legally sufficient and Belgium where fewer than 50% of institutions used a consent document (Sienaert, Dierick et al., 2006). In Malawi (Selis, Kauye et al., 2008) and some Asian countries (Chanpattana, Kramer et al., 2010) often no consent is obtained.

#### 5.4.1.1 Recommendation

The author recommends the creation of national, standardized, evidence-based, information leaflets, that would contain sufficient information to allow the patient or their next-of-kin to make an informed decision. The information form can be used to facilitate the compulsory discussion that must take place with the patient and, if applicable, their next-of-kin. A standard consent form which takes cognizance of the Mental Health Care Act (MHCA) as described previously (Segal & Thom, 2006), is also suggested.



**Figure 18: ECT consent recommendations**

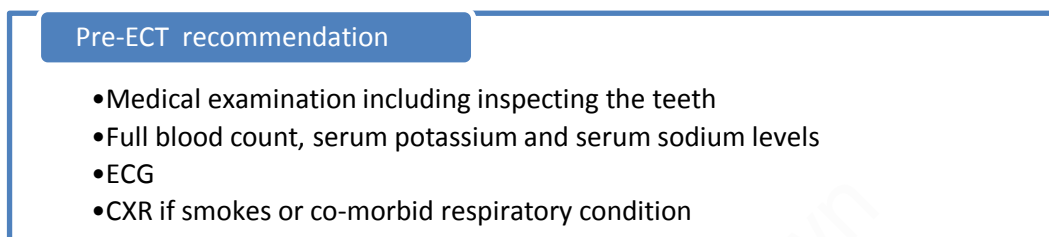
## 5.5 Pre-ECT evaluation

Relevant guidelines state that a pre-ECT evaluation should include a psychiatric and general medical history, as well as a physical examination which includes an assessment of the mouth and teeth (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001; Scott, 2005; National Services Scotland, 2010; Royal College of Psychiatrists, 2012). The presence of a protocol for pre-ECT investigations is regarded as good practice (National Services Scotland, 2010). Even though the APA guidelines state that no laboratory tests are routinely required as part of the work-up, they do recommend that a minimum screening battery is performed. This would entail a full blood count, serum potassium and serum sodium levels, and an ECG. The need for further investigations would be led by the findings of each patients' medical history and medical examination (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001).

The South African guideline recommends that basic blood investigations, a chest X-ray (CXRs), and an electroencephalogram (EEG) should be part of the pre-ECT evaluation. The author queries the justification of CXRs and EEGs for all patients - rather than only for patients identified as high risk patients - and questions whether the electrocardiogram (ECG)

is not a be more appropriate test, since transient cardiovascular changes during ECT are well known. A more cost-effective strategy could also be the use of a CXR only in patients who smoke or have respiratory co-morbidity.

All doctors in this study report that they enquire into a medical history. A medical examination was not performed by all practitioners (only by 95.5%), while only seven (33.3%) reported performing a dental review. The vast majority (87%, n = 20) reported performing a minimal blood work-up.

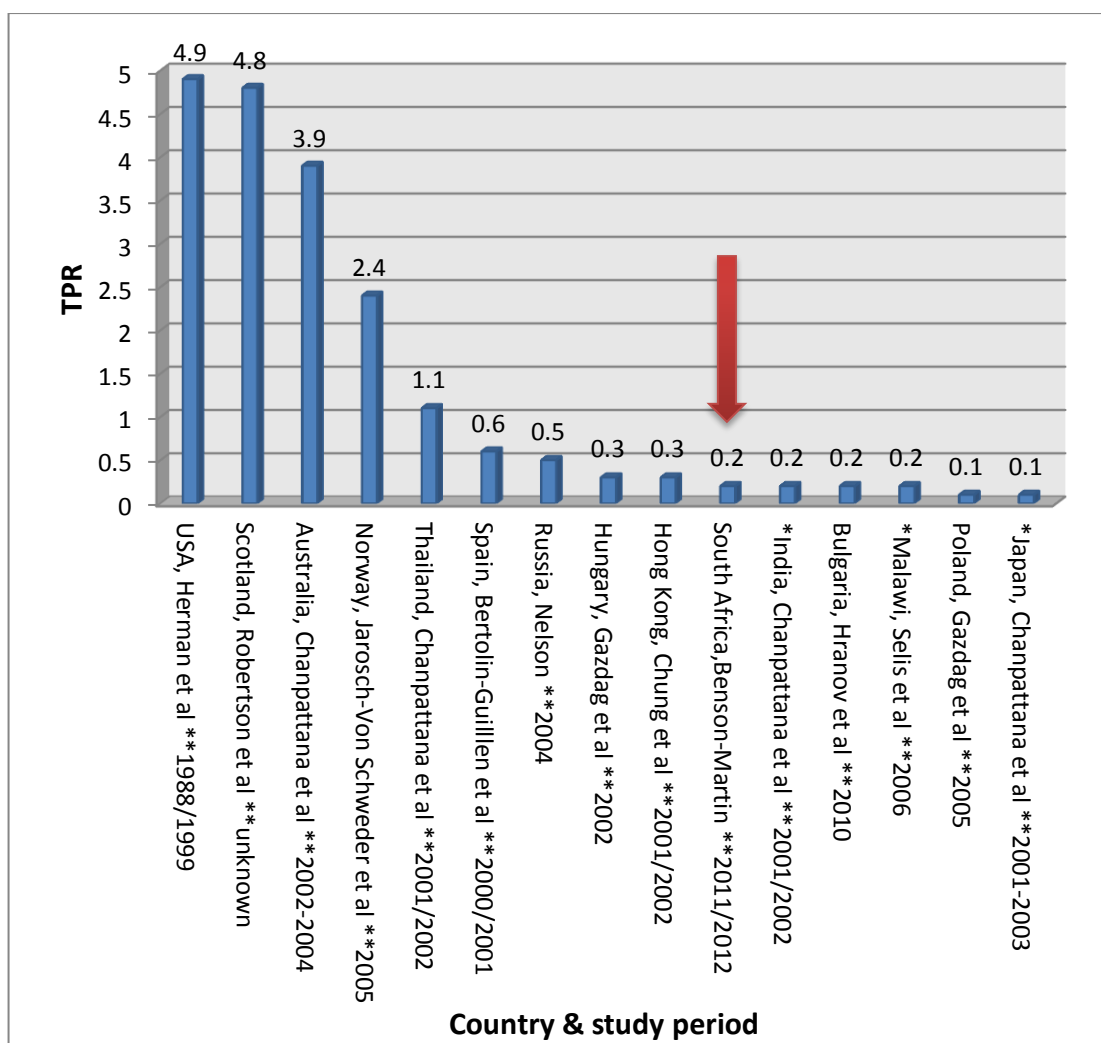


**Figure 19: Pre-ECT evaluation recommendations**

## **5.6 Clinical Aspects of ECT**

### **5.6.1 TPR**

Figure 20 below summarises the estimated TPR across the globe and where this survey has broadly estimated South Africa's position.



**Figure 20: Treated Persons per 10 000 ppy (TPR)**

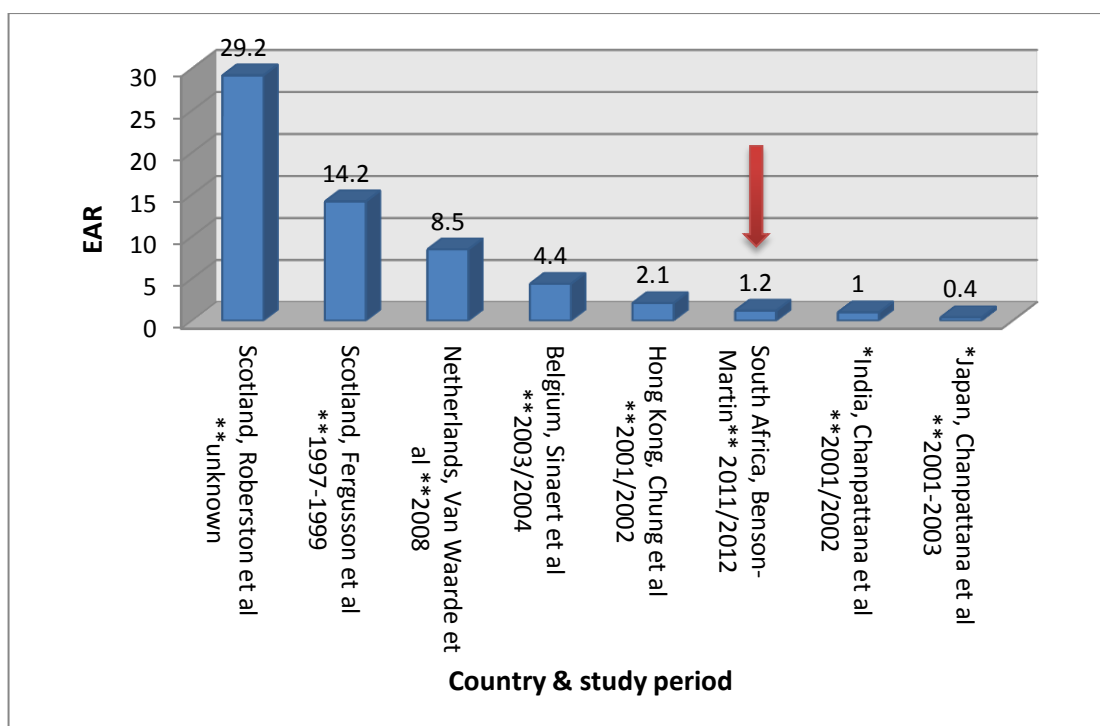
\* Author's calculation from available data

\*\* Years refer to period of data collection

The TPR is comparable with that of India, Bulgaria and Malawi. It is lower than that of some high-income countries, as well as Thailand, Russia and Hungary, but higher than that reported in Poland and Japan.

### 5.6.2 EAR

Similarly to the TPR, the EAR is comparable to that of India and is lower than that of the high-income countries studied below (see Figure 21 below).



**Figure 21: Number of ECT procedures per 10 000 ppy (EAR)**

\* Author's calculation from available data

\*\* Years refer to period of data collection

### 5.6.3 Patients receiving ECT in the private versus the public sector

The STROBE guidelines on reporting for observational studies suggest that inferential analysis of all variables may not be desirable in basic descriptive studies (Vandenbroucke, von Elm et al., 2007). However, because there is huge variability in health delivery in South Africa, it would be important to understand if there are any differences in ECT characteristics between the private and the state health sector. Of interest therefore was the finding that significantly more patients in the private sector receive ECT than in the public sector. The reasons for this could potentially be explained from a resource point of view with more patients in the private sector having access to ECT facilities than in the public sector. This finding could also indicate that more private psychiatrists are willing to use this as a treatment modality than public sector psychiatrists. Other reasons might also include financial; the procedure is a known billable procedure, or potential motivation on the part of the psychiatrist to induce a more rapid treatment response due to limited patient medical aid cover.

## 5.7 Modified ECT

All guidelines that regulate ECT do not explicitly explain that ECT must be performed under anaesthesia with the administration of muscle relaxants - but it is overwhelmingly assumed that this is the case. This is evident from the extensive information available about

anaesthetic protocols during ECT (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001; National Institute for Health and Care Excellence, 2003; Scott, 2005; National Services Scotland, 2010; Royal College of Psychiatrists, 2012). The South African guideline states that there should be “an anaesthetist to provide ECT” and “there should be general anaesthesia available together with muscle relaxants” (Department of Health Republic of South Africa, 2009).

From the literature review, it became apparent that there are still countries that offer unmodified ECT at times. These would include Russia (Nelson, 2005), Spain (Bertolin-Guillen, Peiro-Moreno et al., 2006), India (Andrade, Agarwal et al., 1993; Chanpattana, Kunigiri et al., 2005), Japan (Chanpattana, Kojima et al., 2005), Thailand (Chanpattana & Kramer, 2004), Pakistan (Minhas & Ostroff, 2012) and Malawi (Selis, Kauye et al., 2008).

This study indicates that currently all ECT treatments in South Africa are modified.

## **5.8 Indications**

NICE guidelines recommend that ECT only be used in cases of severe depression, catatonia and “prolonged or severe episode of mania” (National Institute for Health and Care Excellence, 2003).

The UK ECT Consensus group on ECT recommends that ECT be a treatment of choice for severe depression associated with attempted suicide, suicidal ideation or refusal of food and fluids. ECT could also be considered for severe depressive illnesses associated with stupor, marked psychomotor retardation or depressive hallucinations or delusions. It can be used to treat severe mania associated with physical exhaustion of a life-threatening nature; or with treatment-resistance. In schizophrenia, ECT can be used as a fourth-line treatment where treatment with clozapine is ineffective or results in intolerable side-effects. Lastly ECT can be considered in the treatment of catatonia when benzodiazepine treatment has had no efficacy (Scott, 2005).

The APA states that there are primary reasons for ECT use i.e. ECT as a first-line treatment prior to the use of psychotropic medication. This could arise when: there is a need for a rapid response; when the risks of other treatments outweigh the risks of ECT; a history of poor medication response or good ECT response; and when the patient prefers ECT over psychotropic medication. Secondary use of ECT (i.e. after a trial of medication) can occur when there is treatment-resistance, intolerable medication side effects, or a deterioration in the patients’ condition needing a rapid response (American Psychiatric Association: Committee on Electroconvulsive Therapy, 2001).

According to the literature review, depression is reported by many articles to be the most common diagnostic indication for ECT in Europe, North America and Australia. Mania and

psychotic illnesses feature less prominently as an indication in Europe and Australia. Of interest is the contrast for the continents of Asia and Africa where many papers report the most common indication as psychosis. Psychosis is in fact the only diagnostic indication from the African studies (Selis, Kauye et al., 2008).

This survey shows that depression was the most common indication for ECT in South Africa in 2011/2012. This is more in keeping with practice in North America and Europe and contrasts significantly with reported practice elsewhere in Africa.

### **5.9 Gender and Age Data**

According to the literature review, women were administered ECT most frequently in Europe, North America and Australia. The gender ratio was equal in Asia, while limited reports from Africa showed a male predominance. This study shows that 73% of patients that received ECT in South Africa were women.

While it is not uncommon for people older than 60 years to receive ECT in Europe North America and Australia, the treatment appeared to be administered more commonly to a population aged younger than 60 years in Asia and Africa. This still seems to be the case with just over 10% of individuals being over 60 years in this survey. The vast majority of patients (89%) were between the ages of 18 and 59 years, with 0.2% of patients being less than 18 years of age.

### **5.10 Limitations of the Study**

This research study was a retrospective self-report about ECT practice and not a physical audit, and so had to rely on the answers given by the respondents. In addition, the questionnaire was completed by one psychiatrist and one nurse per hospital and his/her method or knowledge of ECT practice might not correlate with that of another ECT practitioner in the hospital.

According to Cook, Dickenson and Eccles, the average response rates to posted questionnaires is 57.5%. (95% CI: 52.2 % to 59.8%) (2009). A review of studies using the Internet to conduct surveys, states that the response rates can range from nine to 94% (Braithwaite, Emery et al., 2003). Posted or e-mail questionnaire surveys are however favoured by social science and medical researchers because of their relatively low cost and minimal personal and organisational needs (Rossouw, 2000; Cummings, Savitz et al., 2001) The limitation is that the issue of ensuring external validity and a representative sample can be challenging (Braithwaite, Emery et al., 2003). However, other than retrospective case note reviews and actual physical audit visits, a survey such as this (see description in Section 3: Research Design and Methodology) appear to be the most useful avenue for obtaining

relevant information in this very specific population of ECT service providers that are spread over a huge geographical area.

The response rate to this survey was 82.8% which can be gauged as fairly good. However the study population was quite small; 29 units of which 24 units responded.

An analysis of the non-responders was not done in this study. It must be noted though, that because a specific population which had many characteristic similarities (nurses and psychiatrists involved in ECT services) was targeted, it could be assumed that there was not much heterogeneity between responders and non-responders. Response bias would therefore be minimal, so contributing positively to the external validity of the study.

Another limitation in the study is the missing data or item non-response i.e. certain respondents did not respond to certain questions. The respondent's reasons for non-response could possibly vary from fatigue, stress, perception that the questions were too sensitive to answer, or simply a lack of knowledge. It can further be hypothesised that questions requiring more than just an implicit response (e.g. tabulating the number of patients or counting the indications for ECT), were often neglected. Other potential reasons could be questionnaire-related e.g. potentially not phrasing the question clearly; not providing clear definitions; questionnaire being too long etc.; missing data could play a negative role in that it reduces sample representativeness. However it was decided that missing data would simply be omitted in the analysis, thus reducing the  $n$  for certain parameters and had been reported as such.

### **5.11 Areas for Further Study**

This survey attempted to study in detail the aspects involved in ECT in South Africa. Areas for further study could include clinical outcomes of ECT in the South African set-up. An important factor that is receiving much international attention is the cognitive side-effects associated with ECT- which could be the subject of another audit.

This study did not explore the MHU's perceptions and attitudes towards ECT. This is an important avenue to explore especially in relation to cultural influences. Likewise, perception and attitudes of medical staff would also be of interest. Quality of life in relation to ECT can be studied in the context of a lower-middle income country (LMIC) like South Africa. This could further lead to an enquiry into the cost-effectiveness of ECT in relation to other treatment modalities. Modalities such as continuation and maintenance ECT can be explored.

Lastly, a study about the difference in rate of ECT use in the private versus the public health sector of the country would be of interest.

## 5.12 Conclusion

The author recommends the further development of revised standards and guidelines against which to accredit ECT units across the country. The audit could be modelled on the well-established SEAN (National Services Scotland, 2010) and ECTAS (Royal College of Psychiatrists, 2012) audit process which could be used by provincial departments of health to licence units.

This is the first nationwide study in South Africa documenting the scope of ECT practice in both private and public sector psychiatric practice. Unpublished data of a pan-African survey of ECT in 2011 showed that there is a wide variety in ECT prescription and practice (Leuvenink, 2011).

In conclusion, this survey has revealed that ECT practice in South Africa: is generally on par with international standards, but would need improvement on aspects such as training and accreditation. The informed consent and assent process is respected and maintained. The estimated rate of ECT use has been established and this could be used as a comparator in global assessments. The most frequent indication for use in this country is depression but it is also used in the treatment of psychosis, catatonia and mania. Finally, the use of ECT in the elderly and in minors is not as common as it is in some parts of the world.

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## 7 Appendix

### 7.1 Appendix A: Questionnaire

1. Please indicate the name of hospital where the ECT suite is situated.

2. In which province is the hospital?

3. Please specify if it is a (choose one):

- 3.1 Public Psychiatric Hospital
- 3.2 Public Central Hospital
- 3.3 Public Regional Hospital
- 3.4 Public District Hospital
- 3.5 Private Psychiatric hospital
- 3.6 Private General Hospital

4. How many ECT procedures have been conducted in the last 12 months

5. If no ECT performed in last 12 months, please specify whether this is due to

- 5.1 No Indication for ECT Yes  No
- 5.2 Lack of Equipment Yes  No
- 5.3 Lack of Staff Yes  No
- 5.4 Lack of Expertise Yes  No
- 5.5 No Licence Yes  No

6. Is ECT performed in:

- 6.1 A ward/treatment room Yes  No
- 6.2 Minor Theatre/Operating room Yes  No

7. Is there a separate recovery room? Yes  No

8. Which of the following is performed

- 8.1 Inpatient ECT Yes  No

- 8.2 Outpatient ECT Yes  No
- 8.3 Both inpatient and outpatient ECT Yes  No
9. Is ECT performed by a
- 9.1 Consultant Psychiatrist Yes  No
- 9.2 Psychiatry Registrar in the presence of Consultant Psychiatrist Yes  No
- 9.3 Psychiatry Registrar in the absence of Consultant Psychiatrist Yes  No
- 9.4 Other professional (e.g. GP, Medical officer, Physician) Yes  No
- 9.5 Please state type of professional
10. Is the patient anaesthetised for the ECT process Yes  No
11. If so, is the anaesthetic procedure performed by a:
- 11.1 Consultant Anaesthetist Yes  No
- 11.2 Anaesthetic Registrar Yes  No
- 11.3 Other (e.g. GP, Medical Officer) Yes  No
- 11.4 Please state the type of professional
12. Is a nurse / nurses present to assist during the anaesthetic and ECT procedure Yes  No
13. If so, is the nurse a:
- 13.1 Professional Nurse: Speciality Anaesthetics Yes  No
- 13.2 Professional Nurse: Speciality Psychiatry Yes  No
- 13.3 Professional Nurse: Generalist Yes  No
- 13.4 Enrolled Nurse Yes  No
- 13.5 Enrolled Nursing Assistant Yes  No
14. Is there another nurse present for the recovery room Yes  No
15. On how many patients was ECT performed in the last 12 months.
- 15.1 Male
- 15.2 Female

15.3 Unknown

16. Please tabulate the number of patients who received ECT- in the last 12 months-in the age ranges below:

16.1 < 18 years

16.2 18-59 years

16.3 ≥ 60 years

17. In the last 12 months: please indicate the number of patients treated with ECT for the conditions listed below. Please consider the main indication only, not co-morbidities

17.1 Depression

17.2 Mania

17.3 Psychosis

17.4 Anxiety

17.5 Depression in pregnancy

17.6 Mania in pregnancy

17.7 Psychosis in pregnancy

17.8 Postpartum depression

17.9 Postpartum mania

17.10 Postpartum psychosis

17.11 Other

18. Does pre-treatment work-up routinely include:

18.1 Written information about the procedure Yes  No

18.2 Oral information about the procedure Yes  No

18.3 Informed signed consent or assent Yes  No

- 18.4 Medical history Yes  No
- 18.5 Dental history Yes  No
- 18.6 Physical examination Yes  No
- 18.7 Dental review Yes  No
- 18.8 Basic blood investigations Yes  No
- 18.9 Please list blood investigations
- 18.10 Chest X-ray Yes  No
- 18.11 ECG Yes  No
- 18.12 Other- Please specify
19. Pre-ECT anaesthetic assessment is performed as follows:
- 19.1 All patients assessed by anaesthetist before ECT Yes  No
- 19.2 All patients assessed at the 1<sup>st</sup> ECT session Yes  No
- 19.3 Selective referral of patients for pre-ECT assessment Yes  No
20. Are any of the following psychotropic medications generally discontinued or omitted during the ECT course:
- 20.1 Benzodiazepines Yes  No
- 20.2 Anticonvulsants Yes  No
- 20.3 Lithium Yes  No
- 20.4 Antidepressants Yes  No
- 20.5 Antipsychotics Yes  No
- 20.6 Other Yes  No
- 20.7 Please specify
- 20.8 None Yes  No
21. What type of ECT machine is used
- 21.1 Spectra Machine Yes  No
- 21.2 Thymatron machine Yes  No

- 21.3 Other-Please specify
22. What kind of electrical stimulation is used
- 22.1 Brief pulse Yes  No
- 22.2 Ultra-brief pulse Yes  No
- 22.3 Sine wave Yes  No
- 22.4 Not known Yes  No
23. What method of ECT dosage administration is used
- 23.1 Age method Yes  No
- 23.2 Half-age method Yes  No
- 23.3 Dose titration method Yes  No
- 23.4 Other- Please specify
24. Which electrode placement is used
- 24.1 Bilateral/Bitemporal exclusively Yes  No
- 24.2 Bifrontal exclusively Yes  No
- 24.3 Unilateral exclusively Yes  No
- 24.4 Both unilateral and bilateral placements Yes  No
25. What length of seizure duration is considered adequate
26. If a seizure is considered inadequate, how often is re-stimulation attempted
- Once  Twice  Thrice  More often
27. Is pre-medication with an anticholinergic medication used routinely
- Yes  No
28. If so, which agent is used
- 28.1 Atropine Yes  No
- 28.2 Glycopyrrolate Yes  No
- 28.3 Other Yes  No
29. What kind of induction agent is most often used
- 29.1 Propofol Yes  No

- 29.2 Methohexitol Yes  No
- 29.3 Thiopental Yes  No
- 29.4 Etomidate Yes  No
- 29.5 Midazolam Yes  No
- 29.6 Other- please state
- 29.7 None Yes  No
30. What kind of muscle relaxant agent is most often used
- 30.1 Suxemethonium Yes  No
- 30.2 Rocuronium Yes  No
- 30.3 Atracurium Yes  No
- 30.4 Mivacurium Yes  No
- 30.5 Rapacuronium Yes  No
- 30.6 Other- please state
- 30.7 None Yes  No
31. What kind of anaesthetic monitoring is used during ECT
- 31.1 Noninvasive blood pressure Yes  No
- 31.2 Capnography Yes  No
- 31.3 Pulse oximetry Yes  No
- 31.4 Continuous electrocardiography (ECG) Yes  No
- 31.5 None Yes  No
32. What kind of seizure monitoring is used during ECT?
- 32.1 Clinical observation of convulsive muscle activity Yes  No
- 32.2 Cuff Method Yes  No
- 32.3 Electroencephalography (EEG) Yes  No
- 32.4 Electromyography (EMG) Yes  No
33. How many ECT procedures would you administer in a standard course
-

34. What is the standard frequency of ECT procedures per week
- 34.1 Once a week Yes  No
- 34.2 Twice a week Yes  No
- 34.3 Three times a week Yes  No
- 34.4 More often Yes  No
35. Is continuation ECT (c-ECT) performed Yes  No
36. Is maintenance ECT (m-ECT) performed Yes  No

## 7.2 Appendix B: Introduction letter

Dear Doctor

My name is Janine Benson-Martin, a psychiatrist in state practice currently enrolled at the University of Cape Town for a Masters of Philosophy: Public Mental Health. The project is entitled “**The Scope of ECT Practice in South Africa**”. The purpose of this study is to investigate local ECT in South Africa and to compare to international practice.

I would thus need to collect data from at least one clinician involved in administering ECT per designated ECT unit. Data will be collected by means of an e-mailed questionnaire (Time to complete: 12-15 min). It will cover relevant questions on the following: location of the ECT site; frequency of performance of ECT procedures; common indicators for use; ECT and anaesthetic work-up; the type of ECT machine used, ECT technique and scheduling; anaesthesia and monitoring tools used; and finally staffing of the ECT team. In addition, I would also kindly request the ECT Unit Nurse to tabulate the following *12-month* statistics and report it to the psychiatrist for entry into the questionnaire:

- Number of ECT procedures performed
- Number of patients who received ECT
- Tabulation of patients according to sex and age
- Tabulation according to indications for ECT

**Would the clinician please e-mail the questionnaire back to me with the *name of the hospital as a filename*? If any information is outstanding, clinicians will be contacted telephonically in order to clarify questions. Consent will be obtained from each respondent at the beginning of the questionnaire. To ensure confidentiality, no personal identifiable data will be collected. The consent form can be scanned and e-mailed back to me or can be faxed to 021 4403199.**

Thanking you in advance for your anticipated cooperation.

Signature removed

MBChB(UCT), Dr.med.(Zürich), CML(Unisa), FCPsych(SA)

### 7.3 Appendix C: Information Sheet

The purpose of this study is to determine current electroconvulsive therapy practice (ECT) in South Africa and to compare it with practice in the rest of the world. This would involve determining the characteristics of local ECT practice wherever it is performed.

In order to complete this research project, I would need to collect data from you, the clinician involved in administering ECT. I therefore kindly request the completion of this questionnaire. For your convenience it can be completed electronically and a telephonic follow-up will follow if need be. This will be arranged at your convenience. The questionnaire will cover relevant questions on the following: location of the ECT site; frequency of performance of ECT procedures; common indicators for use; ECT and anaesthetic work-up; the type of ECT machine used, ECT technique and scheduling; anaesthesia and monitoring tools used; and staffing of the ECT team.

Consent will be obtained from each respondent at the beginning of the questionnaire. To ensure confidentiality, no personal identifiable data will be collected. All information about *individual* hospital ECT units or health organisations remains confidential and data will be analysed as groups e.g. private sector and public sector.

Participants will be voluntary and no remuneration will be offered for participation. Collected data will be stored in a secure location and access will be restricted to the investigator, my supervisor, and the statistician who will help with the data analysis. On completion of this study the results could be made available to the participants, the hospital facility, and the DOH upon request.

Permission for this study has been granted from the University of Cape Town, Human Research Ethics Committee. HREC Ref: 239/2012

**For any further enquiries, please contact: (c) 0846111927; (w) 0214403225; j.benson-martin@uct.ac.za**

## 7.4 Appendix D: Consent Form

### CONSENT FORM

I  agree to participate in this study and to the documentation of my responses to this questionnaire.

I understand that no personal identifying data will be used in this study.

I understand that the results of the analysis carried out on the recorded material will be made available to participants on request.

I understand that the findings will only be utilised for research purposes, subject to approval of the University of Cape Town Research Ethics Committee, and that any information from such research will be used in the process of fulfilling the dissertation requirements for an MPhil Degree in Public Mental Health. The results of this study is also intended for publication in a peer-reviewed journal

I understand that I may withdraw my consent for any aspect of the above at any time.

If any further information is required regarding your rights and welfare as research subjects, feel free to contact the Human Research Ethics Committee, University of Cape Town. Tele: 021 4066338, Fax: 021 4066411.

For your convenience, the completed consent form can be scanned and e-mailed to: [j.benson-martin@uct.ac.za](mailto:j.benson-martin@uct.ac.za); or faxed to 021 4403199

Signature of participant: ..... Date: [Click here to enter a date](#).

Signature of researcher: \_

Date: [Click here to enter a date](#).