

ECT in the United States

Charles H. Kellner, MD

Chief of Electroconvulsive Therapy (ECT)
New York Community Hospital
Brooklyn, NY USA

Tallinn, Estonia
May 24, 2018

Charles H. Kellner, MD

Disclosures

- NIMH (grant support)
- UpToDate (honoraria for ECT topics)
- Cambridge University Press (royalties)
- NorthWell Health System
(honoraria for teaching ECT course)
- Psychiatric Times (fees for ECT column)

Data Sources

- CMS: Centers for Medicare and Medicaid Services
- Texas mandated ECT reporting
- PubMed
- Patrick Ying, MD
- CK, personal experience
- The Internet (fake news?)

The USA is Not Estonia

- Estonia: 1.316 million
- USA: 325.7 million
- US population is 250 X that of Estonia

New York City is Not Estonia

- Estonia: 1.316 million
- New York City: 8.538 million
- NYC population is 6 X that of Estonia

Brooklyn is Not Estonia

- Estonia: 1.316 million
- Brooklyn: 2.637 million
- Brooklyn population is 2 X that of Estonia

ECT Around the World

“Excellent ECT services are all alike; every deficient ECT service is deficient in its own way.”

Adapted from: Tolstoy, L. 1828-1910, author







✕ Exit full screen



Perspectives on ECT in the USA

- Optimist: ECT is alive and well
- Pessimist: ECT remains a treatment of last resort (easier to buy a gun than get ECT)
- Scientist: wish there were better data on utilization (like Nordic countries)

The FDA and ECT

William M. McDonald, MD, Richard D. Weiner, MD, PhD,†
Laura J. Fochtmann, MD, MBI,‡§|| and W. Vaughn McCall, MD, MS¶*

The practice of electroconvulsive therapy (ECT) in the United States has come to a very important juncture, and we believe this is a critical period that will have a long-term impact on ECT practice in the United States and potentially in other countries. On December 29, 2015, the Food and Drug Administration (FDA) Office of Device Management proposed new rules for the reclassification of ECT devices in the United States. The proposal includes limitations on the indications for use of ECT devices and warnings that will need to be given to patients and their families who are considering ECT (the full texts of the proposed rule [<https://www.gpo.gov/fdsys/pkg/FR-2015-12-29/pdf/2015-32592.pdf>] and guidance document [<http://www.fda.gov/downloads/MedicalDevices/DeviceRegulationandGuidance/>]

FDA “Cleared Indications for Use” ECT Devices

1. Depression (unipolar and bipolar)
2. Schizophrenia
3. Bipolar manic (and mixed) states
4. Schizoaffective disorder
5. Schizophreniform disorder
6. Catatonia

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JAMA Network

- Podcast:
- *Treating Depression in Older Patients*
- 34 minutes, including section on treatment resistance
- NOT A SINGLE MENTION OF ECT!

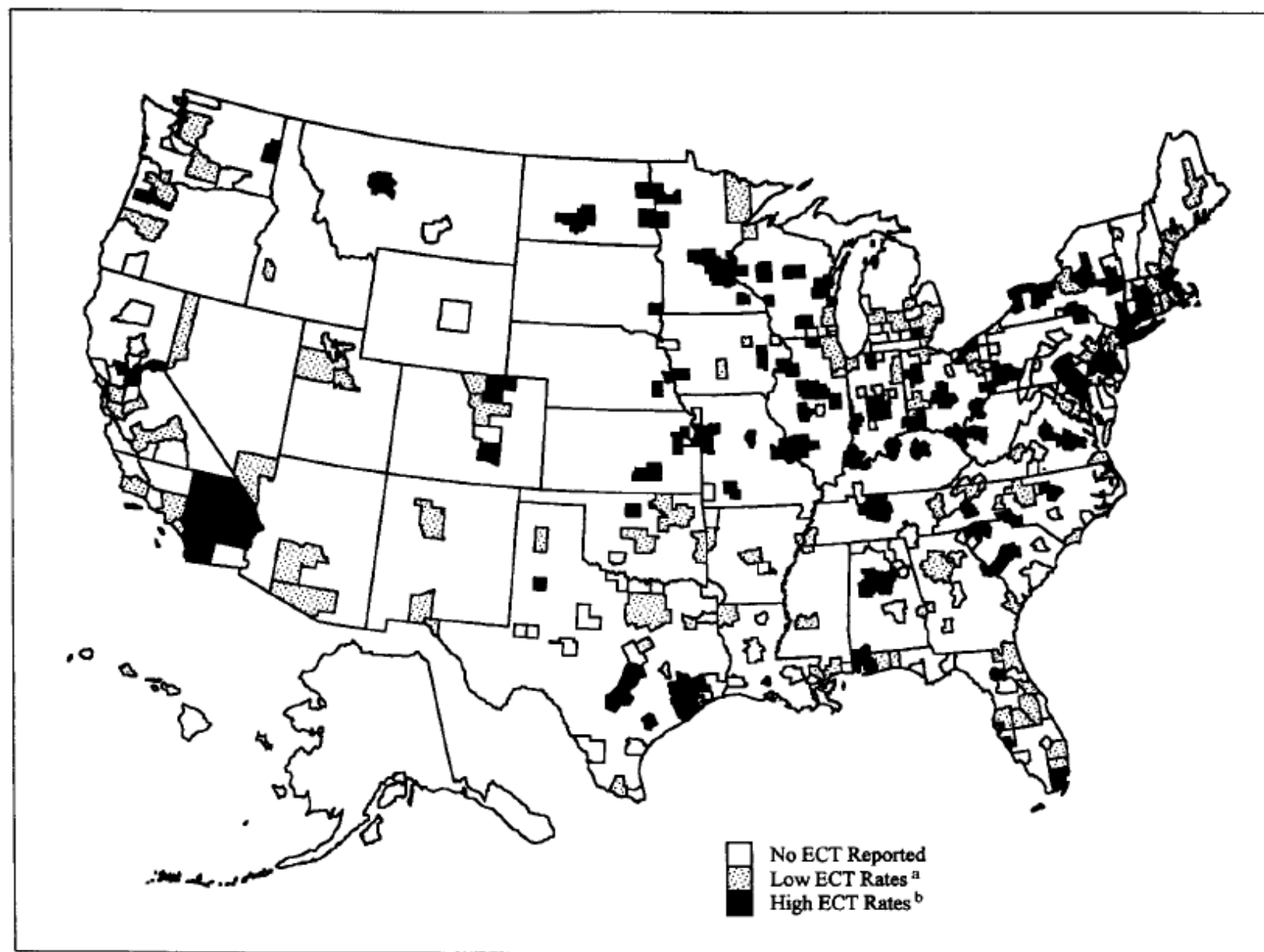
Use of ECT in the United States in 1975, 1980, and 1986

James W. Thompson, M.D., M.P.H., Richard D. Weiner, M.D., Ph.D.,
and C. Patrick Myers, M.A.

Objective: The objective was to analyze nationally representative data from the National Institute of Mental Health (NIMH) to update trends in the use of ECT in the United States. Method: The data are estimates from the NIMH Sample Survey Program for 1975, 1980, and 1986, which include representative samples of inpatients in psychiatric facilities in the United States. The authors' analyses use trend data from public general hospitals, private general hospitals, private psychiatric hospitals, and state and county mental hospitals. They report on 126,739 patients who received ECT in 1975, 1980, and 1986, focusing on data from 1980 and 1986. Results: In 1986, 36,558 patients received ECT. This represents a decrease from the 1975 figure (58,667 patients) but no change from 1980 (31,514 patients). ECT was used primarily in private general hospitals (64%) and private psychiatric hospitals and much less often in public general hospitals and state and county mental hospitals. In 1986 over 90% of ECT recipients were white, and 84% had an affective disorder diagnosis. Although 71% of the patients who received ECT were women, hospital type and age were more important than gender in predicting ECT use. Individuals 65 years of age and older received ECT out of proportion to their numbers in inpatient care. Conclusions: The declining use of ECT in the United States ended in the 1980s. Few African Americans receive ECT, and its use is becoming more targeted toward patients with affective disorders. The amount of services research done on this modality is very small. Basic questions have yet to be answered, including who refers patients for ECT and why, and how ECT fits into the overall course of treatment.

(Am J Psychiatry 1994; 151:1657-1661)

FIGURE 1. Annual ECT Use in 317 U.S. Metropolitan Statistical Areas



^aECT use per capita greater than zero and less than the median rate for all metropolitan statistical areas.

^bECT use per capita equal to or greater than the median rate for all metropolitan statistical areas.

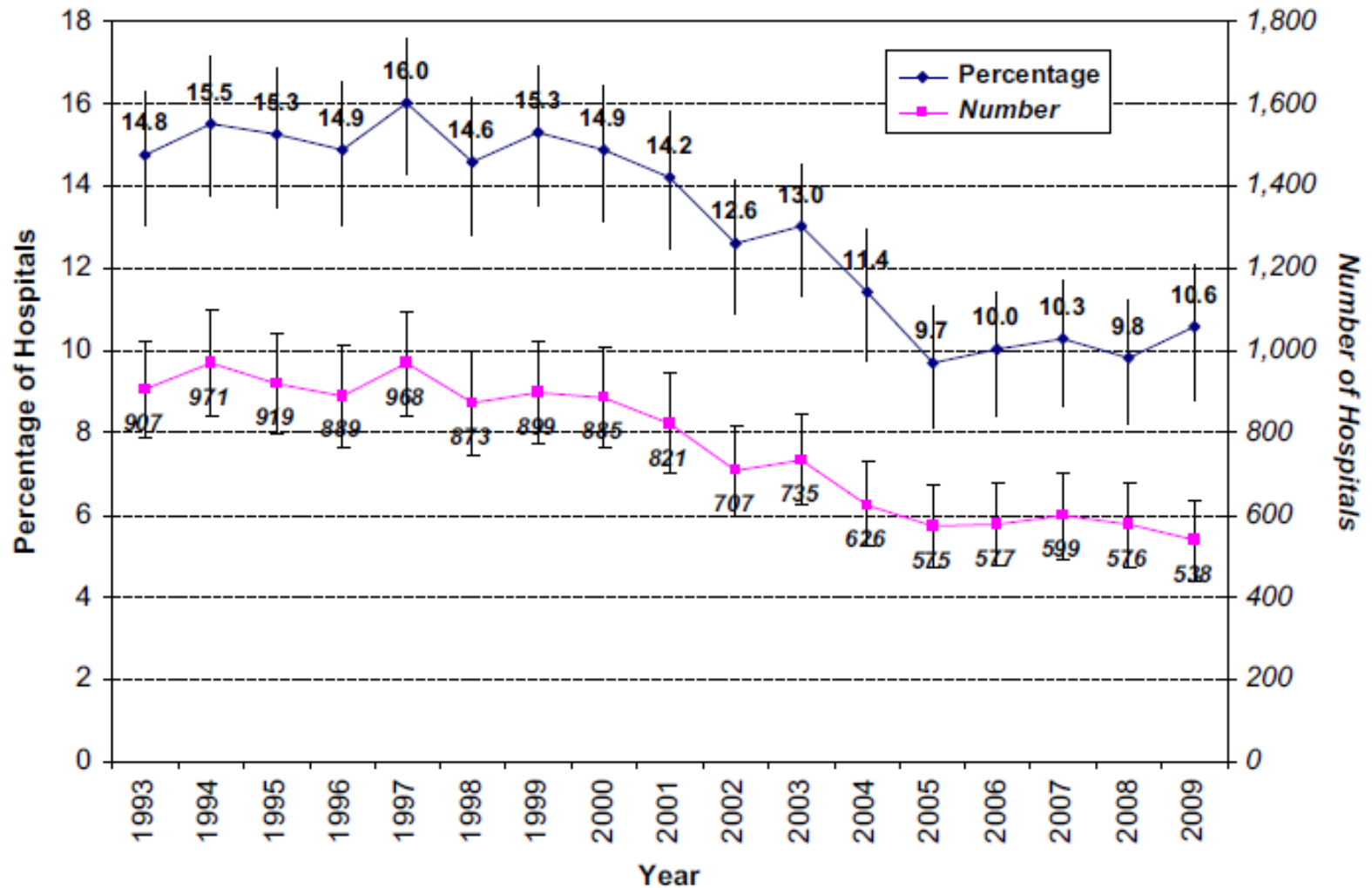
Variation in ECT Use in the United States

Richard C. Hermann, M.D., Robert A. Dorwart, M.D., M.P.H.,
Claudia W. Hoover, M.A., and Jeremy Brody, B.A.

***Objective:** The authors measured the variation in ECT utilization rates across 317 metropolitan statistical areas of the United States and determined to what degree this variation is associated with health care system characteristics, demographic factors, and the stringency of state regulation of ECT. **Method:** Data from APA's 1988–1989 Professional Activities Survey were used to estimate ECT utilization rates for the metropolitan statistical areas. Multiple regression analysis was used to determine the relative influence of provider, demographic, and regulatory factors on variation in ECT use across areas. **Results:** Among the psychiatrists surveyed, 17,729 reported treating 4,398 patients with ECT during the study period. No ECT use was reported in 115 metropolitan statistical areas. Among the remaining 202 metropolitan statistical areas, annual ECT use varied from 0.4 to 81.2 patients per 10,000 population. The strongest predictors of variation in ECT use across metropolitan statistical areas were the number of psychiatrists, number of primary care physicians, number of private hospital beds per capita, and stringency of state regulation of ECT. **Conclusions:** Rates of ECT use were highly variable, higher than for most medical and surgical procedures. In some urban areas, access to ECT appears limited. Predictors of variation in ECT rates have implications for expanding access to the procedure. The extent of variation suggests psychiatrists continue to lack consensus regarding the use of ECT. Better data on the effectiveness of psychiatric treatments may lead to a broader professional consensus and may narrow variations in clinical practices.*

(Am J Psychiatry 1995; 152:869–875)

ECT in US General Hospitals



Case BG, et al.; Declining Use of Electroconvulsive Therapy in US General Hospitals.
 Biol Psychiatry. 2012 Oct. PMID: 23059049

Association of Electroconvulsive Therapy With Psychiatric Readmissions in US Hospitals

Eric P. Slade, PhD; Danielle R. Jahn, PhD; William T. Regenold, MDCM; Brady G. Case, MD

IMPORTANCE Although electroconvulsive therapy (ECT) is considered the most efficacious treatment available for individuals with severe affective disorders, ECT's availability is limited and declining, suggesting that information about the population-level effects of ECT is needed.

OBJECTIVE To examine whether inpatient treatment with ECT is associated with a reduction in 30-day psychiatric readmission risk in a large, multistate sample of inpatients with severe affective disorders.

DESIGN, SETTING, AND PARTICIPANTS A quasi-experimental instrumental variables probit model of the association correlation of ECT administration with patient risk of 30-day readmission was estimated using observational, longitudinal data on hospital inpatient discharges from US general hospitals in 9 states. From a population-based sample of 490 252 psychiatric inpatients, a sample was drawn that consisted of 162 691 individuals with a principal diagnosis of major depressive disorder (MDD), bipolar disorder, or schizoaffective disorder. The key instrumental variable used in the analysis was ECT prevalence in the prior calendar year at the treating hospital. To examine whether ECT's association with readmissions was heterogeneous across population subgroups, analyses included interactions of ECT with age group, sex, race/ethnicity, and diagnosis group. The study was conducted from August 27, 2015, to March 7, 2017.

MAIN OUTCOME AND MEASURES Readmission within 30 days of being discharged.

RESULTS Overall, 2486 of the 162 691 inpatients (1.5%) underwent ECT during their index admission. Compared with other inpatients, those who received ECT were older (mean [SD], 56.8 [16.5] vs 45.9 [16.5] years; $P < .001$) and more likely to be female (65.0% vs 54.2%; $P < .001$) and white non-Hispanic (85.3% vs 62.1%; $P < .001$), have MDD diagnoses (63.8% vs 32.0%; $P < .001$) rather than bipolar disorder (29.0% vs 40.0%; $P < .001$) or schizoaffective disorder (7.1% vs 28.0%; $P < .001$), have a comorbid medical condition (31.3% vs 26.6%; $P < .001$), have private (39.4% vs 21.7%; $P < .001$) or Medicare (49.2% vs 39.4%; $P < .001$) insurance coverage, and be located in urban small hospitals (31.2% vs 22.3%; $P < .001$) or nonurban hospitals (9.0% vs 7.6%; $P = .02$). Administration of ECT was associated with a reduced 30-day readmission risk among psychiatric inpatients with severe affective disorders from an estimated 12.3% among individuals not administered ECT to 6.6% among individuals administered ECT (risk ratio [RR], 0.54; 95% CI, 0.28-0.81). Significantly larger associations with ECT on readmission risk were found for men compared with women (RR, 0.44; 95% CI, 0.20-0.69 vs 0.58; 95% CI, 0.30-0.88) and for individuals with bipolar disorder (RR, 0.42; 95% CI, 0.17-0.69) and schizoaffective disorder (RR, 0.44; 95% CI, 0.11-0.79) compared with those who had MDD (RR, 0.53; 95% CI, 0.26-0.81).

CONCLUSIONS AND RELEVANCE Electroconvulsive therapy may be associated with reduced short-term psychiatric inpatient readmissions among psychiatric inpatients with severe affective disorders. This potential population health effect may be overlooked in US hospitals' current decision making regarding the availability of ECT.

Association of Electroconvulsive Therapy With Psychiatric Readmissions in US Hospitals

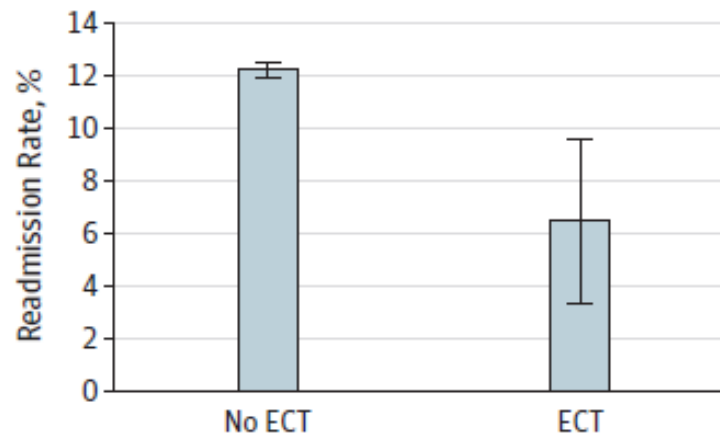
Table 1. Weighted Sample Characteristics^a

Characteristic	No. (%)			F ^b	P Value
	Overall (N = 162 691)	No ECT (n = 160 205)	ECT (n = 2486)		
Age, mean (SD), y	46.1 (16.6)	45.9 (16.5)	56.8 (16.5)	1024.5	<.001
Women	90 655 (54.4)	89 038 (54.2)	1617 (65.0)	112.1	<.001
Race/ethnicity					
White, non-Hispanic	107 152 (62.4)	105 031 (62.1)	2121 (85.3)	989.9	<.001
Black, non-Hispanic	21 715 (15.8)	21 632 (16.0)	83 (3.3)	1034.0	<.001
Hispanic	18 376 (10.4)	18 254 (10.5)	122 (4.9)	152.4	<.001
Other	15 448 (11.4)	15 288 (11.4)	160 (6.4)	96.0	<.001
Diagnosis group					
MDD	68 287 (32.5)	66 700 (32.0)	1587 (63.8)	507.0	<.001
Bipolar disorder	65 961 (39.9)	65 239 (40.0)	722 (29.0)	1056.0	<.001
Schizoaffective disorder	28 443 (27.6)	28 266 (28.0)	177 (7.1)	396.8	<.001
Substance use disorder	64 265 (34.4)	63 812 (34.7)	453 (18.2)	425.9	<.001
Medical comorbidity ^c	39 978 (26.7)	39 201 (26.6)	777 (31.3)	24.0	<.001
Length of stay, mean (SD), d	20.6 (20.1)	20.6 (20.1)	20.7 (19.4)	0.3	.87
Source of payment ^d					
Private insurance	48 633 (22.0)	48 137 (21.7)	979 (39.4)	317.3	<.001
Medicare	47 884 (39.5)	46 982 (39.4)	1223 (49.2)	92.2	<.001
Medicaid	38 531 (25.3)	38 668 (25.6)	186 (7.5)	1050.2	<.001
Other insurance	11 950 (5.9)	12 024 (5.9)	67 (2.7)	92.9	<.001
Uninsured	15 693 (7.3)	16 018 (7.4)	31 (1.2)	634.0	<.001
Hospital type					
Urban, medium or large	99 714 (67.7)	98 235 (67.8)	1479 (59.5)	68.7	<.001
Urban, small	44 771 (22.8)	43 996 (22.3)	775 (31.2)	81.6	<.001
Nonurban	15 173 (7.7)	14 949 (7.6)	224 (9.0)	5.5	.02
Unknown location	3033 (1.8)	3025 (1.9)	8 (0.3)	155.4	<.001
Hospital delivers any inpatient ECT	63 677 (40.8)	61 191 (39.9)	2486 (100)		NA

Association of Electroconvulsive Therapy With Psychiatric Readmissions in US Hospitals

Eric P. Slade, PhD; Danielle R. Jahn, PhD; William T. Regenold, MDCM; Brady G. Case, MD

Figure. Estimated 30-Day Inpatient Readmission Rates Without and With Electroconvulsive Therapy (ECT)



Error bars indicate 95% CI.

Modern Electroconvulsive Therapy Vastly Improved yet Greatly Underused

JAMA Psychiatry August 2017 Volume 74, Number 8

Harold A. Sackeim, PhD

Since the 1940s, electroconvulsive therapy (ECT) has been considered the most effective intervention for severe mood disorders.¹ To my knowledge, no treatment, pharmacological

←
Related article page 798

or otherwise, has matched ECT in speed or likelihood of remission of major depressive episodes. Electroconvulsive therapy is equally effective in unipolar and bipolar depression and has profound anti-manic properties.² Several long-term follow-up studies have suggested that patients who receive ECT have reduced mortality of all causes relative to non-ECT control patients.³

There was a dramatic decrease in ECT use once antidepressant medications were introduced. While this decrease may have slowed in recent years, only a small fraction of potentially appropriate patients receive ECT in the United States. In this issue of *JAMA Psychiatry*, Slade et al⁴ found across 9 states that only 1.5% of general hospital inpatients with severe mood disorder received ECT during their index admission. Historically, the 2 major clinical considerations thought to limit ECT use were its adverse cognitive effects and propensity for relapse. In recent years, both limitations have been substantially addressed.

Marked progress has been made in refining the ECT electrical stimulus. In the era of sine-wave stimulation (1940-1980s), the time to recover full orientation following seizure induction averaged several hours, with many patients developing continuous disorientation.⁵ The introduction of titration of the ECT electrical dose to the individual seizure threshold and brief pulse stimulation reduced the time to orientation recovery to about 45 minutes for bilateral and 30 minutes for right unilateral ECT.⁶ The introduction of ultrabrief stimulation further reduced recovery time to approximately 15 minutes for bilateral and 10 minutes for right unilateral ECT.⁷ The most severe and persistent adverse cognitive effect of ECT pertains to memory for past events (retrograde amnesia), and orientation recovery time predicts the magnitude of this long-term amnesia.⁸ With the advances in ECT technique that reduced recovery time, there was a parallel decrease in the severity of long-term retrograde amnesia. Recent work has failed to detect any adverse effect of high-dose, ultrabrief pulse right unilateral ECT in memory or other cognitive assessments conducted within days of ECT course termination.⁷ In a 2016 large multisite study in geriatric depression, this form of ECT resulted in a 62% remission rate.⁹

At the time of the introduction of antidepressant medications, it was estimated that 50% of patients with depression would relapse within 6 months if given placebo following remission with ECT and that only 20% would relapse if administered continuation antidepressant pharmacotherapy. Electroconvulsive therapy samples have become increasingly composed of patients with treatment-resistant depression. It is now estimated that nearly 85% of patients relapse if ECT is followed by placebo and that approximately 50% will retain benefit for a year whether treated with aggressive continuation pharmacotherapy or continuation ECT.^{10,11} However, recent work also indicates that, as in the short-term treatment of the major depressive episode,¹² the combination of ECT and pharmacotherapy as continuation treatment is more potent than either intervention alone. In their randomized study in geriatric depression, Kellner et al¹³ demonstrated that the combination of pharmacological treatment with venlafaxine and lithium and individualized administration of high-dose, ultrabrief pulse right unilateral ECT was superior to pharmacology alone and resulted in a 6-month relapse rate of less than 15%.

A salient contribution of the STAR*D study¹⁴ was the recalibration of expectations regarding antidepressant medication efficacy. The STAR*D study found that after failing to benefit from 2 antidepressant treatments, the conjoint probability of remitting with a third or fourth medication regimen and sustaining that remission for a year was, in each case, less than 5%.¹⁴ It is now widely recognized that approximately 30% of patients with mood disorders present with treatment-resistant depression. Even if the recent findings of Kellner et al¹³ are dismissed and a more conservative rate of sustained remission is adopted, ECT has a several-fold advantage over the level 3 and level 4 STAR*D pharmacological strategies, both in the likelihood of remission with short-term treatment and likelihood of sustaining the remission for a year (eg, 60% remission rate × 50% sustained rate = 30% remission and sustained rate). The growing awareness of the limitations of our interventions for treatment-resistant depression, the strong efficacy of ECT, and the fact that ECT can now be routinely conducted with minimal cognitive consequences compel renewed interest in this intervention.

Slade et al⁴ have added another piece of evidence supporting the efficacy of ECT. While controlling for a variety of patient-level variables, such as age, sex, and length of index hospitalization, they found that the rate of readmission for mood disorder within 30 days of hospital discharge was about half in patients who had received ECT (6.6%) compared with the much larger sample of inpatients not treated with ECT (12.3%). This finding is of consequence because the study examined the entire population of inpatients with mood disorder diagnoses in general hospitals in 9 US states and thus was

Identifying Recipients of Electroconvulsive Therapy: Data From Privately Insured Americans

Samuel T. Wilkinson, M.D., Edeanya Agbese, M.P.H., Douglas L. Leslie, Ph.D., Robert A. Rosenheck, M.D.

Objective: Despite the effectiveness of electroconvulsive therapy (ECT), limited epidemiologic research has been conducted to identify rates of ECT use and characteristics of patients who receive ECT. Sociodemographic and clinical characteristics associated with ECT use were examined among patients with mood disorders in the MarketScan commercial insurance claims database.

Methods: Among individuals with major depressive disorder or bipolar disorder, sociodemographic and clinical characteristics of those who received ECT and those who did not were compared by using bivariate effect size comparisons and multivariate logistic regression.

Results: Among unique individuals in the 2014 MarketScan database (N=47,258,528), the ECT utilization rate was 5.56 ECT patients per 100,000 in the population. Of the 969,277 patients with a mood disorder, 2,471 (.25%) received ECT.

Those who received ECT had substantially higher rates of additional comorbid psychiatric disorders (risk ratio [RR]=5.70 for any additional psychiatric disorder), numbers of prescription fills for any psychotropic medication (Cohen's $d=.77$), rates of any substance use disorder (RR=1.97), and total outpatient psychotherapy visits (Cohen's $d=.49$). The proportion of patients with a mood disorder who received ECT in the West (.19%) was substantially lower than in other U.S. regions (.28%). This difference was almost entirely accounted for by one western state comprising 59.1% of patients in that region.

Conclusions: Use of ECT is exceptionally uncommon and limited to patients with extensive multimorbidity and high levels of service use. ECT utilization is most limited in areas of the country where regulatory restrictions are greatest.

Psychiatric Services in Advance (doi: 10.1176/appi.ps.201700364)

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TABLE 1. Demographic, clinical, and service use characteristics of privately insured adults with mood disorders^a

Variable	Non-ECT group ^b (N=969,277)		ECT group (N=2,471)		Effect size	
	N	%	N	%	Risk ratio	Cohen's d
Demographic characteristic						
Male	315,132	32.6	806	32.6	1.00	
Age (years), M±SD	42.9±13.6		46.3±12.4			.27
Urban area resident	850,347	87.7	2,183	88.3	1.01	
Comorbid medical condition						
Seizures	12,794	1.3	77	3.1	2.36	
Insomnia	43,230	4.5	170	6.9	1.54	
Myocardial infarction	4,846	.5	17	.7	1.38	
Congestive heart failure	8,917	.9	32	1.3	1.41	
Peripheral vascular disease	14,248	1.5	65	2.6	1.79	
Cerebrovascular accident	22,972	2.4	107	4.3	1.83	
Chronic obstructive airway disease	99,351	10.3	326	13.2	1.29	
Hepatic disease	30,629	3.2	105	4.3	1.34	
Diabetes mellitus	92,760	9.6	334	13.5	1.41	
Renal disease	12,698	1.3	67	2.7	2.06	
Cancer	32,083	3.3	110	4.5	1.36	
Any pain diagnosis	228,652	23.6	655	26.5	1.12	
Musculoskeletal pain	346,517	35.8	1,119	45.3	1.27	
Charlson Comorbidity Index (M±SD) ^c	.50±1.18		.68±1.26			.15
Psychiatric diagnosis						
Other depression (dysthymia)	270,428	27.9	1,986	80.4	2.88	
Posttraumatic stress disorder	41,194	4.3	285	11.5	2.71	
Anxiety disorder	380,538	39.3	1,595	64.6	1.64	
Adjustment disorder	85,490	8.8	237	9.6	1.09	
Personality disorders	14,539	1.5	273	11.1	7.37	
Schizophrenia	13,279	1.4	283	11.5	8.33	

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TABLE 2. Geographic variation of ECT utilization rates among privately insured adults with a mood disorder^a

U.S. region ^b	Non-ECT group	ECT group	% receiving ECT
Northeast	226,567	633	.28
North-Central	196,311	535	.27
South	306,649	842	.27
West	213,411	397	.19

^a Source: 2014 MarketScan database. ECT, electroconvulsive therapy

^b Of the data, 2.5% were missing.

Electroconvulsive Therapy at a Veterans Health Administration Medical Center

Samuel T. Wilkinson, MD† and Robert A. Rosenheck, MD*‡*

Objectives: Little epidemiologic research has examined the practice of electroconvulsive therapy (ECT). We investigated sociodemographic and clinical characteristics, service use, and psychotropic medication prescription patterns associated with ECT use at a Veterans Health Administration Medical Center.

Methods: Among veterans receiving specialty mental health services, we compared those who received ECT with those who did not using bivariate χ^2 and t tests and multivariate logistic regression.

Results: In fiscal year 2012, 11,117 veterans received specialty mental health services, of whom 50 received ECT (0.45%) in FY2012 or FY2013. Those who received ECT were more likely to be diagnosed with major depressive or bipolar disorders and had substantially higher levels of mental health service usage (Cohen $d > 0.75$) and psychotropic prescription fills, including antidepressants (Cohen $d = 2.66$), antipsychotics (Cohen $d = 2.15$), lithium (Cohen $d = 1.34$), mood stabilizers (Cohen $d = 1.30$), and anxiolytic/sedative/hypnotics (Cohen $d = 1.34$).

Conclusions: Our findings suggest that ECT is used as a treatment of last resort, although available evidence and guidelines recommend wider use.

Key Words: electroconvulsive therapy, services, epidemiology

(*J ECT* 2017;33: 249–252)

Electroconvulsive Therapy at a Veterans Health Administration Medical Center

Samuel T. Wilkinson, MD† and Robert A. Rosenheck, MD*‡*

TABLE 1. Demographic, Medical Comorbidities, Psychiatric Indications, Service Usage, and Psychotropic Prescription Rates

	No-ECT Group		ECT Group		Effect Size		Test Statistic		<i>df</i>	<i>P</i>
	N = 11,067		N = 50		RR/	Cohen <i>d</i>	$\chi^2/$	<i>t</i> Statistic		
	Mean/N	SD/%	Mean/N	SD/%						
Demographic Variables										
Male sex	10,255	0.9	45	0.9	0.97		0.04		1	0.84
Age (y)*	56.5	16.4	59.6	10.5		0.19		−2.12	50	0.04
Race†										
White	8488	0.8	44	0.9	1.08		1.32		1	0.25
African American	1440	0.1	2	0.0	0.29		3.70		1	0.05
Other race	57	0.0	2	0.0	7.32		11.69		1	<0.01
Disability Measures										
Service connected, 50% or more	3231	0.3	17	0.3	1.17		0.42		1	0.52
Service connected, less than 50%	1886	0.2	6	0.1	0.70		0.77		1	0.38
Receives VA pension	383	0.0	5	0.1	2.89		6.33		1	0.01
Homeless during the year	1558	0.1	7	0.1	0.99		0.06		1	0.80
Medical Comorbidities										
Congestive heart failure	5403	0.5	27	0.5	1.11		0.70		1	0.40
Cerebrovascular accident	527	0.0	3	0.1	1.26		0.19		1	0.66
Chronic obstructive airway disease	1739	0.2	8	0.2	1.02		0.01		1	0.92
Diabetes mellitus	2366	0.2	12	0.2	1.12		0.27		1	0.60
Cancer	1047	0.1	4	0.1	0.85		0.09		1	0.76
Any pain diagnosis	5596	0.5	28	0.6	1.11		0.32		1	0.57
Charlson Medical Severity Diagnosis Index	1.6	2.0	1.9	2.2		0.16		−1.11	11,115	0.27

Regulation of Electroconvulsive Therapy

A Systematic Review of US State Laws

Robin Livingston, MD, Chester Wu, MD,* Kathy Mu, DO,* and M. Justin Coffey, MD*†*

Objectives: The goal of this study was to systematically review current US state laws on electroconvulsive therapy (ECT) in order to provide a comprehensive resource to educate practitioners, potential patients, and lawmakers.

Methods: Individual state legislative Web sites were searched by 2 independent authors using the following search terms: “electroconvulsive therapy,” “convulsive therapy,” “electroconvulsant therapy,” “electroshock therapy,” and “shock therapy” from March 2017 to May 2017. All sections of state law pertaining to ECT were reviewed, and pertinent data regarding consent, age restrictions, treatment limitations, required reporting, defined qualified professionals, fees, and other information were extracted.

Results: State regulation on ECT widely varied from none to stringent requirements. There were 6 states without any laws pertaining to ECT. California, Illinois, Massachusetts, Missouri, New York, South Dakota, Tennessee, and Texas were noted to be the most regulatory on ECT.

Conclusions: There are no US national laws on ECT leaving individual state governments to regulate treatment. Whereas some states have detailed restrictions on use, other states have no regulation at all. This variation applies to multiple areas of ECT practice, including who can receive ECT, who can provide informed consent, who can prescribe or perform ECT, and what administrative requirements (eg, fees, reporting) must be met by ECT practitioners. Knowledge of these state laws will help providers not only to be aware of their own state's regulations, but also to have a general awareness of what other states mandate for better patient care and utilization of ECT.

Key Words: ECT, electroconvulsive therapy, law, regulation

(*J ECT* 2018;34: 60–68)

to the variation of ECT utilization in the United States is stringency of individual state regulation.^{6–8} Some states have no codes or regulations governing ECT, whereas others have extensive restrictions. For example, California has many statutes about ECT including age restrictions, reporting guidelines, qualifications required to administer ECT, and treatment limitations. It is important for providers to be aware of their respective states' legislation and to be able to access other states' regulations. Furthermore, with updates of the Joint Commission Guidelines⁹ and the possibility of ECT being reclassified as a class II device by the US Food and Drug Administration,¹⁰ a review of more recent legislation is warranted.

To our knowledge, the first and only compilation of individual state ECT laws was by Harris¹¹ in 2006. The objective was to compare requirements, specifically regarding informed consent, for ECT treatment in adults. The goal of this study was to provide a comprehensive presentation of individual state codes and regulations regarding ECT.

MATERIALS AND METHODS

Two independent authors searched individual state legislative Web sites using the following search terms: “electroconvulsive therapy,” “convulsive therapy,” “electroconvulsant therapy,” “electroshock therapy,” and “shock therapy.” The search period was from March 2017 to May 2017. All sections of state law pertaining to ECT were reviewed, and pertinent data regarding consent, age restrictions, treatment limitations, required reporting, defined qualified professionals, fees, and other information were extracted. Questions and ambiguities regarding specific state laws

Regulation of ECT in the USA

- 44/50 states have specific ECT regulations
- 21 states have specific regulations for ECT in minors
- 9 states mandate ECT reporting

Regulation of ECT in California

Age Restrictions	Qualified Professional	Reporting Guidelines	Other
<p><12 y old – no ECT. Aged 12-16 y – only if emergency situation and ECT deemed lifesaving, 3 child psychiatrists appointed by the local mental health director agree, and thoroughly documented and reported to the director of Health Care Services. Voluntary patients aged 16-17 y old – may grant/withhold consent to the same extent as adult voluntary patient.</p> <p>Population of CA: 39,000,000</p>	<p>May only be performed by a physician licensed in California. Psychologists may not administer.</p>	<p>Quarterly</p>	<p>Details appointed members of ECT Review Committee and their function. Persons with developmental disabilities admitted or committed to hospital may refuse. No more than 15 treatments within 30-d period or >30 treatments within 1-y period. To exceed – prior approval must be obtained from review committee of facility or county – maximum no, of additional treatments shall be specified.</p>

Regulation of ECT in the USA

- In Colorado, the required consent form must state:

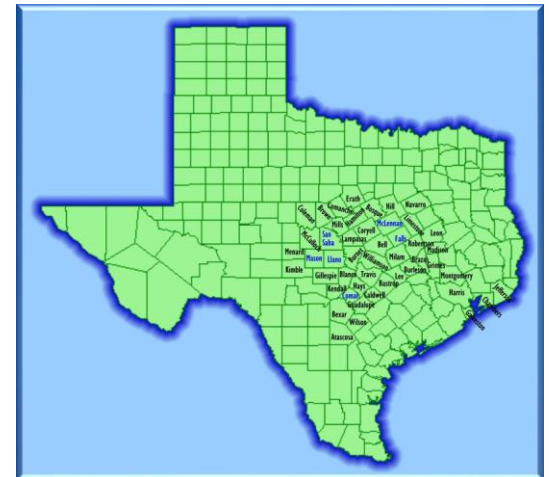
There is a “difference of opinion within the medical profession on the use of ECT.”

Electroconvulsive Therapy and All-Cause Mortality in Texas, 1998–2013

Nora M. Dennis, MD,† Paul A. Dennis, PhD,*† Alan Shafer, PhD,‡
Richard D. Weiner, MD, PhD,*† and Mustafa M. Husain, MD†§*

Introduction: Electroconvulsive therapy (ECT) remains an effective treatment for major depressive disorder. Since 1995, Texas has maintained an ECT database including patient diagnoses and outcomes, and reporting any deaths within 14 days of receiving an ECT treatment, encompassing a total of 166,711 ECT treatments administered in Texas over the previously unreported period of 1998 to 2013.

Methods: Descriptive analysis summarized information on deaths reported during the 16-year period—cause of death, type of treatment (index or maintenance) and patient demographics. Multiple logistic regression of death incidence by treatment session was performed to determine whether patient age, sex, race, diagnosis, or year of treatment was associated with death after ECT.



Electroconvulsive Therapy and All-Cause Mortality in Texas, 1998–2013

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Results: Of those deaths occurring within 1 day of an ECT treatment, the death rate was 2.4 per 100,000 treatments. Looking at all deaths within 14 days of an ECT treatment, the death rate increased to 18 per 100,000 treatments but included all deaths regardless of likelihood of causal association with ECT, for example, accidents and suicides, the latter a leading cause of death among individuals with severe major depression or other disorders for which ECT is indicated. Death rate increased significantly

with increasing patient age ($P = 0.001$) and male sex ($P = 0.009$), and there was a nonsignificant trend toward increased death amongst patients with bipolar disorder or schizophrenia ($P = 0.058$) versus depression.

Conclusions: Our data indicate that ECT is in general a safe procedure with respect to the likelihood of immediate death. Suicide remains a significant risk in ECT patients, despite evidence that ECT reduces suicidal ideation.

Key Words: electroconvulsive therapy, suicidal ideation, suicide, depressive disorder, major bipolar disorder

(*J ECT* 2017;33: 22–25)

Electroconvulsive Therapy and All-Cause Mortality in Texas, 1998–2013

Nora M. Dennis, MD,† Paul A. Dennis, PhD,*† Alan Shafer, PhD,‡
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TABLE 1. Types of Death within 14 Days of Last ECT Treatment from 1998 Until 2013

Type of Death	Females	Males	Age	Days Since Last Treatment	Index	Maintenance
Cardiopulmonary	<u>6 (43%)</u>	2 (13%)	58.63 (18.81)	1.33 (0.58)	5	3
Other medical	2 (14%)	3 (19%)	61.60 (22.73)	12.00 (–)	4	1
Suicide	3 (21%)	<u>6 (38%)</u>	52.67 (18.70)	4.13 (2.70)	5	4
Accident	0 (0%)	<u>2 (13%)</u>	59.50 (19.09)	5.00 (4.24)	1	1
Unknown	3 (21%)	3 (19%)	60.33 (18.11)	1.5 (0.71)	6	0

Sociodemographic Characterization of ECT Utilization in Hawaii

Celia M. Ona, MD,† Jane M. Onoye, PhD,†‡ Deborah Goebert, DrPH,†‡ Earl Hishinuma, PhD,† R. Janine Bumanglag, BS,† Junji Takeshita, MD,†‡ Barry Carlton, MD,†‡ and Michael Fukuda, MSW†*

Objectives: Minimal research has been done on sociodemographic differences in utilization of electroconvulsive therapy (ECT) for refractory depression, especially among Asian Americans and Pacific Islanders.

Methods: This study examined sociodemographic and diagnostic variables using retrospective data from Hawaii, an island state with predominantly Asian Americans and Pacific Islanders. Retrospective data were obtained from an inpatient and outpatient database of ECT patients from 2008 to 2010 at a tertiary care community hospital on O'ahu, Hawaii.

Results: There was a significant increase in overall ECT utilization from 2008 to 2009, with utilization remaining stable from 2009 to 2010. European Americans (41%) and Japanese Americans (29%) have relatively higher rates of receiving ECT, and Filipino Americans and Native Hawaiians have relatively lower rates in comparison with their population demographics. Japanese Americans received significantly more ECT procedures than European Americans.

Conclusions: Electroconvulsive therapy is underutilized by certain sociodemographic groups that may benefit most from the treatment. There are significant differences in ECT usage based on ethnicity. Such differences may be related to help-seeking behavior, economic differences, and/or attitudes regarding mental illness. Further research is needed to elucidate the reasons for differences in utilization.

Key Words: ECT, ethnicity, Asian Americans, Pacific Islanders, treatment utilization

(*J ECT* 2014;30: 43–46)



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Connecting People with Data

Start



Estimated ECT in the USA/Year

75,000 - 80,000 patients

450,000 - 500,000 treatments

(extrapolated from 2014 Texas data,
personal communication, Patrick Ying, MD)

5% Medicare Sample (2010)

Practice Location	<65	>65	Grand Total
Office	1 (0.02%)	0 (0.00%)	1 (0.02%)
Inpatient Hospital	897 (15.3%)	822 (14.0%)	1719 (29.3%)
Outpatient Hospital	1436 (24.4%)	1932 (32.9%)	3368 (57.3%)
Psychiatric Hospital	299 (5.1%)	335 (5.7%)	634 (10.8%)
Partial Psychiatric	73 (1.2%)	79 (1.3%)	152 (2.6%)
Grand Total	2706 (46.1%)	3168 (53.9%)	5874 (100.0%)

(Adapted from Patrick Ying, MD, personal communication)

CMS and ECT

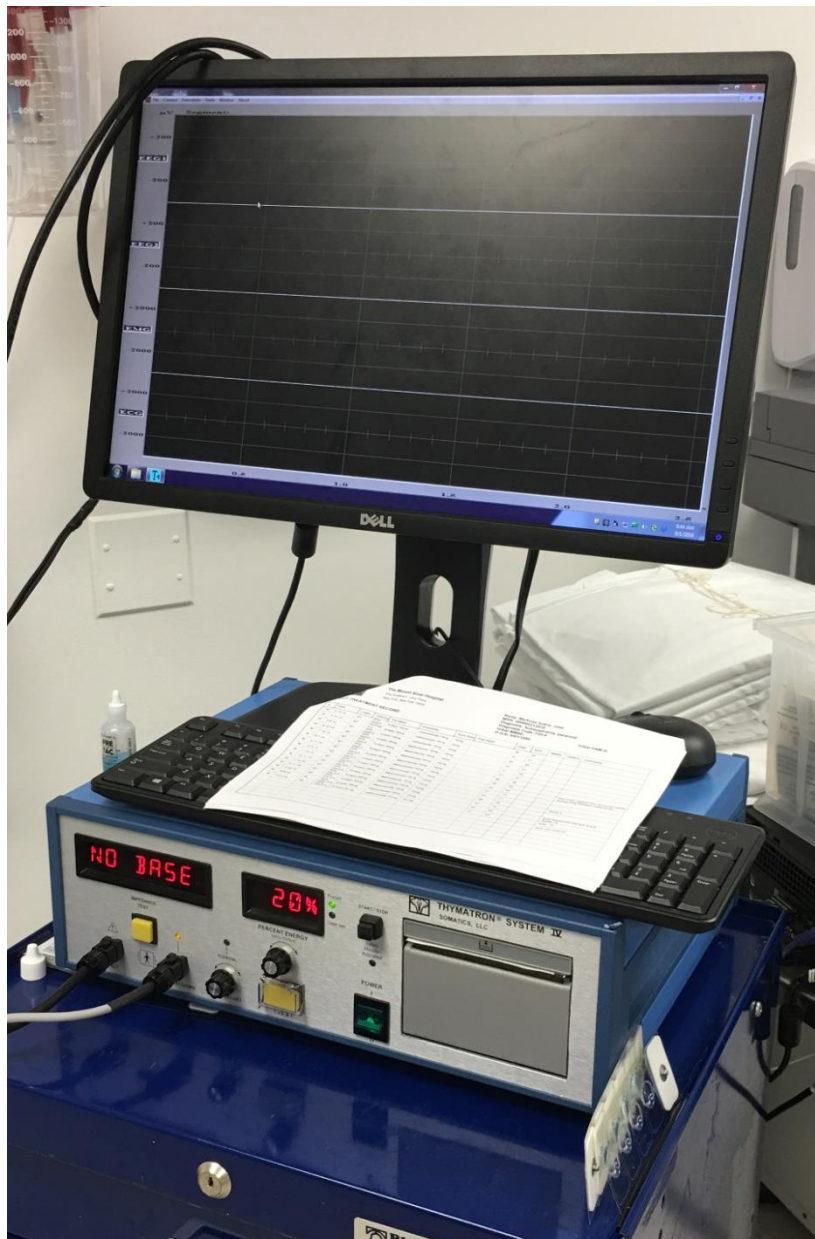
- CMS: Centers for Medicare and Medicaid Services
- Dictate reimbursement for medical procedures (commercial carriers follow CMS for almost all procedures)
- **No reimbursement codes for ECT done outside of hospital setting**

Effect of CMS Regulations

- No ECT performed in ambulatory surgery centers
- No ECT performed in “office” settings
- ECT use/access dramatically reduced

ECT in the USA: Technique

- Methohexital>propofol>etomidate
- BL and RUL probably 50/50
- 3 X/ week schedule



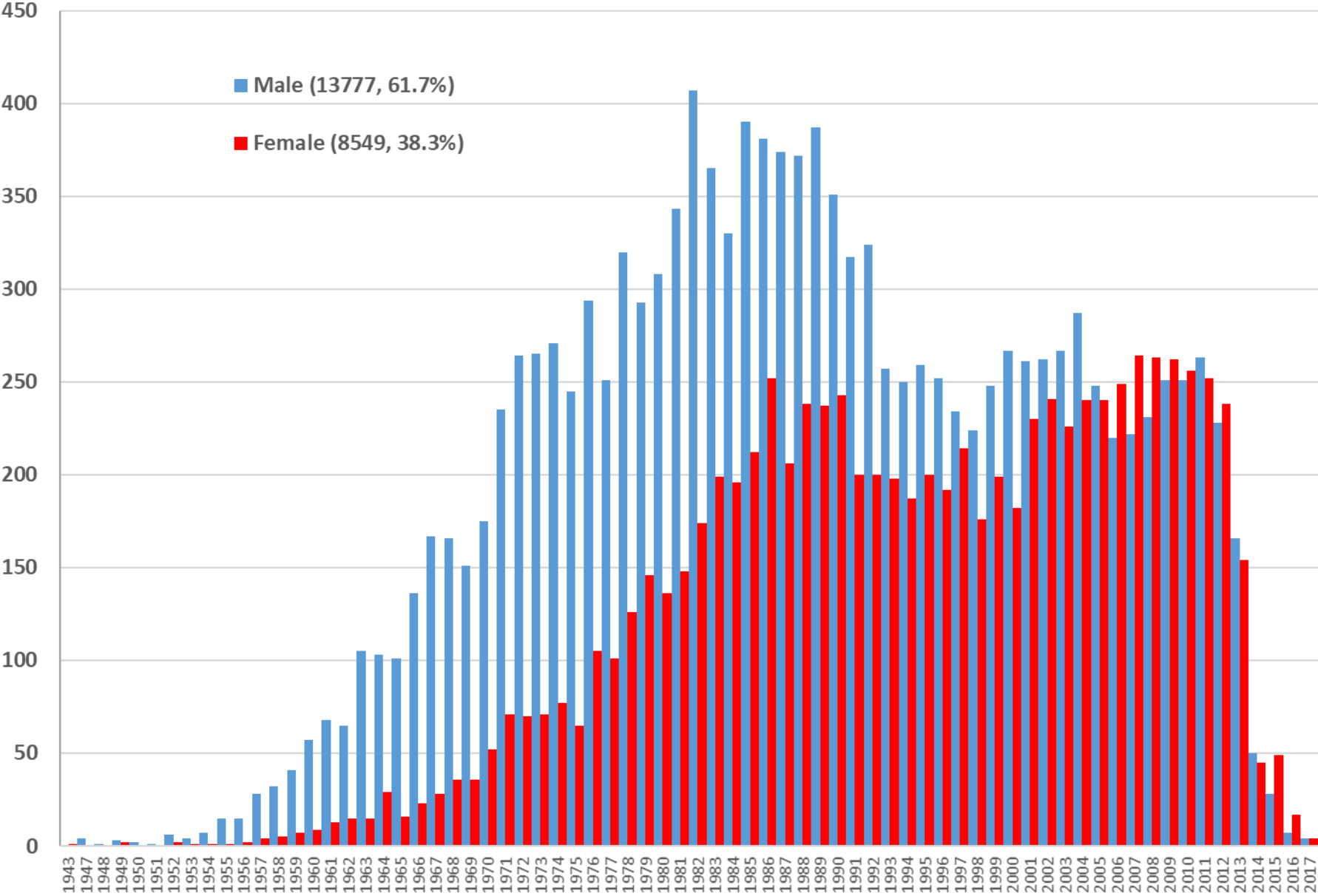
ECT in the USA: Providers

- Psychiatrists only (no non-MDs)
- 1 double-boarded psychiatrist/anesthesiologist

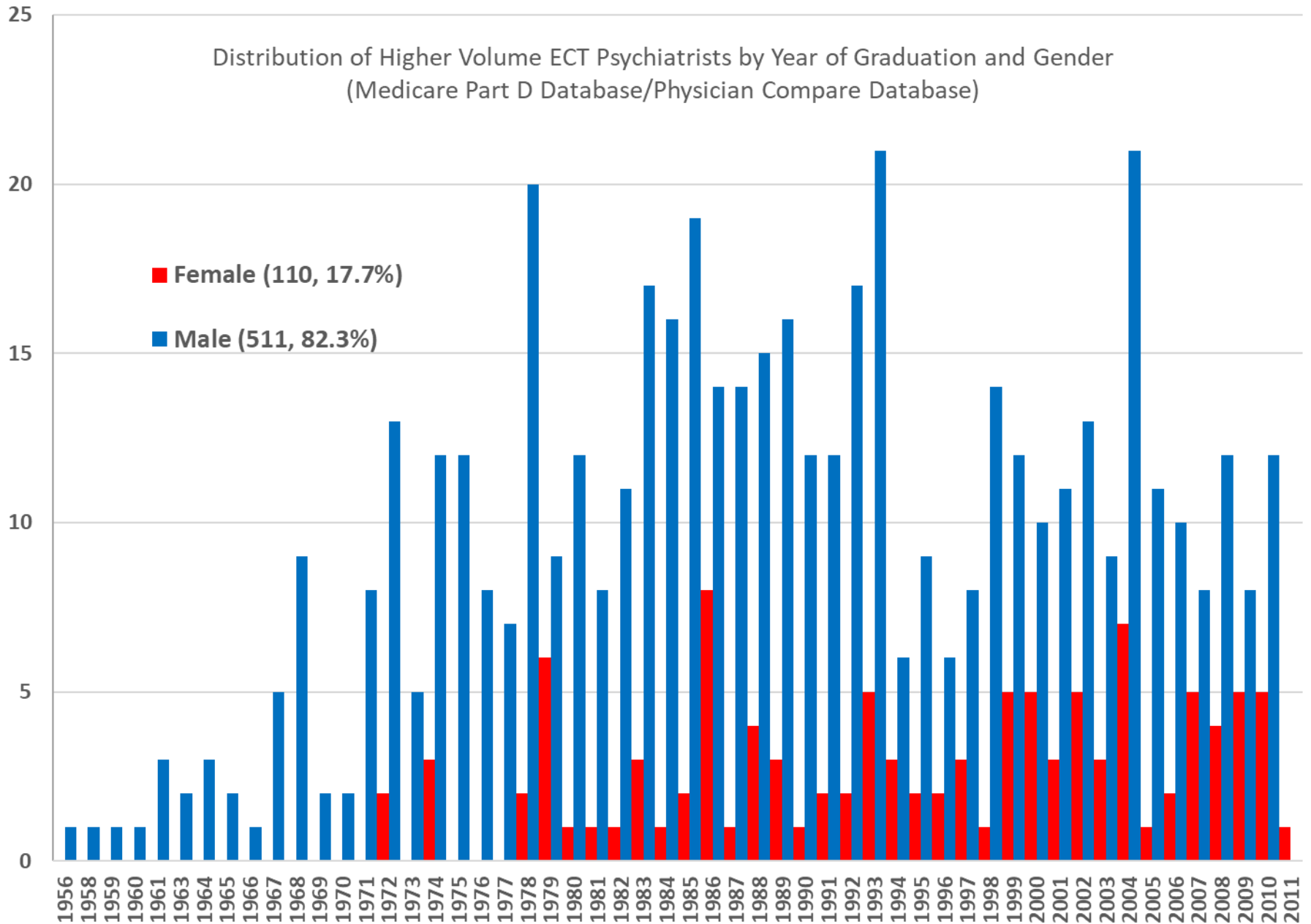
Psychiatrists in the USA

- Total: 49,000
- ECT psychiatrists: ? 1000
- ISEN members: ~300 (includes nurses, psychologists)

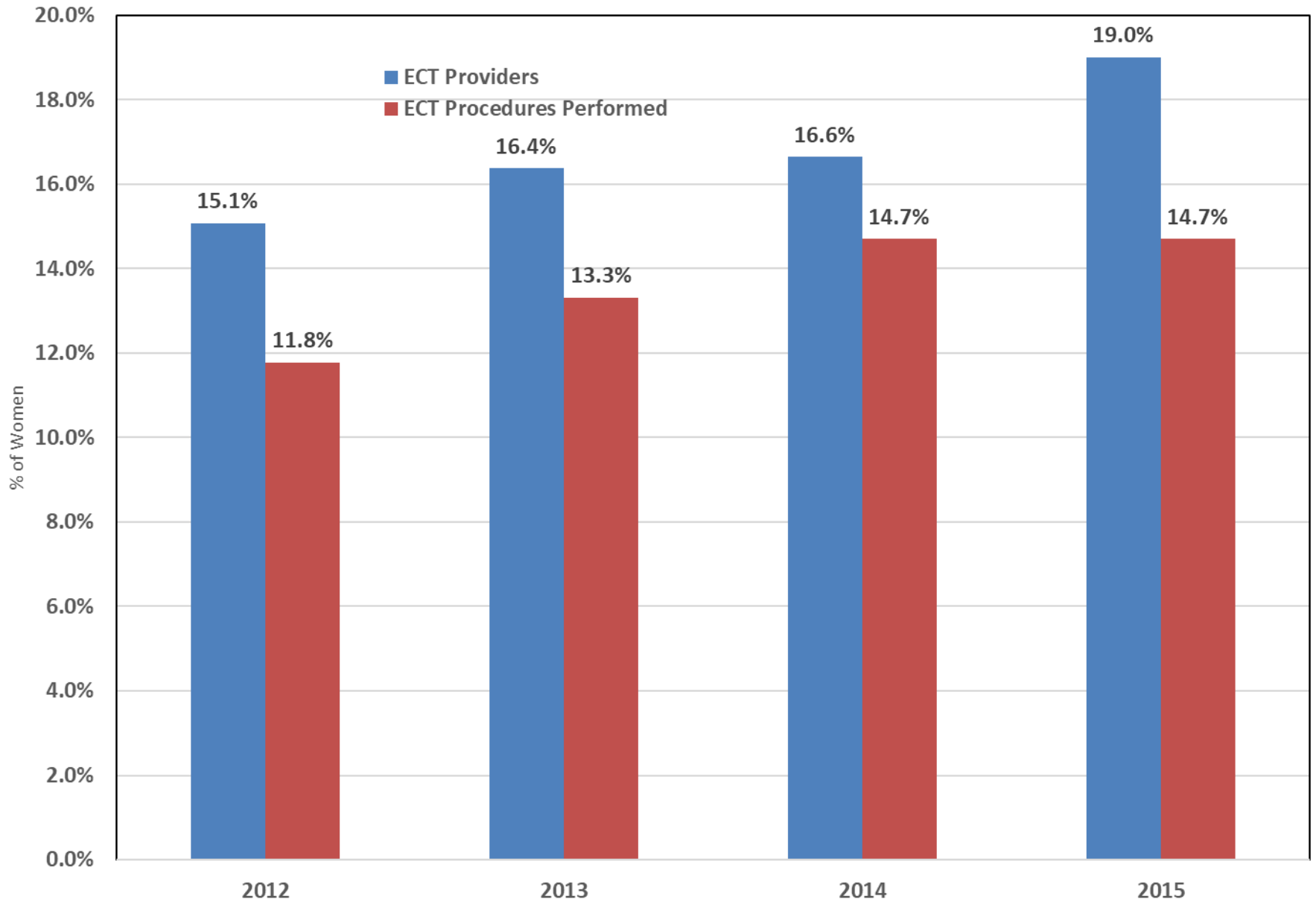
Distribution of Psychiatrists by Year of Graduation and Gender (Physician Compare Database)



Distribution of Higher Volume ECT Psychiatrists by Year of Graduation and Gender
(Medicare Part D Database/Physician Compare Database)



Percentage of ECT Providers and ECT Procedures Performed by Women



ECT in the USA: High-volume Centers (ECT/year)

- McLean Hospital (MA): ~10,000
- Zucker Hillside Hospital (NY): ~6500
- Carrier Clinic (NJ): ~4000
- ?Others

Patient-Centered Electroconvulsive Therapy Care *A Call to Action*

M. Justin Coffey, MD and C. Edward Coffey, MD

Abstract: We present our experience applying the IOM's "10 Simple Rules" to our ECT Service at a major teaching hospital in order to achieve patient-centered care. We encourage all ECT providers to partner with their patients in engaging family members and significant others in each aspect of ECT care, especially the ECT treatment itself.

Key Words: patient-centered, carepartner, family, significant other

(*J ECT* 2016;32: 78–79)

TABLE 1. Application of IOM Rules to the Henry Ford Hospital ECT Service

IOM Rule	ECT Service Transformation
No. 1: Care is based on continuous healing relationships.	Patients have continuous access to the ECT team so that care is not based primarily on visits or encounters.
No. 2: Care is customized according to patient needs and values.	At each visit, patients rate the safety, timeliness, efficiency, equity, and overall satisfaction of the ECT care on a 100-point visual analog scale. Any score less than 90 is addressed immediately with the patient, before ECT.
No. 3: The patient is the source of control.	At each visit, patients rate their sense of control over the ECT care on a 100-point visual analog scale. Any score less than 90 is addressed immediately with the patient, before ECT.
No. 4: Knowledge is shared, and information flows freely.	Patients have unfettered access to their own medical information. Referring providers receive treatment updates on the same day of the patient's ECT visit.
No. 7: Transparency is necessary.	Family members and loved ones are invited to participate in every step of the ECT visit, including the actual ECT treatment, and thus become allies for quality and safety of ECT care.

Viewing Medical Procedures

- Delivery of babies
- Resuscitation
- Pediatric procedures
- ECT

Family Member Witnessing ECT

- **Pros**

- Relieves anxiety for patient and family
- Increases family involvement in care
- Improves ECT team performance
- Enhances communication among providers
- **Reduces stigma**

(from *Patient-Centered Electroconvulsive Therapy Care: A Call to Action*. Coffey, MJ and Coffey, CE. *Journal of ECT*. 2015. [Epub ahead of print])

- **Cons**

- Potential negative experience
- Increases stress on providers

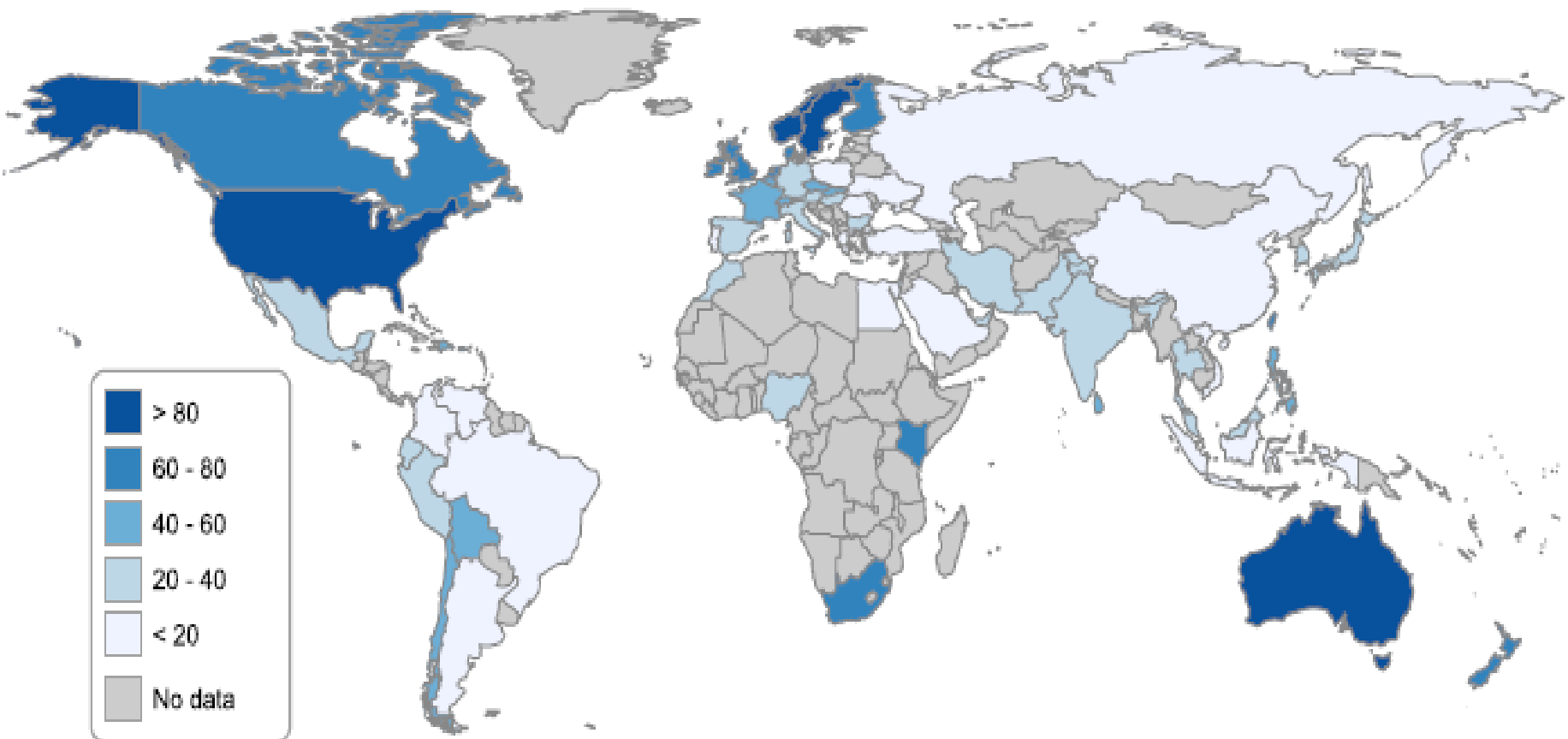
(from *Family Member Presence During Electroconvulsive Therapy: Patient Rights Versus Medical Culture*. Evans, G and Staudenmeier, J. *Journal of ECT*. 2005.)

Demystifying ECT

- “Family member presence provides a witness who can testify to the quotidian nature of ECT.”

(from *Family Member Presence During Electroconvulsive Therapy: Patient Rights Versus Medical Culture*. Evans, G and Staudenmeier, J. *Journal of ECT*. 2005.)

GOOGLE TRENDS: SEARCH ACTIVITY BY COUNTRY FOR “ELECTROCONVULSIVE THERAPY” 2004-2018



Perspectives on ECT in the USA

- Optimist: ECT is alive and well ✓
- Pessimist: ECT remains a treatment of last resort (easier to buy a gun than get ECT)
- Scientist: wish there were better data on utilization (like Nordic countries)