Methods:

In addition to asking about perceived barriers to expanding or starting an ECT service, the survey also inquired about provider demographics, experience, training, ECT service characteristics and approximate volumes. The survey was disseminated in two ways: through the email listserv for ISEN and via US mail service to ECT providers identified through Medicare Provider Utilization and Payment Database. As compensation for completing the survey, participants were offered an Amazon gift card ($40) or that this amount would be donated to one of three charitable organizations. To be included, physicians must be currently practicing or have recently (within the last 3 years) practiced ECT in the United States. The Medicare Provider Utilization and Payment database is publicly available and contains the name and contact information of every physician providing a healthcare service to 10 or more Medicare beneficiaries in a given year. We used the most up-to-date data available at the time of project initiation (2016). The database was searched using the ECT current procedural terminology code (90870) to obtain the names and contact information of providers. In 2016, there were 690 providers listed in the database who provided ECT services to 10 or more Medicare beneficiaries.

Table S1. Potential Barriers to Expanding an Existing ECT Service or Initiating a New Service

Resources/Personnel
Lack of physical space
Lack of adequately trained colleagues/ECT practitioners
Lack of well-trained support staff – nursing
Lack of well-trained support staff – anesthesia
Lack of a "champion"
Stigma
Stigma on the part of patients
Stigma on the part of medical staff (nursing, anesthesia, administration)
Stigma on part of referring providers (community psychiatrists)
Financial Issues
Poor reimbursement rates
Insurance not covering ECT
Other Barriers
Local legal barriers
Electronic medical record issues
Lack of administrative support/bureaucratic issues
Lack of knowledge on part of potential referring providers
Patient transportation/geographic barriers
Lack of appropriate patients
Perceived inefficacy of treatment by patients
Perceived inefficacy of treatment by referring providers
Potential side-effects are not acceptable to patients
Potential side-effects are not acceptable to referring providers
Inability to offer maintenance ECT
Inability to offer outpatient ECT

Table S2. Comparison of Survey Respondents to All ECT Providers in the Medicare Provider Utilization and Payment Database.

Demographic	Survey Respondents (n=192)	All ECT Providers (n=690)	Test Statistic	P value
Male	155 (81%)	559 (81%)	$\chi^2 = 0.009$	0.926
US Census Regional Distribution			$\chi^2 = 4.11$	0.250
Northeast Area	52 (29%)	193 (28%)		
Midwest	42 (23%)	205 (30%)		
South	57 (31%)	202 (29%)		
West	31 (17%)	90 (13%)		

Table S3. Qualitative Data from Semi-Structured Interviews with ECT Practitioners (N=17)

Barrier	Quote
Stigma	It's the most stigmatized treatment in the most stigmatized field of medicine now. *[Participant 1]*
Lack of administrative commitment/comparatively poor reimbursement rate	I had a beautiful dedicated ECT suite in the main hospital, and they sold it to [another clinical] department … because they could make more money. *[Participant 7]*
Lack of support staff	The biggest challenges are to do with anesthesia and nursing support. So, the anesthesia issue is that in many places anesthesiologists don't like doing ECT for several reasons: it delays them getting to their main cases in the OR [operating room], and some consider it not lucrative enough…. And you know, there's no pipeline to train nurses in ECT. *[Participant 7]*
Lack of space (tied to comparatively poor reimbursement)	There's competition for that [space] with pulmonologists, and especially the GI people [gastroenterologists], who do most of the work down there. And at that time there was only one anesthesiologist devoted to that room, and so it was a problem, and the other specialties bring … in a lot more profit than we do. *[Participant 3]* The problem is that many places [put] their ECT services in PACU's [post-anesthesia care units], which are not designed for privacy for a patient, and when you're set up in a PACU … [you have] very limited hours…. When they … put us back in the PACU [they] said: you have to finish your ECT by nine o'clock. We had been doing 20 patients a day, so there is no way that we could do more than four patients which we'd start at 7:30 and have to be out of there by nine o'clock. *[Participant 7]*
Transportation/ Geographic Disparity	Another [patient] who's been getting ECT in [a remote state due to no closer access] … it's about 300 miles away, out of state, out of network for almost 14 years. *[Participant 16]*
Lack of training opportunities/ requirements	A lot of residency programs really give short shrift to ECT, there may be … a lecture or two and maybe, you know, they have some exposure to it, but there are many programs where ECT is not part of the psychiatry service, and unless they do an elective somewhere, residents may not really have any direct exposure to ECT. *[Participant 14]*
Lack of education/stigma among medical peers	I went to the chief medical officer and started talking about doing outpatient ECT and stuff, and he says, well, before you go any further, does it really work? Does that really work? *[Participant 11]* I had a pretty … surprising conversation with one of our faculty members who was warning a potential patient who had a feeding tube because of her depression severity that ECT was barbaric…. And it was her family who actually reached out to us directly because they weren't getting the referral from this particular provider. And she ended up being a fantastic ECT responder…. I dealt with that proactively and had some discussions with that provider [to] better understand his perspective. He was trained in the Middle East, and sure enough, ECT was used without anesthesia, and was used in a more punitive nature. *[Participant 4]*

	That's a common response. I didn't know you guys did that any more. *[Participant 11]*
Failed attempt to improve physical space barrier on national level	I initiated something back some years ago and we partnered with AAGP [American Association for Geriatric Psychiatry] with the geriatric organization and they had been also working with some former lobbyists who worked with Medicare, and we … at least looked into the situation and submitted some data to CMS [Centers for Medicare and Medicaid Services], and posted something on their website. But nothing ever really came of that … But then this came up again … through ISEN [International Society of ECT and Neurostimulation], and … a number of colleagues … have expressed interest and [are] querulous about why can't we do ECT in ambulatory surgery. So we got together, and again, we partnered with people from APA [American Psychiatric Association] and AAGP again and [submitted] detailed paperwork and requests … to CMS…. One of the editors of the American Journal [who] has a major role with the APA, came on board and helped … write all the documentation, and … this was posted and they had their period of review. And … we got the response that it was rejected, and it did not appear to be for any … safety issue or quality issue…. So they simply didn't approve it, but not for any … good clinical reason, [but] we assume economic concerns. *[Participant 14]*

Table S4. Residency Programs that have produced the highest number of practicing ECT doctors among survey respondents.

Residency Program	Number of Survey Respondents	Percent	Cumulative Percent
Yale School of Medicine	7	4	4
Medical University of South Carolina	6	3	7
Johns Hopkins University	6	3	10
Duke University	5	3	13
University of Michigan	5	3	15
West Virginia University	5	3	18
University of California-San Francisco	4	2	20
Cleveland Clinic	4	2	22
University of Iowa	4	2	24
McLean Hospital/MGH (Harvard University)	4	2	26
Sheppard Pratt	4	2	28
Washington University (St. Louis)	4	2	30

Table S5. Stratified analysis of top 8 barriers to expanding an existing ECT service (mean ± standard error) by age, sex, university-affiliated teaching hospital status, and volume of ECT treatments

	University-affiliated teaching hospital			Volume of ECT treatments		
	Yes (n=107)	No (n=45)	t-statistic; *P*	Small (n=57)	Large (n=76)	t-statistic; *P*
Lack of physical space	1.93 ± 0.21	0.98 ± 0.28	8.072; 0.005	1.44 ± 0.27	2.03 ± 0.26	2.960; 0.085
Stigma on the part of patients	1.49 ± 0.18	2.09 ± 0.32	1.769; 0.077	1.60 ± 0.23	1.75 ± 0.24	0.033; 0.856
Patient transportation/ geographic barriers	1.25 ± 0.15	1.69 ± 0.25	1.581; 0.114	1.18 ± 0.20	1.47 ± 0.16	2.358; 0.125
Lack of administrative support/bureaucratic issues	1.34 ± 0.18	1.07 ± 0.25	-0.775; 0.439	1.37 ± 0.24	1.21 ± 0.21	0.847; 0.357
Lack of adequately trained colleagues/ECT practitioners	1.43 ± 0.18	0.91 ± 0.25	-1.772; 0.076	1.09 ± 0.24	1.13 ± 0.21	0.008; 0.927
Potential side-effects are not acceptable to patients	1.26 ± 0.16	1.24 ± 0.25	-0.081; 0.936	0.93 ± 0.21	1.26 ± 0.19	2.109; 0.146
Lack of knowledge on the part of potential referring providers	0.86 ± 0.15	1.40 ± 0.25	2.135; 0.033	1.25 ± 0.26	1.17 ± 0.18	0.118; 0.731
Poor reimbursement rates	0.78 ± 0.14	1.07 ± 0.28	0.381; 0.703	1.11 ± 0.23	0.76 ± 0.18	1.310; 0.252

Note: *P*-values were estimated from Kruskal–Wallis rank-sum tests. ECT services were categorized as small (<21) or large (≥40) on estimated number of ECT treatment per week.

Table S6. Stratified analysis of top 8 barriers to initiating a new ECT service (mean ± standard error) by age, sex, university-affiliated teaching hospital status, and volume of ECT treatments

	University-affiliated teaching hospital			Volume of ECT treatments		
	Yes (n=95)	No (n=38)	t-statistic; *P*	Small (n=50)	Large (n=65)	t-statistic; *P*
Lack of well-trained colleagues/ECT practitioners	2.79 ± 0.21	2.08 ± 0.37	2.049; 0.152	2.20 ± 0.32	2.38 ± 0.25	0.142; 0.706
Lack of a champion	2.21 ± 0.21	1.39 ± 0.33	4.679; 0.031	1.80 ± 0.30	1.95 ± 0.26	0.251; 0.616
Lack of physical space	1.59 ± 0.19	1.50 ± 0.32	0.394; 0.531	1.32 ± 0.26	1.97 ± 0.25	3.136; 0.077
Lack of administrative support/bureaucratic issues	1.74 ± 0.20	1.24 ± 0.30	2.243; 0.134	1.34 ± 0.24	1.86 ± 0.25	1.671; 0.196
Lack of well-training support staff (Nursing)	1.16 ± 0.17	0.84 ± 0.24	0.683; 0.409	0.66 ± 0.20	1.28 ± 0.21	5.279; 0.022
Stigma on part of patients	0.97 ± 0.16	1.55 ± 0.34	1.589; 0.207	1.32 ± 0.27	0.89 ± 0.19	0.564; 0.453
Poor reimbursement rates	0.68 ± 0.15	1.00 ± 0.26	1.640; 0.200	1.20 ± 0.24	0.60 ± 0.18	7.241; 0.007
Patient transportation/geographic barriers	0.55 ± 0.11	0.84 ± 0.22	2.010; 0.156	0.68 ± 0.18	0.45 ± 0.12	1.015; 0.314

Note: *P*-values were estimated from Kruskal–Wallis rank-sum tests. Volume of ECT treatments was categorized as small (<21) or large (≥40) on a weekly basis.

Table S7. Number of ECT providers per state and per Census division, based on the Medicare Provider Utilization and Payment Database (2016 data).

Census Division/State	No. of ECT Providers/State	Population (2016 Census)	# of ECT providers per 100,000 people per state
Division 1 - New England	**92**	**14,755,800**	**6.2**
Connecticut	13	3,578,141	**3.6**
Maine	17	1,331,317	**12.8**
Massachusetts	37	6,823,608	**5.4**
New Hampshire	11	1,342,307	**8.2**
Rhode Island	9	1,056,770	**8.5**
Vermont	5	623,657	**8.0**
Division 2 - Middle Atlantic	**101**	**41,286,530**	**2.4**
New Jersey	21	8,870,827	**2.4**
New York	51	19,633,428	**2.6**
Pennsylvania	29	12,782,275	**2.3**
Division 3 - East North Central	**96**	**46,812,400**	**2.1**
Indiana	13	6,634,304	**2.0**
Illinois	32	12,820,527	**2.5**
Michigan	22	9,950,571	**2.2**
Ohio	22	11,634,370	**1.9**
Wisconsin	7	5,772,628	**1.2**
Division 4 - West North Central	**109**	**21,175,140**	**5.1**
Iowa	8	3,131,371	**2.6**
Kansas	9	2,910,844	**3.1**
Minnesota	39	5,522,744	**7.1**

Missouri	31	6,087,135	**5.1**
Nebraska	12	1,905,616	**6.3**
North Dakota	4	754,434	**5.3**
South Dakota	6	862,996	**7.0**
Division 5 - South Atlantic	**128**	**63,907,311**	**2.0**
Delaware	2	948,921	**2.1**
D.C	2	685,815	**2.9**
Florida	31	20,613,477	**1.5**
Georgia	15	10,301,890	**1.5**
Maryland	11	6,003,323	**1.8**
North Carolina	30	10,154,788	**3.0**
South Carolina	12	4,957,968	**2.4**
Virginia	20	8,410,106	**2.4**
West Virginia	5	1,831,023	**2.7**
Division 6 - East South Central	**36**	**18,935,655**	**1.9**
Alabama	5	4,863,525	**1.0**
Kentucky	5	4,438,182	**1.1**
Mississippi	5	2,987,938	**1.7**
Tennessee	21	6,646,010	**3.2**
Division 7 - West South Central	**38**	**39,508,794**	**1.0**
Arkansas	3	2,989,918	**1.0**
Louisiana	2	4,678,135	**0.4**
Oklahoma	3	3,926,331	**0.8**
Texas	30	27,914,410	**1.1**
Division 8 - Mountain	**29**	**23,838,802**	**1.2**
Arizona	8	6,941,072	**1.2**

Colorado	6	5,539,215	**1.1**
Idaho	0	1,682,380	**0.0**
New Mexico	4	2,091,630	**1.9**
Montana	1	1,040,859	**1.0**
Utah	8	3,041,868	**2.6**
Nevada	0	2,917,563	**0.0**
Wyoming	2	584,215	**3.4**

Division 9 - Pacific	**61**	**52,720,879**	**1.2**
Alaska	0	741,456	**0.0**
California	45	39,167,117	**1.1**
Hawaii	2	1,427,559	**1.4**
Oregon	3	4,089,976	**0.7**
Washington	11	7,294,771	**1.5**