Transcranial magnetic stimulation (TMS) is a procedure in which a magnetic field is pulsed into the brain, causing focal depolarization of neurons and subsequent activation of the corresponding neuroanatomical region. It is a form of neuromodulation, but not since electroconvulsive therapy has a psychiatric procedure been presented that has this degree of development, research, and adoption. The relative ease of use, lack of need for anesthesia, and reasonable safety has brought this psychiatric procedure to office-based practices.

The first U.S. Food and Drug Administration (FDA)-cleared commercial device for depression was approved in 2008 using an iron core figure-8 coil design. In 2013, a second device received FDA clearance for depression using the H-coil design. Although the clinical significance associated with differing coil design and their subsequent differences in stimulation patterns is unknown, psychiatrists now have some flexibility in their treatment choices and device adoption. The debate over efficacy for its approved indication of depression has ended with several blinded, sham-controlled trials favoring active treatment. Now discussion has focused on expanding uses for this modality and optimal methods of treatment delivery. We not only have to develop optimal protocols for depression, but in addition, the TMS device creates the opportunity to explore novel applications that extend to other psychiatric disorders and neurological conditions.

There are challenges inherent to setting up a TMS treatment practice that may not be present for traditional psychotherapy or pharmacotherapy treatment settings. The inclusion of a device in the psychiatrist’s arsenal has created a revolution of sorts in mental health. It has given birth to the “interventional psychiatrist.” Providers now must acquire skills and knowledge that were likely never learned during residency. Accurately determining the motor threshold, required for treatment site determination, means a psychiatrist must have physical contact with a patient, manual dexterity and three-dimensional awareness for coil placement, and a reasonable understanding of neuroanatomy and corresponding landmarks present on the head for treatment site determination. Although TMS is a reasonably safe procedure, secondary generalization of the stimulation and subsequent generalized seizure is a risk. Appropriate medical screening and proficiency in the acute management of a potential epileptiform event is a requirement for office-based practices.

The greatest challenges may exist beyond the clinical application. The practice of TMS has forced psychiatrists into the realm of business and marketing. A substantial financial investment is required of providers to acquire the device, modify the facility to accommodate the device, hire and train staff to assist with treatment delivery, and alter their practice flow to accommodate this treatment paradigm. Insurance coverage has been inconsistent, and both manufacturers have a significant overhead cost for operation that makes fee-for-service payment out of reach for many patients. Given these factors, financial viability can be elusive, and practitioners...
may find a return on investment that fails to achieve a profit margin.

Medical devices have a different pathway to deployment than that seen with medications. With medical devices there is a training requirement that may force intimate collaboration with industry, a relationship that, if preferred, is more readily avoided with pharmaceutical companies. Ongoing device support, technical troubleshooting, and device updates mean that some interaction with the industry will persist even after device delivery and installation. Psychiatrists must now have aptitude in interacting with this complex world without the perception of influence while remaining true to their clinical duty. Simply insisting on little to no industry contact is just not feasible in the modern-day medical device world. This industry collaboration must acknowledge and contend with the reality of competing interests, where the industry must achieve profitability through sale of devices and increased clinical use, and clinicians must balance their own financial investment with impartial assessment of clinical need.

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Given the speed at which the field of TMS has been advancing, we sought to bring together some of the most respected TMS experts to create this special issue on clinical TMS. The order of articles was specifically chosen to start with a broad overview followed by a review the physics of TMS and then cover the data for the FDA-cleared indication of depression, and then expand into studies of off-label conditions. We conclude with a review of challenges associated with the business management of a TMS practice. This flow was designed to take TMS from science to practice and empower physicians with the latest practical information needed for clinical application.

As guest editors of this issue, we would like to thank the authors for their time and dedication to this work. The quality of their articles reflects a dedication to the field and to the spirit of continuing medical education. We would also like to Jan Fawcett, MD, and the staff at Psychiatric Annals for this invaluable opportunity to educate providers and advocate for the field of TMS. TMS and interventional psychiatry ushers in a new era, expanding those tools we have available to alleviate the pain and suffering of our patients. To the readers, we hope you find this issue helpful and enjoyable and that it serves as a valuable reference.

The views expressed in this article are those of the authors and do not reflect the official policy of the Department of Army/Navy/Air Force, Department of Defense, or U.S. Government.

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Dr. Grammer currently holds board certification in psychiatry, geriatric psychiatry, and behavioral neurology and neuropsychiatry. He is also currently an Assistant Professor of Psychiatry at the Uniformed Services University. Dr. Grammer is on the Board of Directors and is the Research Committee co-chair for the Clinical TMS Society.

Dr. Grammer has completed two deployments to Iraq, serving as the medical director for the 785th Combat Stress Control Company on his first deployment and as a psychiatrist at the Combat Support Hospital at COB Speicher on his second. He has also deployed to Afghanistan as a psychiatrist at the Combat Support Hospital in Bagram. For 8 years, he served as the Chief of Inpatient Psychiatric Services at Walter Reed National Military Medical Center, where he also created the Transcranial Magnetic Stimulation program in 2009. In August 2013, he assumed a position at the National Intrepid Center of Excellence as the Department Chief of Research. COL Grammer’s military awards include the Bronze Star Medal, Meritorious Service Medal (2nd Award), Army Commendation Medal (3rd Award), Army Achievement Medal (3rd Award), Iraq Campaign Medal (3 Stars), Afghanistan Campaign Medal, Global War on Terrorism Service Medal, NATO ISAF Medal, National Defense Service Medal (2nd Award), Army Service Ribbon, Army Superior Unit Award and Overseas Service Ribbon (3rd Award), and Combat Action Badge.

Tarique Perera, MD, is a board psychiatrist with offices in Greenwich and Danbury, Connecticut, and Manhattan, New York. He graduated from Brandeis University with degrees in biochemistry and economics and received his medical degree at Harvard Medical School. He completed his residency training at Columbia University, College of Physicians and Surgeons, and the New York State Psychiatric Institute. During residency, he became certified in transcranial magnetic stimulation (TMS), electroconvulsive therapy (ECT), and vagus nerve stimulation.

Dr. Perera completed a research fellowship at Columbia University and was later appointed Assistant Professor in Clinical Psychiatry at Columbia University and Director of Preclinical Research at the Division of Biological Psychiatry. He established a research laboratory, The Perera Lab, which studied neurobiological mechanisms involved in the successful treatment of major depression.

Dr. Perera is a lecturer at Columbia’s CME-based training program for ECT and TMS. In October 2010, he founded Contemporary Care of Connecticut to provide comprehensive psychiatric and psychological treatment.

Dr. Perera is the founding president of the Clinical TMS Society, which will be establishing standards for the practice of TMS therapy worldwide and working toward expanding insurance coverage.