

# Clinical Policy: Home State Health Plan Transcranial Magnetic Stimulation for the Treatment of Major Depressive Disorder

Reference Number: MO.CP.BH.TMS.202  
Last Review Date: 11/21

[Coding Implications](#)  
[Revision Log](#)

See [Important Reminder](#) at the end of this policy for important regulatory and legal information.

## Description

The Home State Health Plan Transcranial Magnetic Stimulation (TMS) for Major Depressive Disorder (MDD) Clinical Policy is based on the Missouri Department of Social Services Provider Bulletin, Volume 44, Number 23, effective 11/1/21, and the Centene Advanced Behavioral Health (CABH) CP.BH.201 Deep Transcranial Magnetic Stimulation for Obsessive Compulsive Disorder Clinical Policy.

According to the Provider Bulletin, Volume 44, Number 23, effective 11/1/21, transcranial magnetic stimulation (TMS) is a noninvasive method of brain stimulation technique involving the placement of a small coil over the scalp and passing a rapidly alternating current through the coil wire, which produces a magnetic field that passes unimpeded through the brain. Depending on stimulation parameters (frequency, intensity, pulse duration, stimulation site), repetitive TMS to specific cortical regions can either increase or decrease the excitability of the affected brain structures. Providers typically perform TMS on an outpatient basis, and it does not require anesthesia or analgesia. When used as an antidepressant therapy, TMS produces a clinical benefit without the systemic side effects that may be associated with oral medications. TMS does not produce adverse effects on cognition. Unlike electroconvulsive therapy, TMS does not induce amnesia or seizures. (CMS: Local Coverage Determination TMS L34641, <https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?LCDId=34641>)

## I. Policy/Criteria

- A. TMS is not indicated for maintenance treatment. There is insufficient evidence in the published peer reviewed literature to support the efficacy of maintenance therapy with TMS.
- B. Providers must bill their usual and customary rate. Reimbursement is the lesser of the billed amount or the maximum allowable amount.
- C. TMS services are limited to one per day, 23 per month, and 36 per rolling year consistent with Medicaid National Correct Coding Initiative (NCCI) procedure.
- D. According to the Provider Bulletin, the CABH Medical Director will review requests for an initial 20 sessions of TMS to treat MDD on a case by-case basis applying one or more of the following criteria:
  1. Age  $\geq$  18 years with a confirmed diagnosis of major depressive disorder (MDD), severe (either recurrent or single episode) without psychosis, per DSM-5 Criteria;
  2. Oversight of treatment is provided by a licensed psychiatrist;
  3. Failure to respond to a combination of multiple trials of medication and evidence based psychotherapy treatment during the current episode of illness, with the Physician's Health Questionnaire -9 (PHQ-9) score of  $>$  15 throughout the current course of treatment (or other standardized scale indicating moderately severe to severe depression);
  4. The major depressive disorder diagnosis is not part of a presentation with multiple psychiatric comorbidities and there is no evidence of psychosis;

## Home State Health Plan TMS for the Treatment of MDD

5. Failure of or intolerance to psychopharmacologic agents meeting one or more of the following:
  - a. Lack of clinically significant response in the current depressive episode to two trials of antidepressant agents from at least two different agent classes, with distinct side effects; or
  - b. At least two of the treatment trials were administered as an adequate course of antidepressants with a recognized standard therapeutic dose of at least 6 weeks duration; or
  - c. At least two recognized augmentation treatments have been attempted such as lithium, thyroid hormone, second generation antipsychotic augmentation, dual
  - d. antidepressant approaches, etc.; or
  - e. The patient is unable to take antidepressants due to one of the following:
    - i. Documented major adverse drug interactions with medically necessary medications;
    - ii. Inability to tolerate antidepressant agents, as evidenced by trials of two such agents that were clearly causative of intolerable side effects in the current episode;
    - iii. Resistance to treatment with psychopharmacologic agents as evidenced by a lack of clinically significant response to one trial of psychopharmacologic agents in the current depressive episode from at least two different agent classes. Each agent in the treatment trial must have been administered at an adequate course of mono- or poly- drug therapy.
- E. A prior trial (recent or by history) of an evidence-based psychotherapy known to be effective in the treatment of MDD (e.g., cognitive-behavioral therapy; interpersonal therapy) of an adequate frequency and duration without significant improvement in depressive symptoms as documented by a standardized rating scale for depressive symptoms.
- F. History of good response to TMS in a previous depressive episode as evidenced by a greater than 50% improvement in a standardized rating scale for depressive symptoms; or
- G. The member is a candidate for and has declined electroconvulsive therapy, and TMS is considered a less invasive treatment option;
- H. Does not have any of the following contraindications:
  1. History of seizure or any history of seizures (except those induced by ECT or isolated febrile seizures in infancy without subsequent treatment or recurrence);
  2. Conductive or ferromagnetic or other magnetic-sensitive metals implanted or embedded in head or neck within 30 cm of TMS coil placement other than dental fillings (e.g. cochlear implants, implanted electrodes/stimulators, aneurysm clips or coils, stents, bullet fragments, metallic dyes in tattoos);
  3. Other implanted stimulators controlled by or that use electrical or magnetic signals, (e.g. deep brain stimulation, cardiac pacemaker, cardioverter defibrillator, intracardiac lines and medication pumps)
  4. Vagus nerve stimulator leads in the carotid sheath;
  5. Substance abuse at time of treatment;
  6. Severe dementia;
  7. Severe cardiovascular disease;
  8. Presence of acute or chronic psychotic symptoms or disorders (such as schizophrenia, schizophreniform or schizoaffective disorder) in the current depressive episode;

## Home State Health Plan TMS for the Treatment of MDD

9. Neurological conditions that include epilepsy, cerebrovascular disease, dementia, increased intracranial pressure, history of repetitive or severe head trauma, or primary or secondary tumors in the central nervous system;
  10. Known non-adherence with previous treatment for depression.
- I. Retreatment may be considered for participants who met the guidelines for initial TMS treatment and subsequently develop relapse of depressive symptoms if the patient responded to prior TMS treatments as evidenced by a greater than 50% improvement in a standardized rating scale for depression.
1. Standardized Rating Scales for Depression: Standardized rating scales that reliably measure depressive symptoms include but are not limited to the following:
    - a. Patient Health Questionnaire-9 (PHQ-9),
    - b. Beck Depression Inventory (BDI),
    - c. Hamilton Depression Rating Scale (HAM-D),
    - d. Montgomery Asberg Depression Rating Scale (MADRS),
    - e. Quick Inventory of Depressive Symptomatology (QIDS),
    - f. Inventory for Depressive Symptomatology Systems Review (IDS-SR).
- J. Provider Qualifications
1. A psychiatrist who has examined the participant and reviewed the record must write the order for treatment.
  2. The psychiatrist must have experience in administering TMS therapy.
  3. The psychiatrist must directly supervise the treatment (must be present in area but does not necessarily personally provide the treatment).
  4. Provider must administer TMS with a US Food and Drug Administration (FDA) cleared device for the treatment of MDD in a safe and effective manner according to the manufacturer's user manual and specified stimulation parameters
  5. Certified Community Behavioral Health Organizations may utilize a physician with experience administering TMS to order and directly supervise TMS treatment (must be present in area but does not necessarily personally provide the treatment).

## Background

In the United States in a given year, major depression affects 14 to 15 million adults, or approximately 5% to 8% of the adult population. Major depression, also known as major depressive disorder (MDD), unipolar depression, or clinical depression, is a severe illness that results in significant disability and morbidity, and is the leading cause of disability in many developed countries. More than 60% of the individuals experiencing a major depressive episode (MDE) will have additional MDEs as often as once or twice a year. If untreated, the frequency and severity of depressive illness increase, often leading to suicide.

Antidepressant medications are the standard medical somatic therapy for major depression. Antidepressant drugs and/or evidence based psychotherapy are successful in producing remission in up to 65% of the treated patients with MDD. Each of the numerous antidepressant drugs available is categorized by class according to the neurotransmitter system with which it mostly interacts (noradrenalin, serotonin, dopamine, etc.). If an antidepressant drug in one class does not relieve symptoms or causes intolerable side effects, an antidepressant drug in another class may be prescribed. The rate of remission, or complete symptom relief, is only 33% for monotherapy with the first antidepressant drug tried and diminishes with each successive

## Home State Health Plan TMS for the Treatment of MDD

antidepressant drug tried. After failing 2 antidepressant drug classes trials, plus augmentation techniques, patients are then considered drug-resistant and remission rates drop to 20%. These data and the increasing prevalence of MDD and drug-resistant MDD suggest a need for alternative treatments for depression.

Psychotherapy is the standard non-medication treatment for major depression. Cognitive behavioral therapy and interpersonal therapy have both been found to be effective in the treatment of this disorder.

ECT is the standard non-drug somatic therapy for depression. Other non-medication somatic therapies include vagus nerve stimulation (VNS), deep brain stimulation (DBS) and TMS. All rely on electrical stimulation of neurons in regions of the brain responsible for mood. Theoretically, electrical stimulation alters mood by altering brain chemistry or metabolism and/or neurotransmitter release. VNS has not lived up to its original promise and the trials of DBS are not yet conclusive enough for wide use of this invasive procedure. ECT delivers electrical pulses to the brain via electrode pads positioned on the scalp. As currently practiced, ECT triggers brief 'controlled' seizures, requires general anesthesia and a muscle relaxant to prevent severe body convulsions, raises heart rate and blood pressure during treatment, and leads to transient confusion and anterograde memory loss after treatment. ECT induces rapid improvement in symptoms but must be repeated over several sessions (usually 6-10) to prevent relapse.

Transcranial magnetic stimulation consists of brief repetitive pulses of magnetic energy applied to the scalp via a large electromagnetic coil positioned on the scalp over the right or left dorsolateral prefrontal cortex (DLPFC), the mood center considered as directly associated with depression. The magnetic pulses generate low levels of electrical current in underlying brain tissue, around 120% motor threshold (10Hz, 4-second train duration, 26 second inter-train interval, between 3000 and 5000 pulses per session), using a figure-eight solid core coil, which is postulated to 'entrain' local neuronal activity back to euthymia. TMS does not require anesthesia or surgery and may be performed on an out-patient basis but typically is repeated 5 times per week over the course of 4-6 weeks to achieve maximum response. TMS may be used alone or as an adjunct to antidepressant medication.

Repeated daily left prefrontal transcranial magnetic stimulation (rTMS or TMS) was first proposed as a potential treatment for depression in 1993. Multiple studies from researchers around the world since then have repeatedly demonstrated that TMS has antidepressant effects greater than sham treatment, and that these effects are clinically meaningful. A large industry sponsored trial, published in 2007, resulted in US FDA approval in October 2008 for the treatment of adult patients with Major Depression without psychosis (MDD) who "have not adequately responded to appropriate pharmacological treatment intervention."

The TMS Therapy system is a computerized electromechanical instrument that delivers non-invasive magnetic stimulation to the brain in the form of brief duration, rapidly alternating, or pulsed, magnetic fields, which induce small electric fields in the cortex directly below the area where the transducer is placed on the patient's head. These electric fields are sufficient to produce an action potential across the membranes of the neurons in the targeted region of the left

## Home State Health Plan TMS for the Treatment of MDD

prefrontal cortex. This induced electric field, which is internal to the cortex, is the intended substrate for stimulation. The magnetic pulse is simply a conduit to transfer the electrical energy within the system to the cortex. This energy transfer system brings the unique ability to stimulate selected spatially discrete regions of the cortex, using non-invasive direct electromagnetic stimulation. Once action potentials are created, these neurons fire, releasing naturally produced neurotransmitters. This release starts a cascade of neurochemical events typical of normal neuro-network function.

The Agency for Healthcare Research and Quality published a comparative effectiveness review entitled, “Nonpharmacologic Interventions for Treatment-Resistant Depression in Adults” (Gaynes et al., 2011). Modalities reviewed included ECT, rTMS, vagal nerve stimulation and psychotherapy. Conclusions were as follows:

“Our review suggests that comparative clinical research on nonpharmacologic interventions in a TRD population is early in its infancy, and many clinical questions about efficacy and effectiveness remain unanswered. Interpretation of the data is substantially hindered by varying definitions of TRD and the paucity of relevant studies. The greatest volume of evidence is for ECT and rTMS. However, even for the few comparisons of treatments that are supported by some evidence, the strength of evidence is low for benefits, reflecting low confidence that the evidence reflects the true effect and indicating that further research is likely to change our confidence in these findings. This finding of low strength is most notable in two cases: ECT and rTMS did not produce different clinical outcomes in TRD, and ECT produced better outcomes than pharmacotherapy. No trials directly compared the likelihood of maintaining remission for nonpharmacologic interventions. The few trials addressing adverse events, subpopulations, subtypes, and health-related outcomes provided low or insufficient evidence of differences between nonpharmacologic interventions. The most urgent next steps for research are to apply a consistent definition of TRD, to conduct more head-to-head clinical trials comparing nonpharmacologic interventions with themselves and with pharmacologic treatments, and to delineate carefully the number of treatment failures following a treatment attempt of adequate dose and duration in the current episode.”

The Institute for Clinical Systems (ICSI) published a health care guideline: Major Depression in Adults in Primary Care in 2010. They concluded, based on the review of the medical literature, that in spite of the ongoing lack of clarity about the patient’s population who should be targeted for TMS, there is enough evidence to consider rTMS using a 6-week protocol as an evidence based treatment for treatment-resistance in adults, but not a first line treatment.

The American Psychiatric Association’s workgroup on the treatment for major depression published a practice guideline in October 2010 stating in those whose symptoms have not responded adequately to medications, ECT remains the most effective form of therapy and should be considered, as well as TMS when ECT is not effective or tolerated. They cite a number of meta-analyses in the recent literature finding that individuals with treatment-resistant depression were more likely to respond to TMS than sham treatments (25% with TMS vs 17% with sham.)

George et al (2010) conducted a National Institutes of Health–sponsored, industry independent sham controlled randomized trial using TMS therapy for major depressive disorder.

## Home State Health Plan TMS for the Treatment of MDD

The major goal of this study was to assess whether active, compared with sham, rTMS increased the remission rate during the initial phase of the study. The trial took place from 2004 – 2009 at 4 university hospital clinics with 199 study participants. The study inclusion criteria included 18 – 70 year olds with the DSM-IV diagnosis of major depressive disorder (single episode or recurrent with less than 5 year from onset) with a Hamilton Scale for depression score of 20. The study participants needed to be stable during a 2-wk medication-free lead-in period and have a moderate level of treatment resistance defined as insufficient clinical benefit to 1- 4 adequate medication trials or intolerant to 3 trials of medications. Participants were excluded if they had a history of seizure or neurologic disorder, previous treatment with TMS or vagus nerve stimulation, failure to respond to electroconvulsive treatment or currently taking medication that could lower the seizure threshold.

Patients were randomized 1:1 to either active or sham rTMS. There was a 2-week lead-in phase, a 3-week fixed-treatment phase and a variable 3-week extension phase of clinical improvers. During the 3-week fixed treatment phase, rTMS sessions were scheduled daily in a 5-day sequence for a total of 15 sessions. Each treatment lasted about 50 minutes, including 40 minutes of the actual delivery of rTMS or the sham treatment. A certified masked clinical rate who was not involved in administering the TMS assessed patients weekly.

The primary efficacy outcome measure was the dichotomous variable of remission, defined as a Hamilton Scale for Depression (HAM-D) score of  $\leq 3$  or 2 consecutive HAM-D scores  $< 10$  during phase 1. Secondary outcome measures included the dichotomous variable of the responses defined as a 50% decrease in the HAM-D score from baseline at the final phase 1 visit, Montgomery-Asperg Depression Rating Scale scores, Clinical Global Impression Severity of Illness Scale scores, and patient-reported reported Inventory of Depressive Symptoms–Self report scores.

### Results

Primary (Remitters): for the primary analysis of remission in the intention to treat (ITT) sample (=190), there was a significant effect of the treatment (odds ratio, 4.2; 95% confidence interval, 1.32-13.24;  $P=.02$ ). There were 18 remitters (9.5% [14.1% in the active arm and 5.1% in the sham arm]).

Secondary (Responders): the responder analysis had similar results. All remitters were also responders, but not all responders were remitters. There were 19 responders (10.0%), (15% active and 5% sham) in the ITT sample, 14 (9.1%) (14% active and 5% sham) in the complete sample and 7 (5.8%) in the fully adherent sample. Similar to the remission analyses, logistic regression detected a main effect of treatment condition for the ITT ( $P=.009$ ) and completer ( $P=.02$ )

Patients, treaters, and raters were effectively masked. Minimal adverse effects did not differ by treatment arm, with an 88% retention rate (90% sham and 86% active). Primary efficacy analysis revealed a significant effect of treatment on the proportion of remitters (14.1% active rTMS and 5.1% sham) ( $P=.02$ ). The odds of attaining remission were 4.2 times greater with active rTMS than with sham (95% confidence interval, 1.32 – 13.24). The number needed to treat was 12; most remitters had low antidepressant treatment resistance. Almost 30% of the

## Home State Health Plan TMS for the Treatment of MDD

patients remitted in the open-label follow-up (30.2% originally active and 29.6% sham.)

Study limitations included failure to enroll the projected 240 suggested by the initial power analysis. It was also unclear how long patients needed to be treated. Patients who met the 30% improvement criteria continued randomized treatment for an additional 3 weeks or until the patient stopped showing meaningful response to treatment. With this rule, no one received treatment for a full 6 weeks. Despite more rigorous requirements for progression (30% improvement at 3 weeks vs 25% improvement at 4 weeks), this study showed a significant improvement in remission at 3 to 5 weeks.

The authors concluded that the treatment was relatively well tolerated, with no difference in the adverse events between the sham and the active TMS treatment arms. Adverse events included headache (active 29% vs sham 23%), discomfort at the stimulation site (active 17% vs sham 10%), Insomnia (active 10% vs sham 7%) and worsening of depression or anxiety (active 6% vs sham 8%). There were no seizures, and the retention rate was high at 88%. They also concluded that the high- intensity rTMS for at least 3 weeks is significantly more likely than sham rTMS to induce remission in antidepressant free patients with moderately treatment resistant unipolar MDD. The treatment effect seen in the primary analysis was also reflected in the secondary analyses in the remitted completer samples and in analyzing the number of responders. Similar treatment differences were found with continuous measures of symptom change, such as the Montgomery-Asberg Depression Rating Scale, the Clinical Global Impression Severity of Illness Scale, and the patient rated inventory of Depressive Symptoms self-report. Daily left prefrontal rTMS as monotherapy produced statistically significant and clinically meaningful antidepressant therapeutic effects greater than sham. The odds of attaining remission were 4.2 times greater with active rTMS than with sham (95% confidence interval, 1.21-13.24).

Janicak et al (2010) noted that TMS can be an effective acute antidepressant treatment, but few studies systematically examine persistence of benefit. They assessed the durability of antidepressant effect after acute response to TMS in patients with MDD using protocol-specified maintenance antidepressant monotherapy. Three hundred one patients were randomly assigned to active or sham TMS in a 6-week, controlled trial. Nonresponders could enroll in a second, 6-week, open-label study. Patients who met criteria for partial response (i.e., >25% decrease from the baseline HAMD 17) during either the sham-controlled or open-label study (n = 142) were tapered off TMS over 3 weeks, while simultaneously starting maintenance antidepressant monotherapy. Patients were then followed for 24 weeks in a naturalistic follow-up study examining the long-term durability of TMS. During this durability study, TMS was readministered if patients met pre-specified criteria for symptom worsening (i.e., a change of at least one point on the CGI-S scale for 2 consecutive weeks). Relapse was the primary outcome measure. The reported results stated that 10 of 99 (10%; Kaplan-Meier survival estimate = 12.9%) patients relapsed. Thirty-eight (38.4%) patients met criteria for symptom worsening and 32/38 (84.2%) re-achieved symptomatic benefit with adjunctive TMS. Safety and tolerability were similar to acute TMS monotherapy. They concluded that the initial data suggested that the therapeutic effects of TMS are durable and that TMS may be successfully used as an intermittent rescue strategy to preclude impending relapse.

## Home State Health Plan TMS for the Treatment of MDD

Holtzheimer et al (2010) reported that rTMS has shown safety and efficacy for treatment resistant depression, but requires daily treatment for 4-6 weeks. Accelerated TMS, with all treatments delivered over a few days, would have significant advantages in terms of access and patient acceptance. Open-label accelerated TMS (aTMS), consisting of 15 rTMS sessions administered over 2 days, was tested in 14 depressed patients not responding to at least one antidepressant medication. Effects on depression, anxiety, and cognition were assessed the day following treatment, then after 3 and 6 weeks. No seizure activity was observed and only one patient had a serious adverse event (increased suicidal ideation). Two patients failed to complete a full course of aTMS treatments, and 36% did not complete all study visits. Depression and anxiety significantly decreased following aTMS treatments and improvements persisted 3 and 6 weeks later. Response rates immediately following treatment and at 3 and 6 weeks were 43, 36, and 36%, respectively. Remission rates at the same time points were 29, 36, and 29%. The authors concluded that aTMS demonstrated an excellent safety profile with efficacy comparable to that achieved in daily rTMS in other trials. Limitations primarily include open-label treatment and a small sample size.

In general, studies of rTMS in the medical literature show a short-term benefit for patients with a treatment resistant major depressive disorder who received active versus sham rTMS. Treatment benefit has been defined by response or remission rates using measurements made with validated depression rating scales. Most studies have short treatment periods, varying from one to six weeks and few studies have included long term outcomes. Questions remain about stimulation parameters and the length of optimal treatment but treatment is well-tolerated without significant adverse events and clinically significant results. Additional questions are raised about the comparative effectiveness of the devices used, and their use for “maintenance” or prevention of post-treatment relapse as well as the durability of the clinical effect after end of treatment.

A 2018 Hayes review finds evidence suggesting there may be a potential but unproven benefit for the use of TMS as augmentation for pharmacotherapy for depression. New forms of TMS are under investigation in general MDD populations. Two examples are paired pulse TMS and theta burst stimulation (TBS). Standard TMS delivers single pulses of magnetic energy repetitively, whereas paired pulse TMS delivers 2 pulses of magnetic energy simultaneously. For paired pulse TMS, pulses may be delivered at the same or different intensity. As with standard TMS, stimulation parameters vary and may involve low-frequency pulses, which inhibit cortical activity, or high-frequency pulses, which stimulate cortical activity. TBS involves short bursts of 3 low-intensity pulses with inner high-frequency (within the gamma range) pulses that are delivered at 5 Hertz (within the theta range). Applying TBS continuously for 40 seconds has stimulatory effects, while applying TBS intermittently (e.g., 2-second pulses every 10 seconds) has inhibitory effects.

Some investigators have considered whether neuronavigation (e.g., with magnetic resonance imaging guidance) would improve the effectiveness of TMS for treatment-resistant depression (Fitzgerald et al., 2009). Stanford Accelerated Intelligent Neuromodulation Therapy or SAINT, an accelerated, high-dose, iTBS protocol with fMRI-guided targeting, was well tolerated and safe in a sample size of 21 patients with TRD who received fifty iTBS sessions (1,800 pulses per session, 50-minute intersession interval) delivered as 10 daily sessions over 5 consecutive days at 90% resting motor threshold (adjusted for cortical depth) (Eleanor J. Cole et al., 2020). Nineteen

## Home State Health Plan TMS for the Treatment of MDD

of 21 participants (90.5%) met remission criteria (defined as a score <11 on the MADRS). In the intent-to-treat analysis, 19 of 22 participants (86.4%) met remission criteria. Neuropsychological testing demonstrated no negative cognitive side effects. It is possible that either of these techniques may improve the results obtained with standard TMS, but extensive study will be required to determine this.

### Coding Implications

This clinical policy references Current Procedural Terminology (CPT®). CPT® is a registered trademark of the American Medical Association. All CPT codes and descriptions are copyrighted 2021, American Medical Association. All rights reserved. CPT codes and CPT descriptions are from the current manuals and those included herein are not intended to be all-inclusive and are included for informational purposes only. Codes referenced in this clinical policy are for informational purposes only. Inclusion or exclusion of any codes does not guarantee coverage. Providers should reference the most up-to-date sources of professional coding guidance prior to the submission of claims for reimbursement of covered services.

CPT®* Codes	Description
90867	Therapeutic repetitive transcranial magnetic stimulation (tms) treatment; initial, including cortical mapping, motor threshold determination, delivery and management
90868	Therapeutic repetitive transcranial magnetic stimulation (tms) treatment; subsequent delivery and management, per session
90869	Therapeutic repetitive transcranial magnetic stimulation (tms) treatment; subsequent motor threshold re-determination with delivery and management

ICD-10-CM Code	Description
F32.2	Major depressive disorder, single episode, severe without psychotic features
F33.2	Major depressive disorder, recurrent severe without psychotic features

Reviews, Revisions, and Approvals	Date	Approval Date
Initial approval incorporating the state specific requirements from Provider Bulletin, Volume 44, Number 23, effective 11/1/21	11/1/21	11/30/21

### References

1. Baeken C, Marinazzo D, Everaert H, et al. The Impact of Accelerated HF-rTMS on the Subgenual Anterior Cingulate Cortex in Refractory Unipolar Major Depression: Insights From 18FDG PET Brain Imaging. *R.Brain Stimul.* 2015 Feb 7. pii: S1935-861X(15)00879-7. doi: 10.1016/j.brs.2015.01.415. [Epub ahead of print] PMID:25744500
2. Berlim M, Van den Eynde F, Daskalakis Z. Clinically meaningful efficacy and acceptability of low-frequency repetitive transcranial magnetic stimulation (rTMS) for treating primary major depression: a meta-analysis of randomized, doubleblind and sham-controlled trials. *Neuropsychopharmacology.* 2013b;38(4):543-551.

## Home State Health Plan TMS for the Treatment of MDD

3. Berlim MT, Broadbent HJ, Van den Eynde F. Blinding integrity in randomized sham controlled trials of repetitive transcranial magnetic stimulation for major depression: a systematic review and meta-analysis. *Int J Neuropsychopharmacol*. 2013 Feb 11:1-9. [Epub ahead of print] PMID: 23399312 [PubMed - as supplied by publisher].
4. Berlim MT, Van den Eynde F, Daskalakis ZJ. A systematic review and meta-analysis on the efficacy and acceptability of bilateral repetitive transcranial magnetic stimulation (rTMS) for treating major depression. *Psychol Med*. 2013c;43(11):2245-2254
5. Berlim MT, Van den Eynde F, Daskalakis ZJ. Efficacy and Acceptability of High Frequency Repetitive Transcranial Magnetic Stimulation (rTMS) versus Electroconvulsive Therapy (ECT) for Major Depression: A Systematic Review and Meta-Analysis of Randomized Trials. *Depress Anxiety*. 2013 Jan 24. doi: 10.1002/da.22060. [Epub ahead of print]
6. Brunoni AR, Moffa AH, Fregni F, et al. Transcranial direct current stimulation for acute major depressive episodes: meta-analysis of individual patient data. *Br J Psychiatry*. 2016 Apr 7. pii: bjp.bp.115.164715. [Epub ahead of print]
7. Chatterjee B, Kumar N, Jha S. Role of repetitive transcranial magnetic stimulation in maintenance treatment of resistant depression. *Indian J Psychol Med*. 2012 Jul;34(3):286-9. doi: 10.4103/0253-7176.106039.
8. Connolly KR, Helmer A, Cristancho MA, et al. Effectiveness of transcranial magnetic stimulation in clinical practice post-FDA approval in the United States: results observed with the first 100 consecutive cases of depression at an academic medical center. *J Clin Psychiatry*. 2012 Apr;73(4):e567-73. doi: 10.4088/JCP.11m07413. PMID: 22579164
9. Fitzgerald PB et al. A double blind randomized trial of unilateral left and bilateral prefrontal cortex transcranial magnetic stimulation in treatment resistant major depression. *J Affect Disord*. 2012 Jul;139(2):193-8. doi: 10.1016/j.jad.2012.02.017. Epub 2012 Mar 5
10. Fitzgerald PB, et al. Equivalent beneficial effects of unilateral and bilateral prefrontal cortex transcranial magnetic stimulation in a large randomized trial in treatment-resistant major depression. *Int J Neuropsychopharmacol*. 2013 Oct;16(9):1975-84. doi: 10.1017/S1461145713000369. Epub 2013 May 13.
11. Fitzgerald PB, Hoy KE, Anderson RJ, Daskalakis ZJ. A study of the pattern of response to rTMS treatment in depression. *Depress Anxiety*. 2016 Apr 5. doi: 10.1002/da.22503.
12. Fitzgerald PB, Hoy KE, Elliot D, et al. A negative double-blind controlled trial of sequential bilateral rTMS in the treatment of bipolar depression. *J Affect Disord*. 2016 Mar 5;198:158-162. doi: 10.1016/j.jad.2016.03.052. [Epub ahead of print]
13. Fitzgerald PB, Hoy KE, Herring SE, et al. A double blind randomized trial of unilateral left and bilateral prefrontal cortex transcranial magnetic stimulation in treatment resistant major depression. *J Affect Disord*. 2012 Jul;139(2):193-8. doi: 10.1016/j.jad.2012.02.017. Epub 2012 Mar 5. PMID: 22397890
14. Gaynes BN, Lux L, Hansen RA, et al. Nonpharmacologic interventions for treatment resistant depression in adults. Comparative effectiveness review no. 33. (prepared by RTI International-University of North Carolina (RTI-UNC). Evidence-based practice center under contract no. 290-02=0016I.) AHRQ publication no. 11-EHCO56-EF. Rockville, MD: Agency for Healthcare Research and Quality. September 2011. Available at: [https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/treatment-resistant-depression\\_research.pdf](https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/treatment-resistant-depression_research.pdf). Accessed Dec 7, 2018
15. Gedge L, Beaudoin A, Lazowski L, et al. Effects of electroconvulsive therapy and repetitive transcranial magnetic stimulation on serum brain-derived neurotrophic factor levels in

## Home State Health Plan TMS for the Treatment of MDD

- patients with depression. *Front Psychiatry*. 2012;3:12. doi: 10.3389/fpsyt.2012.00012. Epub 2012 Feb 24. PMID: 22375129
16. Gelenberg, A, Freeman MP, Markowicz JC, et al Practice Guideline for the Treatment of Patients with Major Depressive Disorder. Third Edition. American Psychiatric Association. Oct 2010; reaffirmed Oct 2015. Accessed Dec 7, 2018. Available at: [http://psychiatryonline.org/pb/assets/raw/sitewide/practice\\_guidelines/guidelines/mdd.pdf](http://psychiatryonline.org/pb/assets/raw/sitewide/practice_guidelines/guidelines/mdd.pdf)
  17. George MS. Transcranial magnetic stimulation for the treatment of depression. *Expert Rev Neurother*. 2010 Nov;10(11):1761-72. Review.
  18. George MS, Lisanby SH, Avery D, et al. Daily left prefrontal transcranial magnetic stimulation therapy for major depressive disorder. A sham-controlled randomized trial. *Arch Gen Psychiatry*. 2010;60(5):5007-516.
  19. Harel EV, Rabany L, Deutsch L, et al. H-coil repetitive transcranial magnetic stimulation for treatment resistant major depressive disorder: An 18-week continuation safety and feasibility study. *World J Biol Psychiatry*. 2012 Feb 7. [Epub ahead of print] PMID: 22313023
  20. Hayes. Medical Technology Directory. Transcranial Magnetic Stimulation (TMS) to Enhance Pharmacotherapy for Depression. March 19, 2014. Updated Feb 2018. Accessed December 7, 2018.
  21. Hernández-Ribas R, Deus J, Pujol J, et al. Identifying brain imaging correlates of clinical response to repetitive transcranial magnetic stimulation (rTMS) in major depression. *Brain Stimul*. 2013 Jan;6(1):54-61. doi: 10.1016/j.brs.2012.01.001. Epub 2012 Feb 22. PMID: 22417767.
  22. Holtzheimer PE 3rd, McDonald WM, Mufti M, et al. Accelerated repetitive transcranial magnetic stimulation for treatment-resistant depression. *Depress Anxiety*. 2010 Oct;27(10):960-3.
  23. Janicak PG, Nahas Z, Lisanby SH, et al. Durability of clinical benefit with transcranial magnetic stimulation (TMS) in the treatment of pharmacoresistant major depression: assessment of relapse during a 6-month, multisite, open-label study. *Brain Stimul*. 2010 Oct;3(4):187-99.
  24. Kedzior KK, Reitz SK, Azorina V, Loo C. Durability of the antidepressant effect of the high-frequency repetitive transcranial magnetic stimulation (rTMS) in the absence of maintenance treatment in major depression: a systematic review and meta-analysis of 16 double-blind, randomized, sham-controlled trials. *Depress Anxiety*. 2015 Mar;32(3):193-203. doi: 10.1002/da.22339. Epub 2015 Feb 13. PMID: 25683231
  25. Kedzior KK, Reitz SK. Short-term efficacy of repetitive transcranial magnetic stimulation (rTMS) in depression- reanalysis of data from meta-analyses up to 2010. *BMC Psychol*. 2014 Oct 7;2(1):39. doi: 10.1186/s40359-014-0039-y. eCollection 2014.
  26. Lan MJ, Chhetry BT, Liston C et al.: Transcranial Magnetic Stimulation of Left Dorsolateral Prefrontal Cortex Induces Brain Morphological Changes in Regions Associated with a Treatment Resistant Major Depressive Episode: An Exploratory Analysis. *Brain Stimul*. 2016 Mar 2. pii: S1935-861X(16)30025-0. doi: 10.1016/j.brs.2016.02.011. [Epub ahead of print]
  27. Leuchter AF, Hunter AM, Krantz DE, et al. Acad Rhythms and blues: modulation of oscillatory synchrony and the mechanism of action of antidepressant treatments. *Sci*. 2015 May;1344(1):78-91. doi: 10.1111/nyas.12742. Epub 2015 Mar 23. PMID: 25809789
  28. Levkovitz Y, Isserles M, Padberg F, et al. Efficacy and safety of deep transcranial

## Home State Health Plan TMS for the Treatment of MDD

- magnetic stimulation for major depression: a prospective multicenter randomized controlled trial. *World Psychiatry*. 2015 Feb;14(1):64-73. doi:10.1002/wps.20199. PMID:25655160
29. Liu B, Zhang Y, Zhang L, Li L. Repetitive transcranial magnetic stimulation as an augmentative strategy for treatment-resistant depression, a meta-analysis of randomized, double-blind and sham-controlled study. *BMC Psychiatry*. 2014 Nov 30;14(1):342. doi: 10.1186/s12888-014-0342-4.
  30. Prasser J, Schecklmann M, Poepl TB, et al. Bilateral prefrontal rTMS and theta burst TMS as an add-on treatment for depression: a randomized placebo controlled trial. *World J Biol Psychiatry*. 2015 Jan;16(1):57-65.
  31. Rapinesi C, Bersani FS, Kotzalidis GD, et al. Maintenance Deep Transcranial Magnetic Stimulation Sessions are Associated with Reduced Depressive Relapses in Patients with Unipolar or Bipolar Depression. *Front Neurol*. 2015 Feb 9;6:16. doi: 10.3389/fneur.2015.00016.eCollection 2015. Review. PMID: 25709596
  32. Tor PC, Gálvez V, Goldstein J, et al. Pilot Study of Accelerated Low-Frequency Right-Sided Transcranial Magnetic Stimulation for Treatment-Resistant Depression. *J ECT*. 2016 Feb 24.
  33. Triggs WJ, Ricciuti N, Ward HE, et al. Right and left dorsolateral pre-frontal rTMS treatment of refractory depression: a randomized, sham-controlled trial. *Psychiatry Res*. 2010 Aug 15;178(3):467-74.
  34. Holtzheimer PE. Unipolar depression in adults: Indications, efficacy, and safety of transcranial magnetic stimulation (TMS). In: UpToDate, Roy-Byrne PP (Ed). UpToDate, Waltham, MA. Accessed Dec 6, 2018
  35. Thase M, Connolly KR. Unipolar depression in adults: Treatment of resistant depression. In: UpToDate, Roy-Byrne PP (Ed). UpToDate, Waltham, MA. Accessed Dec 6, 2018
  36. Thase M, Connolly KR. Unipolar depression in adults: Management of highly resistant (refractory) depression. In: UpToDate, Roy-Byrne PP (Ed). UpToDate, Waltham, MA. Accessed Nov 21, 2019
  37. Senova S, Cotovio G, Pascual-Leone A, Oliveira-Maia AJ. Durability of antidepressant response to repetitive transcranial magnetic stimulation: Systematic review and meta-analysis. *Brain Stimul*. 2018 Oct 2. pii: S1935-861X(18)30320-6. doi: 10.1016/j.brs.2018.10.001
  38. U.S FDA. Class II Special Controls Guidance Document: Repetitive Transcranial Magnetic Stimulation (rTMS) Systems - Guidance for Industry and FDA Staff. July 2011. Accessed Nov 21, 2019
  39. Holtzheimer, P. Unipolar depression in adults: Indications, efficacy, and safety of transcranial magnetic stimulation (TMS). In: UpToDate, Roy-Byrne PP (Ed). UpToDate, Waltham, MA. Accessed Nov 21, 2019.
  40. Hayes. Health Technology Assessment. Transcranial Magnetic Stimulation for The Treatment of Obsessive-Compulsive Disorder. March 5, 2019. Accessed November 21, 2019.
  41. Eleanor J. Cole, et al., Standord Accelerated Intelligent Neuromodulation Therapy for Treatment of Treatment-Resistant Depression. *American Journal of Psychiatry*, vol 177, pp. 716-726, August 01, 2020. <https://doi.org/10.1176/appi.ajp.2019.19070720>
  42. Missouri Department of Social Services Provider Bulletin, Volume 44, Number 23, effective 11/1/21

## Home State Health Plan TMS for the Treatment of MDD

### **Important reminder**

This clinical policy has been developed by appropriately experienced and licensed health care professionals based on a review and consideration of currently available generally accepted standards of medical practice; peer-reviewed medical literature; government agency/program approval status; evidence-based guidelines and positions of leading national health professional organizations; views of physicians practicing in relevant clinical areas affected by this clinical policy; and other available clinical information. The Health Plan makes no representations and accepts no liability with respect to the content of any external information used or relied upon in developing this clinical policy. This clinical policy is consistent with standards of medical practice current at the time that this clinical policy was approved. “Health Plan” means a health plan that has adopted this clinical policy and that is operated or administered, in whole or in part, by Centene Management Company, LLC, or any of such health plan’s affiliates, as applicable.

The purpose of this clinical policy is to provide a guide to medical necessity, which is a component of the guidelines used to assist in making coverage decisions and administering benefits. It does not constitute a contract or guarantee regarding payment or results. Coverage decisions and the administration of benefits are subject to all terms, conditions, exclusions and limitations of the coverage documents (e.g., evidence of coverage, certificate of coverage, policy, contract of insurance, etc.), as well as to state and federal requirements and applicable Health Plan-level administrative policies and procedures.

This clinical policy is effective as of the date determined by the Health Plan. The date of posting may not be the effective date of this clinical policy. This clinical policy may be subject to applicable legal and regulatory requirements relating to provider notification. If there is a discrepancy between the effective date of this clinical policy and any applicable legal or regulatory requirement, the requirements of law and regulation shall govern. The Health Plan retains the right to change, amend or withdraw this clinical policy, and additional clinical policies may be developed and adopted as needed, at any time.

This clinical policy does not constitute medical advice, medical treatment or medical care. It is not intended to dictate to providers how to practice medicine. Providers are expected to exercise professional medical judgment in providing the most appropriate care, and are solely responsible for the medical advice and treatment of members. This clinical policy is not intended to recommend treatment for members. Members should consult with their treating physician in connection with diagnosis and treatment decisions.

Providers referred to in this clinical policy are independent contractors who exercise independent judgment and over whom the Health Plan has no control or right of control. Providers are not agents or employees of the Health Plan.

This clinical policy is the property of the Health Plan. Unauthorized copying, use, and distribution of this clinical policy or any information contained herein are strictly prohibited. Providers, members and their representatives are bound to the terms and conditions expressed herein through the terms of their contracts. Where no such contract exists, providers, members and their representatives agree to be bound by such terms and conditions by providing services to members and/or submitting claims for payment for such services.

**Note: For Medicaid members**, when state Medicaid coverage provisions conflict with the coverage provisions in this clinical policy, state Medicaid coverage provisions take precedence. Please refer to the state Medicaid manual for any coverage provisions pertaining to this clinical policy.

## Home State Health Plan TMS for the Treatment of MDD

**Note: For Medicare members,** to ensure consistency with the Medicare National Coverage Determinations (NCD) and Local Coverage Determinations (LCD), all applicable NCDs, LCDs, and Medicare Coverage Articles should be reviewed prior to applying the criteria set forth in this clinical policy. Refer to the CMS website at <http://www.cms.gov> for additional information.

©2016 Centene Corporation. All rights reserved. All materials are exclusively owned by Centene Corporation and are protected by United States copyright law and international copyright law. No part of this publication may be reproduced, copied, modified, distributed, displayed, stored in a retrieval system, transmitted in any form or by any means, or otherwise published without the prior written permission of Centene Corporation. You may not alter or remove any trademark, copyright or other notice contained herein. Centene® and Centene Corporation® are registered trademarks exclusively owned by Centene Corporation.