Transcranial magnetic stimulation (TMS) is a noninvasive method of delivering electrical stimulation to the brain. A magnetic field is delivered through the skull, where it induces electric currents that affect neuronal function. Repetitive TMS (rTMS) is being evaluated as a treatment of depression and other psychiatric/neurologic brain disorders. Imaging studies had showed a decrease in activity of the left dorsolateral prefrontal cortex (DLPFC) in depressed patients, and early studies suggested that high frequency (e.g., 5–10 Hz) TMS of the left DLPFC had antidepressant effects.

In contrast to electroconvulsive therapy, TMS can be performed in an office setting as it does not require anesthesia and does not induce a convulsion.

TMS is also being studied as a treatment for a variety of other disorders including alcohol dependence, Alzheimer's disease, neuropathic pain, obsessive-compulsive disorder, postpartum depression, depression associated with Parkinson's disease, schizophrenia, migraine, spinal cord injury, tinnitus, autism, eating disorders, and fibromyalgia. Currently, FDA approval for conditions outside of major depression only include obsessive compulsive disorder (OCD). For the treatment of OCD, studies on efficacy are extremely limited.

Treatment
A typical rTMS session lasts 30 to 60 minutes and does not require anesthesia. During the procedure an electromagnetic coil is held against the forehead near an area of the brain that is thought to be involved in mood regulation. Then, short electromagnetic pulses are administered through the coil. The magnetic pulses easily pass through the skull, and causes small electrical currents that stimulate nerve cells in the targeted brain region.

Because this type of pulse generally does not reach further than two inches into the brain, scientists can select which parts of the brain will be affected and which will not be. The magnetic field is about the same strength as that of a magnetic resonance imaging scan. Generally, the person feels a slight knocking or tapping on the head as the pulses are administered.
Not all scientists agree on the best way to position the magnet on the patient's head or give the electromagnetic pulses. They also do not yet know if rTMS works best when given as a single treatment or combined with medication and/or psychotherapy. More research is underway to determine the safest and most effective uses of rTMS.

**Side Effects**
A person may have discomfort at the site on the head where the magnet is placed. The muscles of the scalp, jaw, or face may contract or tingle during the procedure. Mild headaches or brief lightheadedness may result. It is also possible that the procedure could cause a seizure, although documented incidences of this are uncommon. Two large-scale studies on the safety of rTMS found that most side effects, such as headaches or scalp discomfort, were mild or moderate, and no seizures occurred. Because the treatment is relatively new, however, long-term side effects are unknown.

**Criteria**

TMS is medically necessary when **ALL** of the following criteria are met:

1. Adult 18 years of age or older.
2. Diagnosis of major depressive disorder or persistent depressive disorder (DSM 5 diagnostic terminology).
3. Failure of a full course of evidence-based psychotherapy, such as cognitive behavioral therapy for the current depressive episode.
4. Considered treatment refractory based on lack of a clinically significant response to four different psychopharmacologic agents from two different classes administered at therapeutic doses for the current depressive episode. The trialed agents should be administered for at least 6 weeks
5. No contraindications to TMS are present (see section on contraindications).
6. Electroconvulsive therapy has previously been attempted, is medically contraindicated, or has been offered and declined by the patient.

**Treatment Course**
Once approved, a course of 30 sessions (typically 5 days a week for 6 weeks) followed by 6 sessions for tapering therapy over the next several weeks.

**Maintenance Therapy**
Maintenance therapy is considered not medically necessary as there is insufficient evidence to support this treatment at the present time.

**Retreatment**
Retreatment may be considered medically necessary when **ALL** of the following criteria have been met:

1. Current major depressive symptoms have worsened by 50 percent from the prior best response of the PHQ-9 score.
2. Prior treatment response demonstrated a 50 percent or greater reduction from baseline depression scores.
3. No contraindications to TMS are present (see section on contraindications).
Contraindications
1. History of seizure disorder. Individuals with dehydration may be more prone to seizures so hydration prior to treatments is recommended.
2. Metal implants or devices present in the head or neck.
4. Diagnosis of severe dementia.
5. Diagnosis of severe cardiovascular disease.

Investigational
TMS is considered investigational in the treatment of all other psychiatric or neurological disorders, including but not limited to bipolar disorder, OCD, dementia, substance abuse, chronic pain syndrome, eating disorders, PTSD, and schizophrenia.

Literature does not support use of TMS in the pediatric population younger than 18 years of age. Additional concerns of using stimulation in the developing brain need to be addressed that show safety and long term efficacy of therapy. Therefore, TMS would be considered investigational for this group.

Coding
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

References
Consensus Recommendations for the Clinical Application of Repetitive Transcranial Magnetic Stimulation (rTMS) in the Treatment of Depression.

May 2017The Journal of Clinical Psychiatry 79(1).
DOI: 10.4088/JCP.16cs10905.

Evidence-based guidelines on the therapeutic use of repetitive transcranial magnetic stimulation (rTMS).

DOI: 10.1016/j.clinph.2014.05.021.

Development of utilization management criteria may also involve research into other state Medicaid programs, other payer policies, consultation with experts and review by the Medicaid Clinical Advisory Committee (CAC). These sources may not be referenced individually unless they are specifically published and are otherwise applicable to the criteria at issue.

### Criteria Change History

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Signature

C. David Smith, MD