MetroPlus Health

Policy and Procedure

Title: Title: Magnetic Resonance Image Guided High Intensity Focused Ultrasound (MRgFUS) for Tremor	**Division: Medical Management** **Department: Utilization Management**
Approval Date: 3/30/18	**LOB: Medicaid, HIV SNP, MetroPlus Gold, Goldcare I&II, Essential, HARP**
Effective Date: 3/30/18	**Policy Number: UM-MP228**
Review Date: 6/27/2025	**Cross Reference Number:**
Retired Date:	**Page 1 of 10**

1. **POLICY:**
   Magnetic Resonance Image Guided High Intensity Focused Ultrasound (MRgFUS) for Tremor

   For Medicare only, refer to the Medicare Local Coverage Determination Guidelines.

2. **RESPONSIBLE PARTIES:**
   Medical Management Administration, Utilization Management, Integrated Care Management, Claims Department, Provider Contracting

3. **DEFINITIONS**

   Essential Tremor: Essential tremor (ET) is an adult-onset neurological disorder that is common in older adults. Its prevalence of 2–5%. Available treatment options for ET are limited and often inadequate for the management of patient symptoms; current pharmacological agents offer no more than symptomatic and functional improvement, and the responsiveness of individual patients to these agents is unpredictable.

   Magnetic resonance-guided focused ultrasound (MRgFUS) is a non-invasive treatment that combines 2 technologies, focused ultrasound and magnetic resonance imaging (MRI). The ultrasound beam penetrates through the soft tissues and using MRI for guidance and monitoring, the beam can be focused on targeted sites. The ultrasound causes a local increase in temperature in the target tissue, resulting in coagulation necrosis while sparing the surrounding normal structures. The ultrasound waves from each sonication are directed at a focal point which has a maximum focal volume of 20 nm in diameter and 15 nm in height/length. This causes a rapid rise in temperature (i.e., to approximately 65°C to 85°C), which is sufficient to ablate tissue at the focal point. In addition to providing guidance, the associated MRI can provide on-line thermometric imaging that provides a temperature "map" to confirm the therapeutic effect of the ablation treatment and allow for real-time adjustment of the treatment parameters.

   Tremor-Dominant Parkinson's disease (TDPD)
   Tremor is a common motor feature of Parkinson disease (PD), and TDPD is a clinical subtype distinct from the akinesia/rigidity (AR) and postural instability/gait disorder subtypes. This subtype may be more resistant to dopamine-replacement therapy than other motor symptoms.

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4. PROCEDURE:

<u>MRgFUS unilateral thalamotomy is considered medically reasonable and necessary in patients with all of the following:</u>

1. Medication refractory (ONE)
    a. Essential Tremor (ET) (defined as refractory to at least two trials of medical therapy, including at least one first-line agent)
    b. Tremor-Dominant Parkinson's disease (TDPD) (BOTH)
        i. refractory (or intolerant) to levodopa or levodopa equivalent daily dosage (LEDD) ≥ 900 mg
        ii. On-medication Unified Parkinson's Disease Rating Scale (UPDRS) ratio of the mean score for tremor items (items 16, 20, and 21) to the mean postural instability/gait disorder score (items 13-15, 29, and 30) of ≥ 1.5
2. Moderate to severe postural or intention tremor of the dominant hand (defined by a score of ≥2 on the Clinical Rating Scale for Tremor (CRST)
3. Disabling ET (defined by a score of ≥2 on any of the eight items in the disability subsection of the CRST
4. Not a surgical candidate for DBS (e.g., at least 65 years of age, anticoagulant therapy, or surgical comorbidities)

<u>Limitations (not covered):</u>

1. Treatment of head or voice tremor
2. Bilateral thalamotomy
3. Conditions
    a. other neurodegenerative condition
    b. unstable cardiac disease
    c. untreated coagulopathy
    d. risk factors for deep-vein thrombosis
    e. severe depression (defined by a score ≥20 on Patient Health Questionnaire 9 (PHQ-9) or Beck Depression Inventory score (BDI-II) >14)

f. cognitive impairment (defined by a score of <24 on the Mini–Mental State Examination, or Montreal Cognitive Assessment (MoCA) score ≤21)
g. previous brain procedure (transcranial magnetic stimulation, DBS, stereotactic lesioning, or electroconvulsive therapy)
h. a skull density ratio (of cortical to cancellous bone) <0.45 ± 0.05 as calculated from the screening CT
i. MRI contraindicated
j. Drug-induced Parkinsonism
k. history of seizures, brain tumor, intracranial aneurysm or arteriovenous malformation requiring treatment
l. Not indicated in pregnant women

CPT 0398T is inclusive of all radiological services performed. Thus, billing for radiological services associated with the performance of 0398T is not appropriate and thus not allowed.

5. EXCEPTION:

MRgFUS has theoretical potential to be useful for CNS tumors, but experience is limited, and technical problems remain to be solved. (MacDannald). Currently, MetroPlus considers this use experimental.

Analysis of Evidence (Rationale for Determination)

In summary, MRgFUS is a promising new treatment approach that has attributes, positive and negative, distinct from both traditional thalamotomy and deep-brain stimulation (DBS). However, long-term effectiveness and safety remain uncertain and warrant a direct comparison with DBS, the current surgical standard.

However, given the support for traditional thalamotomy, generally, as an alternative “if DBS is not available or practical”, and the support for MRgFUS thalamotomy, specifically, as an alternative in patients “who are not a candidate for DBS” by the American Association of Neurological Surgeons (AANS), Congress of Neurological Surgeons (CNS) and the American Association of Stereotactic and Functional Neurosurgery (ASSFN), MetroPlus Health considers MRgFUS reasonable and necessary in that context.

6. APPLICABLE PROCEDURE CODES:

CPT	Description
61850	Twist drill or burr hole(s) for implantation of neurostimulator electrodes, cortical
61860	Craniectomy or craniotomy for implantation of neurostimulator electrodes, cerebral, cortical
61885	Insertion or replacement of cranial neurostimulator pulse generator or receiver, direct or inductive coupling; with connection to a single electrode array
61886	Incision and subcutaneous placement of cranial neurostimulator pulse generator or receiver, direct or inductive coupling; with connection to 2 or more electrode arrays
0398T	Magnetic resonance image guided high intensity focused ultrasound (MRgFUS), stereotactic ablation lesion, intracranial for movement disorder including stereotactic navigation and frame placement when performed

7. APPLICABLE DIAGNOSIS CODES:

ICD 10 CODE	Description
G20	Parkinson's disease
G21-G21.9	Secondary parkinsonism
G24.1	Genetic torsion dystonia
G24.2	Idiopathic nonfamilial dystonia
G24.3	Spasmodic torticollis
G24.8	Other dystonia
G24.9	Dystonia, unspecified
G25.0	Essential tremor

HCPCS CODE	Description
C1767	Generator; neurostimulator (implantable), non-rechargeable

C1820	Generator; neurostimulator (implantable), non-high-frequency with rechargeable battery and charging system
C1822	Generator, neurostimulator (implantable), high frequency, with rechargeable battery and charging system
L8679	Implantable neurostimulator, pulse generator, any type
L8680	Implantable neurostimulator electrode, each
L8682	Implantable neurostimulator radiofrequency receiver
L8683	Radiofrequency transmitter (external) for use with implantable neurostimulator radiofrequency receiver
L8685	Implantable neurostimulator pulse generator, single array, rechargeable, includes extension
L8686	Implantable neurostimulator pulse generator, single array, non-rechargeable, includes extension
L8687	Implantable neurostimulator pulse generator, dual array, rechargeable, includes extension
L8688	Implantable neurostimulator pulse generator, dual array, non-rechargeable, includes extension

8. BACKGROUND

Magnetic Resonance Image Guided High Intensity Focused Ultrasound (MRgFUS) for Essential Tremor (L37421) (Reference 1)

"Essential tremor (ET) is the most common movement disorder as well as one of the *most treated surgically. The prevalence of ET has been estimated at approximately 3% or 10 million people in the United States. While ET does not shorten life expectancy, the associated disabling symptoms, such as hand tremor, can greatly impact quality of life (functional ADLs, work activities, mood, and socialization).*

Although there are no curative therapies, symptoms of ET are well managed medically in up to 70% of patients, with surgery reserved for medication-refractory severe impairments. Current surgical options include thalamotomy with radiofrequency (RF) ablation and deep-brain stimulation (DBS); both effectively suppress tremor but require intracranial surgery. Stereotactic radiosurgery (SRS), while non-operative, suffers from delay in tremor reduction (making intraoperative validation impossible), a greater than

10% cumulative risk of adverse events, and theoretical concerns about radiation side effects (6, 22). DBS is currently the intervention of choice, "because of its proven efficacy, reversibility, adjustability, and durability" (22), with thalamotomy "a reasonable alternative…. if DBS is not available or practical" (1). This attribute of DBS in creating an adjustable "functional lesion" causes fewer adverse events than thalamotomy (24, 25), and resulted in a general shift away from ablation methods (23).

Neuromodulation with ultrasound energy also required craniotomy until recently; advances in ultrasound transducer design and high-resolution magnetic resonance imaging now allow precise transcranial delivery of high -intensity focused ultrasound. The ultrasound causes a local increase in temperature in the target tissue, resulting in coagulation necrosis while sparing the surrounding normal structures. In addition to providing location guidance, MRI provides real-time clinical monitoring of treatment intensity via thermal imagery. On 1/1/16, a CPT Category III tracking code (0398T) specific to MRgFUS treatment of movement disorder became effective. FDA PMA approval for the Magnetic Resonance Guided Focused Ultrasound Surgery System (MRgFUS) (ExAblate Model 4000, InSightec, Inc.) "for the unilateral thalamotomy treatment of idiopathic essential tremor patients with medication-refractory tremor" came on 7/11/16 (3).

Among the peer-reviewed clinical studies of MRgFUS for the treatment of medication-refractory ET, all but one were small, uncontrolled, pilot studies with short follow-up (4-11). FDA approval for MRgFUS treatment of ET was based on its pivotal study, a prospective, double-blind, randomized, sham-controlled trial (RCT) of MRgFUS to create a unilateral thalamic ablation for the treatment of ET (12). Seventy-six patients with moderate-to-severe essential tremor refractory to at least two trials of medical therapy were randomized in a 3:1 ratio to either MRgFUS or a sham procedure. The primary endpoint, the CRST at 3 months, was significantly improved in the MRgFUS group ($p<0.001$). Secondary outcome measures, including disability and quality of life, were also significantly improved. However, both hand and total tremor scores steadily deteriorated over the year, 23% and 38% respectively. In fact, this drop-in efficacy and the limited follow-up period were cited as major concerns in the accompanying editorial which advocates for much longer follow-up (2-5 years or more) to demonstrate sustained benefit (2). Another concern was persistent adverse neurologic effects in the MRgFUS group at 12 months, including gait disturbance (9%) or numbness (14%).

The editorial concludes that "A head-to-head comparison with DBS would facilitate the direct comparison of the two approaches." Some contend that a direct comparative trial between MRgFUS and DBS will be unlikely "due to the significant differences in invasiveness of the two procedures." Interestingly, a letter to the editor agrees a direct comparative study isn't warranted, but apparently for the opposite ethical reason, noting "that the high rate of adverse events that is consistently reported with thalamotomy of any kind suggests that equipoise does not exist" (13). While it is true that MRgFUS is less invasive than DBS in terms of not requiring cranial penetration with hardware, it is more invasive than DBS in the creation of a fixed thalamic brain lesion, which can result in permanent neurologic deficit.

A recently published meta-analysis is meant to provide "an approximation of an RCT" head-to-head comparison between MRgFUS, DBS, and SRS; the authors claim an actual RCT is unlikely (22). Pre- and postoperative tremor -related disability scores were collected from 32 studies involving 83 MRgFUS, 615 DBS, and 260 SRS cases. MRgFUS thalamotomy resulted in significantly higher utility scores (defined as quality of life and derived from percent change in functional disability) compared with DBS ($P < 0.001$) or SRS ($P < 0.001$). The authors conclude that "preliminary experience with MRgFUS supports its broad adoption for medically refractory ET."

A retrospective analysis of 59 patients who underwent unilateral treatment for drug-resistant ET with RF thalamotomy (n=17), DBS (n=19), and MRgFUS (n=23) showed no statistical differences in tremor severity improvement at 1 month or 1-year follow-up (23). However, MRgFUS had a significantly lower complication rate ($p < 0.01$) at 1 year (4.4%) compared with RF (11.8%) and DBS (21.1%). The authors conclude that "MRgFUS is a promising therapy with the potential to replace DBS for patients who cannot tolerate DBS, the standard surgical treatment for ET," but that "the long-term effects of MRgFUS should be systematically evaluated in a future prospective, randomized study in order to demonstrate whether MRgFUS provides superior management of ET symptoms."

<u>Analysis of Evidence (Rationale for Determination)</u>

In summary, MRgFUS is a promising new treatment approach that has attributes, positive and negative, distinct from both traditional thalamotomy and DBS. However, long-term effectiveness and safety remain uncertain (1, 23) and warrant a direct

comparison with DBS, the current surgical standard. Widespread non-coverage by both Medicare (14-17) and commercial payers (18-21) supports this interpretation.

However, given the support for traditional thalamotomy, generally, as an alternative "if DBS is not available or practical", and the support for MRgFUS thalamotomy, specifically, as an alternative in patients "who are not a candidate for DBS" by the American Association of Neurological Surgeons (AANS), Congress of Neurological Surgeons (CNS) and the American Association of Stereotactic and Functional Neurosurgery (ASSFN), NGS considers MRgFUS reasonable and necessary in that context. Patient selection criteria will largely mirror those used in the pivotal study (see Coverage and Limitations section for details).

9. REFERENCES:

1. Local Coverage Determination (LCD): Magnetic Resonance Image Guided High Intensity Focused Ultrasound (MRgFUS) for Essential Tremor (L37421) Retrieved June 22nd 2025 from: https://www.cms.gov/medicare-coverage-database/view/lcd.aspx?lcdid=37421&ver=24&bc=0

2. Valadka, A. & Ashwini, S. 11/16/2017. AMERICAN ASSOCIATION OF NEUROLOGICAL SURGEONS. [Letter] SUBJECT: LCD DL37421-Draft LCD for MRgFUS for Essential Tremor. Retrieved from: https://www.cns.org/ sites/default/files/ legislative/aans-cns letter to ngs medicare for mrgfus for et 111617.pdf

3. Kim, M; Jung, N; Park, C; Chang, W; Jung, H; Chang, J. [2017]. Comparative Evaluation of Magnetic Resonance-Guided Focused Ultrasound Surgery for Essential Tremor. DOI: 10.1159/000478866

4. Wellmark [2018]. MRI Guided High Intensity Focused Ultrasound [MRGFUS]Ablation. Retrieved from: https://www. wellmark.com/Provider /MedPoliciesAndAuthorizations /MedicalPolicies/policies/MRI Guided High Intensity.aspx

5. McDannold, Nathan, Greg T. Clement, Peter Black, Ferenc Jolesz, and Kullervo Hynynen. "Transcranial magnetic resonance imaging–guided focused ultrasound surgery of brain tumors: initial findings in 3 patients." Neurosurgery 66, no. 2 (2010): 323-332.

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10. ATTACHMENTS:

	Title	Attachment
1		
2		
3		

11. REVISION LOG:

REVISIONS	DATE
Creation date	3/30/2018
Annual Review	3/1/2019
Annual Review	6/8/2020
Annual Review	5/24/2021
Annual Review	7/30/2021
Annual Review. TDPD added to the coverage indications.	6/27/2022
Annual Review	6/27/2023
Annual Review, revised applicable LOBs.	6/24/2024
Annual Review	6/24/2025

Approved: David Ackman Digitally signed by David Ackman Date: 2025.09.17 09:09:53 -04'00' **Date:**	**Approved:** Sanjiv Shah MD Digitally signed by Sanjiv Shah MD Date: 2025.12.04 15:19:31 -05'00' **Date:**
David Ackman, MD **VP Medical Director**	**Sanjiv Shah, MD** **Chief Medical Officer**

Medical Guideline Disclaimer:

 The treating physician or primary care provider must submit MetroPlus Health Plan clinical evidence that the patient meets the criteria for the treatment or surgical procedure. Without this documentation and information, MetroPlus Health Plan will not be able to properly review the request for prior authorization. The clinical review criteria expressed in this policy reflects how MetroPlus Health Plan determines whether certain services or supplies are medically necessary. MetroPlus Health Plan established the clinical review criteria based upon a review of currently available clinical

information(including clinical outcome studies in the peer-reviewed published medical literature, regulatory status of the technology, evidence-based guidelines of public health and health research agencies, evidence-based guidelines and positions of leading national health professional organizations, views of physicians practicing in relevant clinical areas, and other relevant factors). MetroPlus Health Plan expressly reserves the right to revise these conclusions as clinical information changes, and welcomes further relevant information. Each benefit program defines which services are covered. The conclusion that a particular service or supply is medically necessary does not constitute a representation or warranty that this service or supply is covered and/or paid for by MetroPlus Health Plan, as some programs exclude coverage for services or supplies that MetroPlus Health Plan considers medically necessary. If there is a discrepancy between this guidelines and a member's benefits program, the benefits program will govern. In addition, coverage may be mandated by applicable legal requirements of a state, the Federal Government or the Centers for Medicare & Medicaid Services (CMS) for Medicare and Medicaid members. ll coding and website links are accurate at time of publication.

MetroPlus Health Plan has adopted the herein policy in providing management, administrative and other services to our members, related to health benefit plans offered by our organization.