



Louisiana

Deep Brain Stimulation

Policy # 00024

Original Effective Date: 08/25/2005

Current Effective Date: 10/12/2020

Applies to all products administered or underwritten by Blue Cross and Blue Shield of Louisiana and its subsidiary, HMO Louisiana, Inc. (collectively referred to as the "Company"), unless otherwise provided in the applicable contract. Medical technology is constantly evolving, and we reserve the right to review and update Medical Policy periodically.

Note: Responsive Neurostimulation for the Treatment of Refractory Focal Epilepsy is addressed separately in medical policy 00674.

Note: Vagus Nerve Stimulation is addressed separately in medical policy 00134.

When Services May Be Eligible for Coverage

Coverage for eligible medical treatments or procedures, drugs, devices or biological products may be provided only if:

- *Benefits are available in the member's contract/certificate, and*
- *Medical necessity criteria and guidelines are met.*

Based on review of available data, the Company may consider unilateral deep brain stimulation (DBS) of the thalamus in patients with disabling, medically unresponsive tremor due to essential tremor (ET) or Parkinson's disease (PD) to be **eligible for coverage**.**

Based on review of available data, the Company may consider bilateral deep brain stimulation (DBS) of the thalamus in patients with disabling, medically unresponsive tremor in both upper limbs due to essential tremor (ET) or Parkinson's disease (PD) to be **eligible for coverage**.**

Patient Selection Criteria

Coverage eligibility will be considered for deep brain stimulation (DBS) of the thalamus when the following criteria are met:

Disabling, medically unresponsive tremor defined as:

- Tremor causing significant limitation in daily activities; and
- Inadequate control by maximal dosage of medication for at least three months before implant.

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Based on review of available data, the Company may consider unilateral or bilateral deep brain stimulation (DBS) of the globus pallidus or subthalamic nucleus when patient selection criteria are met to be **eligible for coverage**.**

Patient Selection Criteria

Coverage eligibility will be considered for unilateral or bilateral deep brain stimulation (DBS) of the globus pallidus or subthalamic nucleus when all of the following criteria are met:

- Parkinson disease and ALL of the following:
 - A good response to levodopa; AND
 - Motor complications not controlled by pharmacologic therapy; AND
 - One of the following:
 - A minimum score of 30 points on the motor portion of the Unified Parkinson Disease Rating Scale when the patient has been without medication for approximately 12 hours OR
 - Parkinson disease for at least 4 years
- Patients older than 7 years with chronic, intractable (drug-refractory) primary dystonia, including generalized and/or segmental dystonia, hemidystonia, and cervical dystonia (torticollis).

When Services Are Considered Not Medically Necessary

Based on review of available data, the Company may consider deep brain stimulation (DBS) to be **not medically necessary**** when the following contraindications are present:

- Patients who are not good surgical risks because of unstable medical problems or because of the presence of a cardiac pacemaker; or
- Patients who have medical conditions that require repeated magnetic resonance imaging (MRI); or
- Patients who have dementia that may interfere with the ability to cooperate; or
- Patients who have had botulinum toxin injections within the last six months.

When Services Are Considered Investigational

Coverage is not available for investigational medical treatments or procedures, drugs, devices or biological products.

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Based on review of available data, the Company considers deep brain stimulation for other movement disorders, including but not limited to tardive dyskinesia, multiple sclerosis, and post-traumatic dyskinesia to be **investigational**.*

Based on review of available data, the Company considers deep brain stimulation for the treatment of chronic cluster headaches to be **investigational**.*

Based on review of available data, the Company considers deep brain stimulation for the treatment of other psychiatric or neurologic disorders, including but not limited to epilepsy, Tourette syndrome, depression, obsessive-compulsive disorder, anorexia nervosa, alcohol addiction, Alzheimer disease, and chronic pain, to be **investigational**.*

Background/Overview

Deep Brain Stimulation

Deep brain stimulation involves the stereotactic placement of an electrode into the brain (ie, hypothalamus, thalamus, globus pallidus, or subthalamic nucleus). The electrode is initially attached to a temporary transcutaneous cable for short-term stimulation to validate treatment effectiveness. Several days later, the patient returns for permanent subcutaneous surgical implantation of the cable and a radiofrequency-coupled or battery-powered programmable stimulator. The electrode is typically implanted unilaterally on the side corresponding to the most severe symptoms. However, use of bilateral stimulation using two electrode arrays has also been investigated in patients with bilateral, severe symptoms. After implantation, noninvasive programming of the neurostimulator can be adjusted to the patient's symptoms. This feature may be important for patients with Parkinson disease, whose disease may progress over time, requiring different neurostimulation parameters. Setting the optimal neurostimulation parameters may involve the balance between optimal symptom control and appearance of adverse effects of neurostimulation, such as dysarthria, disequilibrium, or involuntary movements.

FDA or Other Governmental Regulatory Approval

U.S. Food and Drug Administration (FDA)

In 1997, the Activa[®] ‡ Tremor Control System (Medtronic) was cleared for marketing by the U.S. FDA for deep brain stimulation. The Activa Tremor Control System consists of an implantable neurostimulator, a deep brain stimulator lead, an extension that connects the lead to the power source,

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a console programmer, a software cartridge to set electrical parameters for stimulation, and a patient control magnet, which allows the patient to turn the neurostimulator on and off, or change between high and low settings.

The FDA labeled indications for Activa were originally limited to unilateral implantation for the treatment of tremor, but the indications have evolved over time. In 2002, the FDA labeled indications were expanded to include bilateral implantation as a treatment to decrease the symptoms of advanced Parkinson disease not controlled by medication. In 2003, the labeled indications were further expanded to include "...unilateral or bilateral stimulation of the internal globus pallidus or subthalamic nucleus to aid in the management of chronic, intractable (drug refractory) primary dystonia, including generalized and/or segmental dystonia, hemidystonia, and cervical dystonia (torticollis) in patients seven years of age or above." In 2018, the deep brain stimulation system received an expanded indication as an adjunctive therapy for epilepsy (P960009 S318). Other deep brain stimulation systems are described in Table 1.

Table 1. Deep Brain Stimulation Systems

System	Manufacturer	Features	PMA or HDE	Approval Date	Indications
Activa Deep Brain Stimulation Therapy System	Medtronic		P96009	1997	Unilateral or bilateral stimulation of the internal globus pallidus or subthalamic nucleus for symptoms of Parkinson disease or primary dystonia
Reclaim [®] ‡ DBS Therapy for Obsessive Compulsive Disorder	Medtronic	Approved for OCD	H050003	2009	Bilateral stimulation of the anterior limb of the internal capsule for severe obsessive-compulsive disorder

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Brio Neurostimulation System	St. Jude Medical		P140009	2015	Parkinsonian tremor (subthalamic nucleus) and essential tremor (thalamus)
Infinity DBS	St. Jude Medical	Directional leads that "steer" current, reducing side effects.	P140009	2016	Parkinsonian tremor
Vercise DBS System	Boston Scientific	Directional leads	P150031	2017	Moderate-to-advanced levodopa-responsive PD inadequately controlled with medication alone

DBS: deep brain stimulation; HDE: humanitarian device exemption; OCD: obsessive-compulsive disorder; PD: Parkinson disease; PMA: premarket approval

FDA product codes: OLM, PJS, NHL, MHY.

Rationale/Source

Deep brain stimulation involves the stereotactic placement of an electrode into a central nervous system nucleus (eg, hypothalamus, thalamus, globus pallidus, subthalamic nucleus). Deep brain stimulation is used as an alternative to permanent neuroablative procedures for control of essential tremor and Parkinson disease. Deep brain stimulation is also being evaluated for the treatment of a variety of other neurologic and psychiatric disorders.

For individuals who have essential tremor or tremor in Parkinson disease who receive deep brain stimulation of the thalamus, the evidence includes a systematic review and case series. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. The systematic review (a TEC Assessment) concluded that there was sufficient evidence that deep brain stimulation of the thalamus results in clinically significant tremor suppression and that outcomes

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after deep brain stimulation were at least as good as thalamotomy. Subsequent studies reporting long-term follow-up have supported the conclusions of the TEC Assessment and found that tremors were effectively controlled five to six years after deep brain stimulation. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have symptoms (eg, speech, motor fluctuations) associated with Parkinson disease (advanced or >4 years in duration with early motor symptoms) who receive deep brain stimulation of the globus pallidus interna or subthalamic nucleus, the evidence includes randomized controlled trials (RCTs) and systematic reviews. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. One of the systematic reviews (a TEC Assessment) concluded that studies evaluating deep brain stimulation of the globus pallidus interna or subthalamic nucleus have consistently demonstrated clinically significant improvements in outcomes (eg, neurologic function). Other systematic reviews have also found significantly better outcomes after deep brain stimulation than after a control intervention. An RCT in patients with levodopa-responsive Parkinson disease of at least four years in duration and uncontrolled motor symptoms found that quality of life at two years was significantly higher when deep brain stimulation was provided in addition to medical therapy. Meta-analyses of RCTs comparing deep brain stimulation of the globus pallidus interna with deep brain stimulation of the subthalamic nucleus have reported mixed findings and have not shown that one type of stimulation is clearly superior to the other. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have primary dystonia who receive deep brain stimulation of the globus pallidus interna or subthalamic nucleus, the evidence includes systematic reviews, RCTs, and case series. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. A pooled analysis of 24 studies, mainly uncontrolled, found improvements in motor scores and disability scores after 6 months and at last follow-up (mean, 32 months). Both double-blind RCTs found that severity scores improved more after active than after sham stimulation. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have tardive dyskinesia or tardive dystonia who receive deep brain stimulation, the evidence includes an RCT and case series. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. Few studies were identified and they had

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small sample sizes (range, 9-19 patients). The RCT did not report statistically significant improvement in the dystonia severity outcomes or the secondary outcomes related to disability and quality of life but may have been under-powered. Additional studies, especially RCTs or other controlled studies, are needed. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have epilepsy who receive deep brain stimulation, the evidence includes systematic reviews, RCTs and many observational studies. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. Two RCTs with more than 15 patients were identified. The larger RCT evaluated anterior thalamic nucleus deep brain stimulation and reported that deep brain stimulation had a positive impact on seizure frequency during some parts of the blinded trial phase but not others, and a substantial number of adverse events (in >30% of patients). There were no differences between groups in 50% responder rates, Liverpool Seizure Severity Scale, or Quality of Life in Epilepsy scores. A 7 year open-label follow-up of the RCT included 66% of implanted patients; reasons for missing data were primarily related to adverse events or dissatisfaction with the device. Reduction in seizure frequency continued to improve during follow-up among the patients who continued follow-up. The smaller RCT (n=16) showed a benefit with deep brain stimulation. Many small observational studies reported fewer seizures compared with baseline, however, without control groups, interpretation of these results is limited. Additional trials are required to determine the impact of deep brain stimulation on patient outcomes. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have Tourette syndrome who receive deep brain stimulation, the evidence includes observational studies, RCTs and systematic reviews. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. Two RCTs with 15 or more patients have been reported. One RCT found differences in severity of Tourette syndrome for active vs sham at three months while the other RCT did not. Neither study demonstrated improvements in comorbid symptoms of obsessive-compulsive disorder or depression. Both studies reported high rates of serious adverse events. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have cluster headaches or facial pain who receive deep brain stimulation, the evidence includes a randomized crossover study and case series. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. In the randomized study, the

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between-group difference in response rates did not differ significantly between active and sham stimulation phases. Additional RCTs or controlled studies are needed. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have treatment resistant depression who receive deep brain stimulation, the evidence includes RCTs and systematic reviews. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. A number of case series and several prospective controlled trials evaluating deep brain stimulation in patients with have been published. Two RCTs of deep brain stimulation in the subgenual cingulate cortex and ventral striatum/ventral capsule were terminated for futility. Another RCT of stimulation of the same brain area (ventral striatum/ventral capsule) did not find a statistically significant difference between groups in the primary outcome (clinical response), and adverse psychiatric events occurred more frequently in the treatment group than in the control group. More recently, a controlled crossover trial randomized patients to sham or active stimulation of the anterior limb of the internal capsule after a year of open-label stimulation. There was a greater reduction in symptom scores after active stimulation, but only in patients who were responders in the open-label phase. Stimulation of the subcallosal (subgenual) cingulate was evaluated in a 2019 sham-controlled within-subject study that found prolonged response in 50% of patients and remission in 30% of patients with treatment resistant depression. Deep brain stimulation for patients with major depressive disorder who have failed all other treatment options is an active area of research, but the brain regions that might prove to be effective for treatment resistant depression have yet to be established. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have obsessive-compulsive disorder who receive deep brain stimulation, the evidence includes RCTs and systematic reviews. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. Among the RCTs on deep brain stimulation for obsessive-compulsive disorder, only one has reported the outcome of greatest clinical interest (therapeutic response rate), and that trial did not find a statistically significant benefit for deep brain stimulation compared with sham treatment. The evidence is insufficient to determine the effects of the technology on health.

For individuals who have multiple sclerosis who receive deep brain stimulation, the evidence includes an RCT. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. One RCT with ten multiple sclerosis patients is insufficient evidence

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on which to draw conclusions about the efficacy of deep brain stimulation in this population. Additional trials are required. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have anorexia nervosa, alcohol addiction, Alzheimer disease, Huntington disease, or chronic pain who receive deep brain stimulation, the evidence includes case series. Relevant outcomes are symptoms, functional outcomes, quality of life, and treatment-related morbidity. RCTs are needed to evaluate the efficacy of deep brain stimulation for these conditions. The evidence is insufficient to determine the effects of the technology on health outcomes.

Supplemental Information

Clinical Input From Physician Specialty Societies and Academic Medical Centers

While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process, through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

In response to requests, input was received from 2 academic medical centers and 2 physician specialty societies while this policy was under review in 2014. Input supported the use of bilateral deep brain stimulation in patients with medically unresponsive tremor in both limbs.

Practice Guidelines and Position Statements

American Academy of Neurology

Essential Tremor

In 2011, the American Academy of Neurology (AAN) updated its guidelines on the treatment of essential tremor. This update did not change the conclusions and recommendations of the AAN (2005) practice parameters on deep brain stimulation for essential tumor. The guidelines stated that bilateral deep brain stimulation of the thalamic nucleus may be used to treat medically refractory limb tremor in both upper limbs (level C, possibly effective) but that there were insufficient data on the risk/benefit ratio of bilateral vs unilateral deep brain stimulation in the treatment of limb tremor. There was insufficient evidence to make recommendations on the use of thalamic deep brain stimulation for head or voice tremor (level U, treatment is unproven).

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Parkinson Disease

Guidelines from AAN (2006) on the treatment of Parkinson disease with motor fluctuations and dyskinesia found that, although criteria are evolving, patients with Parkinson disease considered candidates for deep brain stimulation include those who are levodopa-responsive, non-demented, and neuropsychiatrically intact patients who have intractable motor fluctuations, dyskinesia, or tremor. The AAN concluded that deep brain stimulation of the subthalamic nucleus may be considered a treatment option in Parkinson disease patients to improve motor function and to reduce motor fluctuations, dyskinesia, and medication usage (level C, possibly effective) but found evidence insufficient to make any recommendations about the effectiveness of deep brain stimulation of the globus pallidus or the ventral intermediate nucleus of the thalamus in reducing motor complications or medication usage, or in improving motor function in Parkinson disease patients.

Guidelines from AAN (2010) on the treatment of nonmotor symptoms of Parkinson disease found insufficient evidence for the treatment of urinary incontinence with deep brain stimulation of the subthalamic nucleus. The AAN found that deep brain stimulation of the subthalamic nucleus possibly improves sleep quality in patients with advanced Parkinson disease. However, none of the studies performed deep brain stimulation to treat insomnia as a primary symptom, and deep brain stimulation of the subthalamic nucleus is not currently used to treat sleep disorders.

Tardive Syndromes

Guidelines from AAN on the treatment of tardive syndromes were updated in 2018. The latest guidelines state that “pallidal deep brain stimulation possibly improves tardive dyskinesia and might be considered as a treatment for intractable tardive dyskinesia (Level C, which indicates that the treatment is possibly effective, based on ≥ 1 class II study and consistent with ≥ 2 class III studies).

Tourette Syndrome

Guidelines from AAN (2019) provide recommendations on the assessment for and use of deep brain stimulation in adults with severe, treatment-refractory tics. AAN notes that patients with severe Tourette syndrome resistant to medical and behavioral therapy may benefit from deep brain stimulation, but there is no consensus on the optimal brain target. Brain regions that have been stimulated in patients with Tourette Syndrome include the centromedian thalamus, the globus pallidus internus (ventral and dorsal), the globus pallidus externus, the subthalamic nucleus, and the ventral striatum/ventral capsular nucleus accumbens region. AAN concludes that deep brain

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stimulation of the anteromedial globus pallidus is possibly more likely than sham stimulation to reduce tic severity.

American Society for Stereotactic and Functional Neurosurgery et al

The American Society for Stereotactic and Functional Neurosurgery and the Congress of Neurological Surgeons (2014) published a joint systematic review and guidelines on deep brain stimulation for obsessive-compulsive disorder. The document concluded that there was a single level I study supporting the use of bilateral subthalamic nucleus deep brain stimulation for medically refractory obsessive-compulsive disorder and a single level II study supporting bilateral nucleus accumbens deep brain stimulation for medically refractory obsessive-compulsive disorder. It also concluded that the evidence on unilateral deep brain stimulation was insufficient.

Congress of Neurologic Surgeons

In 2018, evidence-based guidelines from the Congress of Neurologic Surgeons compared the efficacy of bi-lateral deep brain stimulation of the subthalamic nucleus and globus pallidus internus for the treatment of patients with Parkinson disease.

Table 2. Recommendations of the Congress of Neurologic Surgeons for DBS for Parkinson Disease

Goal	Most Effective Area of Stimulation (subthalamic nucleus or globus pallidus internus)	Level of Evidence
Improving motor symptoms	subthalamic nucleus or globus pallidus internus are similarly effective	I
Reduction of dopaminergic medication	subthalamic nucleus	I
Treatment of "on" medication dyskinesias	globus pallidus internus if reduction of medication is not anticipated	I
Quality of life	no evidence to recommend one over the other	I

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Lessen impact of DBS on cognitive decline	globus pallidus internus	I
Reduce risk of depression	globus pallidus internus	I
Reduce adverse effects	insufficient evidence to recommend one over the other	Insufficient

DBS: Deep brain stimulation

National Institute for Health and Care Excellence

The United Kingdom's National Institute for Health and Care Excellence (NICE) has published guidance documents on deep brain stimulation, as discussed in the following subsections.

Tremor and Dystonia

In 2006, NICE made the same statements about use of deep brain stimulation for treatment of both tremor and dystonia. Unilateral and bilateral stimulation of structures responsible for modifying movements, such as the thalamus, globus pallidus, and the subthalamic nucleus, which interact functionally with the substantia nigra, are included in both guidance statements. The guidance stated: “Current evidence on the safety and efficacy of deep brain stimulation for tremor and dystonia (excluding Parkinson's disease) appears adequate to support the use of this procedure.”

Refractory Chronic Pain Syndromes (Excluding Headache)

In 2011, guidance from NICE indicated there is evidence that deep brain stimulation for refractory chronic pain (excluding headache) is associated with serious risks. However, the procedure is “efficacious in some patients” refractory to other treatments.” Patients should be informed that deep brain stimulation may not control their chronic pain symptoms and that possible risks associated with this procedure include the small risk of death.

Intractable Trigeminal Autonomic Cephalalgias

In 2011, guidance from NICE indicated that the evidence on the efficacy of deep brain stimulation for intractable trigeminal autonomic cephalalgias (eg, cluster headaches) was “limited and inconsistent, and the evidence on safety shows that there were serious but well-known adverse effects.”

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Refractory Epilepsy

In 2012, guidance from NICE indicated that the evidence on the efficacy of deep brain stimulation for refractory epilepsy was limited in both quantity and quality: “The evidence on safety showed that there are serious but well-known adverse effects.

Parkinson Disease

In 2003, NICE stated that the evidence on the safety and efficacy of deep brain stimulation for treatment of Parkinson disease “appears adequate to support the use of the procedure.” The guidance noted that deep brain stimulation should only be offered when Parkinson disease is refractory to best medical treatment.

U.S. Preventive Services Task Force Recommendations

Not applicable.

Medicare National Coverage

Effective for services furnished in April 2003, Medicare covers unilateral or bilateral thalamic ventralis intermedius nucleus deep brain stimulation for the treatment of essential tumor and/or parkinsonian tremor and unilateral or bilateral subthalamic nucleus or globus pallidus interna deep brain stimulation for the treatment of Parkinson disease when the following conditions are met:

1. Devices must be approved by the FDA for “deep brain stimulation or devices used in accordance with FDA-approved protocols governing Category B Investigational Device Exemption (IDE) deep brain stimulation clinical trials.”
2. For thalamic ventralis intermedius nucleus deep brain stimulation, patients must meet all of the following criteria:
 - a. “Diagnosis of ET [essential tumor] based on postural or kinetic tremors of hand(s) without other neurologic signs, or diagnosis of idiopathic Parkinson disease (presence of at least 2 cardinal PD [Parkinson disease] features (tremor, rigidity or bradykinesia)) which is of a tremor-dominant form.
 - b. Marked disabling tremor of at least level 3 or 4 on the Fahn-Tolosa-Marin Clinical Tremor Rating Scale (or equivalent scale) in the extremity intended for treatment, causing significant limitation in daily activities despite optimal medical therapy.
 - c. Willingness and ability to cooperate during conscious operative procedure, as well as during postsurgical evaluations, adjustments of medications and stimulator settings.”

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3. For subthalamic nucleus or globus pallidus interna deep brain stimulation, patients must meet all of the following criteria:
 - a. “Diagnosis of PD based on the presence of at least 2 cardinal Parkinson disease features (tremor, rigidity or bradykinesia).
 - b. Advanced idiopathic PD as determined by the use of Hoehn and Yahr stage or Unified Parkinson's Disease Rating Scale part III motor subscale.
 - c. L-dopa responsive with clearly defined ‘on’ periods.
 - d. Persistent disabling Parkinson’s symptoms or drug side effects (eg, dyskinesias, motor fluctuations, or disabling ‘off’ periods) despite optimal medical therapy
 - e. Willingness and ability to cooperate during conscious operative procedure, as well as during post-surgical evaluations, adjustments of medications and stimulator settings.”

Deep brain stimulation is not covered for essential tumor or Parkinson disease patients with any of the following:

1. “Non-idiopathic Parkinson's disease or ‘Parkinson’s Plus’ syndromes.
2. Cognitive impairment, dementia or depression, which would be worsened by or would interfere with the patient's ability to benefit from DBS [deep brain stimulation].
3. Current psychosis, alcohol abuse or other drug abuse.

Structural lesions such as basal ganglionic stroke, tumor or vascular malformation as etiology of the movement disorder.

Previous movement disorder surgery within the affected basal ganglion.

Significant medical, surgical, neurologic or orthopedic co-morbidities contraindicating DBS surgery or stimulation.”

Ongoing and Unpublished Clinical Trials

Some currently unpublished trials that might influence this review are listed in Table 3. Studies with fewer than 20 participants are not included.

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Table 3. Summary of Key Trials

NCT No.	Trial Name	Planned Enrollment	Completion Date
<i>Ongoing</i>			
Epilepsy			
NCT01521754 ^a	Product Surveillance Registry- Deep Brain Stimulation for Epilepsy	191	Mar 2020
NCT02076698	Deep Brain Stimulation of the Anterior Nucleus of the Thalamus in Epilepsy	62	Jun 2021
NCT04181229	Deep Brain Stimulation Post Failed Vagal Nerve Stimulation	50	Nov 2022
NCT04164056	Hippocampal and Thalamic deep brain stimulation for Bilateral Temporal Lobe Epilepsy	80	Sep 2024
NCT03900468 ^a	Medtronic Deep Brain Stimulation Therapy for Epilepsy Post-Approval Study (EPAS)	216	Mar 2027
Huntington's Disease			
NCT02535884 ^a	Deep Brain Stimulation of the Globus Pallidus (GP) in Huntington's Disease	50	Oct 2020
Parkinson Disease			
NCT02937688 ^a	Deep Brain Stimulation for Parkinson's Disease International Study (REACH-PD)	264	Apr 2021
NCT00354133	The Effect of Deep Brain Stimulation of the Subthalamic Nucleus on Quality of Life in Comparison to Best Medical Treatment in Patients With Complicated Parkinson's Disease and	251	Mar 2022

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NCT No.	Trial Name	Planned Enrollment	Completion Date
	Preserved Psychosocial Competence (EARLYSTIM-study)		
NCT01839396 ^a	Implantable Neurostimulator for the Treatment of Parkinson's Disease (INTREPID)	313	Aug 2023
Obsessive-Compulsive Disorder			
NCT01506206	ON/OFF Stimulation and Impulsivity in Patients With Deep Brain Stimulators	60	Dec 2020
NCT01590862	ON/OFF Stimulation and Reward Motivation in Patients With Deep Brain Stimulators	60	Dec 2020
NCT00640133	Effectiveness of Deep Brain Stimulation for Treating People With Treatment Resistant Obsessive-Compulsive Disorder	27	Aug 2020
NCT02773082 ^a	Reclaim Deep Brain Stimulation Therapy for Obsessive-Compulsive Disorder (OCD)	50	Apr 2020
NCT04228744	The Efficacy and Mechanism of deep brain stimulation in VIC and NAcc for Refractory OCD	20	Dec 2022
NCT02844049	European Study of Quality of Life in Resistant OCD Patients Treated by subthalamic nucleus deep brain stimulation	60	Dec 2023
Treatment Resistant Depression			
NCT03653858 ^a	Controlled Randomized Clinical Trial to Assess Efficacy of Deep Brain Stimulation of the sIMFB	47	Jun 2023

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NCT No.	Trial Name	Planned Enrollment	Completion Date
	in Patients With Treatment Resistant Major Depression (FORSEIII)		
NCT01984710	Deep brain stimulation for treatment resistant depression Medtronic Activa PC+S	20	Sep 2023
NCT00367003	Deep Brain Stimulation for Treatment Resistant Depression	40	Nov 2024
<i>Unpublished</i>			
NCT01801319	A Clinical Evaluation of Subcallosal Cingulate Gyrus Deep Brain Stimulation for Treatment-Resistant Depression	40	Dec 2017 (status unknown)
NCT01329133	Deep Brain Stimulation and Obsessive-Compulsive Disorder (STOC2)	31	Apr 2019 (completed)
NCT01973478	Deep Brain Stimulation in Patients With Chronic Treatment Resistant Depression	9 enrolled	Jan 2020 (suspended)

NCT: national clinical trial.

^a Denotes industry-sponsored or cosponsored trial.

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<https://www.cms.gov/medicare-coverage-database/details/ncd-details.aspx?NCDId=279&ncdver=1&DocID=160.24&bc=gAAAABAAAA&>

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03/21/2002 Medical Policy Committee review

03/25/2002 Managed Care Advisory Council approval

06/24/2002 Format revision. No substance change to policy.

08/03/2004 Medical Director review

08/17/2004 Medical Policy Committee review

08/30/2004 Managed Care Advisory Council approval

07/14/2005 Medical Director review

07/19/2005 Medical Policy Committee review. Clinical criteria revision. Coverage eligibility changes. Added investigational statement for DBS for cluster headaches.

08/24/2005 Managed Care Advisory Council approval

06/07/2006 Medical Director review

06/21/2006 Medical Policy Committee approval. Format revisions, FDA/Governmental, Rationale/Source. Coverage eligibility unchanged.

08/01/2007 Medical Director review

08/15/2007 Medical Policy Committee approval. No change to coverage eligibility.

08/06/2008 Medical Director review

08/20/2008 Medical Policy Committee approval. Tardive dyskinesia, Tourette syndrome, depression and epilepsy were added to the list of investigational indications.

08/06/2009 Medical Policy Committee approval

08/26/2009 Medical Policy Implementation Committee approval. Coverage eligibility unchanged.

07/01/2010 Medical Policy Committee approval

07/21/2010 Medical Policy Implementation Committee approval. Coverage eligibility unchanged.

07/07/2011 Medical Policy Committee approval

07/20/2011 Medical Policy Implementation Committee approval. Coverage eligibility unchanged.

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06/28/2012 Medical Policy Committee approval
07/27/2012 Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
02/04/2013 Coding Updated
06/27/2013 Medical Policy Committee approval
07/17/2013 Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
07/10/2014 Medical Policy Committee approval
07/16/2014 Medical Policy Implementation Committee approval. Added anorexia nervosa, alcohol addiction, and chronic pain as investigational indications
01/01/2015 Coding Updated
08/03/2015 Coding update: ICD10 Diagnosis code section added; ICD9 Procedure code section removed.
09/03/2015 Medical Policy Committee approval
09/23/2015 Medical Policy Implementation Committee approval. Added eligibility statement for bilateral DBS of thalamus for bilateral tremors and added Alzheimer disease to list of investigational indications
01/01/2016 Coding update
09/08/2016 Medical Policy Committee approval
09/21/2016 Medical Policy Implementation Committee approval. Added “upper” to coverage statement for bilateral DBS.
01/01/2017 Coding update: Removing ICD-9 Diagnosis Codes
09/07/2017 Medical Policy Committee approval
09/20/2017 Medical Policy Implementation Committee approval. In medically necessary statement on unilateral or bilateral deep brain stimulation of the globus pallidus or subthalamic nucleus, “OR Parkinson disease for at least 4 years” added to medically necessary criteria for use in Parkinson disease.
09/06/2018 Medical Policy Committee approval
09/19/2018 Medical Policy Implementation Committee approval. No change to coverage.
09/05/2019 Medical Policy Committee approval
09/11/2019 Medical Policy Implementation Committee approval. No change to coverage.
09/03/2020 Medical Policy Committee approval
09/09/2020 Medical Policy Implementation Committee approval. No change to coverage.
12/11/2020 Coding update

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Next Scheduled Review Date: 09/2021

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Codes used to identify services associated with this policy may include (but may not be limited to) the following:

Code Type	Code
CPT	61850, 61860, 61863, 61864, 61867, 61868, 61880, 61885, 61886, 95970, 95983, 95984 Code deleted eff 1/1/2021: 61870
HCPCS	C1816, C1820, C1822, C1823, C1883, L8680, L8681, L8682, L8683, L8684, L8685, L8686, L8687, L8688, L8689

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Louisiana

Deep Brain Stimulation

Policy # 00024

Original Effective Date: 08/25/2005

Current Effective Date: 10/12/2020

ICD-10 Diagnosis	<p>F10.20, F32.89-F32.9, F34.81, F34.89, F50.00-F50.02, F95.2, G20, G21.11-G21.19, G21.2-G21.9, G24.01-G24.09, G24.1-G24.9, G25.0-G25.2, G35, G40.A01-G40.A09, G40.A11-G40.A19, G44.001-G44.009, G89.21-G89.29, G89.3-G89.4, Z96.82</p> <p>Codes added eff 10/1/2020: F10.130-F10.139, F10.930-F10.939, G40.42, G40.833, G40.834</p>
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*Investigational – A medical treatment, procedure, drug, device, or biological product is Investigational if the effectiveness has not been clearly tested and it has not been incorporated into standard medical practice. Any determination we make that a medical treatment, procedure, drug, device, or biological product is Investigational will be based on a consideration of the following:

- A. Whether the medical treatment, procedure, drug, device, or biological product can be lawfully marketed without approval of the U.S. Food and Drug Administration (FDA) and whether such approval has been granted at the time the medical treatment, procedure, drug, device, or biological product is sought to be furnished; or
- B. Whether the medical treatment, procedure, drug, device, or biological product requires further studies or clinical trials to determine its maximum tolerated dose, toxicity, safety, effectiveness, or effectiveness as compared with the standard means of treatment or diagnosis, must improve health outcomes, according to the consensus of opinion among experts as shown by reliable evidence, including:
 - 1. Consultation with the Blue Cross and Blue Shield Association technology assessment program (TEC) or other nonaffiliated technology evaluation center(s);
 - 2. Credible scientific evidence published in peer-reviewed medical literature generally recognized by the relevant medical community; or
 - 3. Reference to federal regulations.

**Medically Necessary (or “Medical Necessity”) - Health care services, treatment, procedures, equipment, drugs, devices, items or supplies that a Provider, exercising prudent clinical judgment, would provide to a patient for the purpose of preventing, evaluating, diagnosing or treating an illness, injury, disease or its symptoms, and that are:

- A. In accordance with nationally accepted standards of medical practice;
- B. Clinically appropriate, in terms of type, frequency, extent, level of care, site and duration, and considered effective for the patient's illness, injury or disease; and

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- C. Not primarily for the personal comfort or convenience of the patient, physician or other health care provider, and not more costly than an alternative service or sequence of services at least as likely to produce equivalent therapeutic or diagnostic results as to the diagnosis or treatment of that patient's illness, injury or disease.

For these purposes, “nationally accepted standards of medical practice” means standards that are based on credible scientific evidence published in peer-reviewed medical literature generally recognized by the relevant medical community, Physician Specialty Society recommendations and the views of Physicians practicing in relevant clinical areas and any other relevant factors.

‡ Indicated trademarks are the registered trademarks of their respective owners.

NOTICE: If the Patient’s health insurance contract contains language that differs from the BCBSLA Medical Policy definition noted above, the definition in the health insurance contract will be relied upon for specific coverage determinations.

NOTICE: Medical Policies are scientific based opinions, provided solely for coverage and informational purposes. Medical Policies should not be construed to suggest that the Company recommends, advocates, requires, encourages, or discourages any particular treatment, procedure, or service, or any particular course of treatment, procedure, or service.

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