

Diagnostic Spinal Ultrasonography

Policy Number: RMHP.2025T0462Y
Effective Date: March 1, 2025

[➔ Instructions for Use](#)

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Related Policies
None

Coverage Rationale

Spinal and paraspinal ultrasonography is proven and medically necessary only in neonates and infants for the following indications:

- Evaluation of [Caudal Regression Syndrome](#), including sacral agenesis, anal atresia, or stenosis
- Detection of sequelae of injury, such as:
 - Hematoma following injury such as birth injury
 - Infection or hemorrhage secondary to prior instrumentation such as lumbar puncture
 - Post-traumatic leakage of cerebrospinal fluid
- Evaluation of suspected spinal cord defects such as [Tethered Spinal Cord Syndrome \(TSCS\)](#), [Diastematomyelia](#), [Hydromyelia](#), or [Syringomyelia](#)
- Guidance for lumbar puncture
- Lumbosacral stigmata known to be associated with [Spinal Dysraphism](#)
- Post-operative assessment for spinal cord retethering
- Visualization of blood products within the spinal canal of neonates and infants with intracranial hemorrhage

Spinal and paraspinal ultrasonography is unproven and not medically necessary for all other indications due to insufficient evidence of efficacy.

Definitions

The following definitions may not apply to all plans. Refer to the member specific benefit plan document for applicable definitions.

Caudal Regression Syndrome (CRS): A group of spinal defects with premature growth/development termination of the vertebral column. CRS can be divided into three types: sirenomelia, complete absence of the sacrum and partial absence of the sacrum (Jasiewicz & Kacki, 2021).

Diastematomyelia: Coexistence of two hemicords, at variable levels, causing splaying of the posterior vertebral elements. Results in neurological deficits in lower limb or perineum (NIH, 2023).

Hydromyelia: An abnormal widening of the central canal of the spinal cord. This widened area creates a cavity in which cerebrospinal fluid (commonly known as spinal fluid) can build up. As spinal fluid builds up, it may put abnormal pressure on the spinal cord, and damage nerve cells and their connections (NIH, 2024).

Spinal Dysraphism: A congenital abnormality that results in an abnormal structure in the spine, including the bony structure, the spinal cord, and the nerve roots. Myelomeningocele is a Spinal Dysraphism in which the spinal cord and its contents herniate through a congenital bony defect in the posterior elements (Iftikhar, 2023).

Syringomyelia: A neurological disorder in which a fluid-filled cyst (syrinx) forms within the spinal cord. The syrinx can get big enough to damage the spinal cord and compress and injure the nerve fibers that carry information to and from the brain to the body (NIH, 2023).

Tethered Spinal Cord Syndrome (TSCS): Is a disorder of the nervous system caused by tissue that attaches itself to the spinal cord and limits the movement of the spinal cord. The tissue attachments may be present from birth at the base of the spinal cord (known as the conus medullaris), or they may develop near the site of an injury to the spinal cord. They can cause the spinal cord to stretch abnormally (NIH, 2023).

Applicable Codes

The following list(s) of procedure and/or diagnosis codes is provided for reference purposes only and may not be all inclusive. Listing of a code in this policy does not imply that the service described by the code is a covered or non-covered health service. Benefit coverage for health services is determined by the member specific benefit plan document and applicable laws that may require coverage for a specific service. The inclusion of a code does not imply any right to reimbursement or guarantee claim payment. Other Policies and Guidelines may apply.

CPT Code	Description
76800	Ultrasound, spinal canal and contents

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Diagnosis Code	Description
G95.0	Syringomyelia and syringobulbia
G95.11	Acute infarction of spinal cord (embolic) (nonembolic)
G95.89	Other specified diseases of spinal cord
G96.00	Cerebrospinal fluid leak, unspecified
G96.01	Cranial cerebrospinal fluid leak, spontaneous
G96.02	Spinal cerebrospinal fluid leak, spontaneous
G96.08	Other cranial cerebrospinal fluid leak
G96.09	Other spinal cerebrospinal fluid leak
G97.51	Postprocedural hemorrhage of a nervous system organ or structure following a nervous system procedure
G97.61	Postprocedural hematoma of a nervous system organ or structure following a nervous system procedure
G97.63	Postprocedural seroma of a nervous system organ or structure following a nervous system procedure
M41.00	Infantile idiopathic scoliosis, site unspecified
M41.02	Infantile idiopathic scoliosis, cervical region
M41.03	Infantile idiopathic scoliosis, cervicothoracic region
M41.04	Infantile idiopathic scoliosis, thoracic region
M41.05	Infantile idiopathic scoliosis, thoracolumbar region
M41.06	Infantile idiopathic scoliosis, lumbar region
M41.07	Infantile idiopathic scoliosis, lumbosacral region
M41.08	Infantile idiopathic scoliosis, sacral and sacrococcygeal region
M41.20	Other idiopathic scoliosis, site unspecified
M41.22	Other idiopathic scoliosis, cervical region
M41.23	Other idiopathic scoliosis, cervicothoracic region
M41.24	Other idiopathic scoliosis, thoracic region

Diagnosis Code	Description
M41.25	Other idiopathic scoliosis, thoracolumbar region
M41.26	Other idiopathic scoliosis, lumbar region
M41.27	Other idiopathic scoliosis, lumbosacral region
M41.30	Thoracogenic scoliosis, site unspecified
M41.34	Thoracogenic scoliosis, thoracic region
M41.35	Thoracogenic scoliosis, thoracolumbar region
M41.40	Neuromuscular scoliosis, site unspecified
M41.41	Neuromuscular scoliosis, occipito-atlanto-axial region
M41.42	Neuromuscular scoliosis, cervical region
M41.43	Neuromuscular scoliosis, cervicothoracic region
M41.44	Neuromuscular scoliosis, thoracic region
M41.45	Neuromuscular scoliosis, thoracolumbar region
M41.46	Neuromuscular scoliosis, lumbar region
M41.47	Neuromuscular scoliosis, lumbosacral region
M41.50	Other secondary scoliosis, site unspecified
M41.52	Other secondary scoliosis, cervical region
M41.53	Other secondary scoliosis, cervicothoracic region
M41.54	Other secondary scoliosis, thoracic region
M41.55	Other secondary scoliosis, thoracolumbar region
M41.56	Other secondary scoliosis, lumbar region
M41.57	Other secondary scoliosis, lumbosacral region
M41.80	Other forms of scoliosis, site unspecified
M41.82	Other forms of scoliosis, cervical region
M41.83	Other forms of scoliosis, cervicothoracic region
M41.84	Other forms of scoliosis, thoracic region
M41.85	Other forms of scoliosis, thoracolumbar region
M41.86	Other forms of scoliosis, lumbar region
M41.87	Other forms of scoliosis, lumbosacral region
M41.9	Scoliosis, unspecified
M51.86	Other intervertebral disc disorders, lumbar region
M51.87	Other intervertebral disc disorders, lumbosacral region
P10.0	Subdural hemorrhage due to birth injury
P10.1	Cerebral hemorrhage due to birth injury
P10.2	Intraventricular hemorrhage due to birth injury
P10.3	Subarachnoid hemorrhage due to birth injury
P10.8	Other intracranial lacerations and hemorrhages due to birth injury
P10.9	Unspecified intracranial laceration and hemorrhage due to birth injury
P11.5	Birth injury to spine and spinal cord
P52.0	Intraventricular (nontraumatic) hemorrhage, grade 1, of newborn
P52.1	Intraventricular (nontraumatic) hemorrhage, grade 2, of newborn
P52.3	Unspecified intraventricular (nontraumatic) hemorrhage of newborn
P52.4	Intracerebral (nontraumatic) hemorrhage of newborn
P52.5	Subarachnoid (nontraumatic) hemorrhage of newborn
P52.6	Cerebellar (nontraumatic) and posterior fossa hemorrhage of newborn
P52.8	Other intracranial (nontraumatic) hemorrhages of newborn

Diagnosis Code	Description
P52.9	Intracranial (nontraumatic) hemorrhage of newborn, unspecified
P52.21	Intraventricular (nontraumatic) hemorrhage, grade 3, of newborn
P52.22	Intraventricular (nontraumatic) hemorrhage, grade 4, of newborn
Q05.0	Cervical spina bifida with hydrocephalus
Q05.1	Thoracic spina bifida with hydrocephalus
Q05.2	Lumbar spina bifida with hydrocephalus
Q05.3	Sacral spina bifida with hydrocephalus
Q05.4	Unspecified spina bifida with hydrocephalus
Q05.5	Cervical spina bifida without hydrocephalus
Q05.6	Thoracic spina bifida without hydrocephalus
Q05.7	Lumbar spina bifida without hydrocephalus
Q05.8	Sacral spina bifida without hydrocephalus
Q05.9	Spina bifida, unspecified
Q06.0	Amyelia
Q06.1	Hypoplasia and dysplasia of spinal cord
Q06.2	Diastematomyelia
Q06.3	Other congenital cauda equina malformations
Q06.4	Hydromyelia
Q06.8	Other specified congenital malformations of spinal cord
Q06.9	Congenital malformation of spinal cord, unspecified
Q07.00	Arnold-Chiari syndrome without spina bifida or hydrocephalus
Q07.01	Arnold-Chiari syndrome with spina bifida
Q07.02	Arnold-Chiari syndrome with hydrocephalus
Q07.03	Arnold-Chiari syndrome with spina bifida and hydrocephalus
Q07.8	Other specified congenital malformations of nervous system
Q07.9	Congenital malformation of nervous system, unspecified
Q42.2	Congenital absence, atresia and stenosis of anus with fistula
Q42.3	Congenital absence, atresia and stenosis of anus without fistula
Q76.49	Other congenital malformations of spine, not associated with scoliosis
Q82.6	Congenital sacral dimple
Q87.2	Congenital malformation syndromes predominantly involving limbs
Q89.8	Other specified congenital malformations

Description of Services

Ultrasonography is a noninvasive imaging technique that relies on detection of the reflections or echoes generated as high-frequency sound waves are passed into the body. This technique is commonly used for a number of imaging purposes such as investigation of abdominal and pelvic masses, cardiac echocardiography, and prenatal fetal imaging. Less commonly, it has also been applied to detection of spinal and paraspinal disorders. Ultrasonography of the spinal canal and its contents includes imaging of the spinal cord, the vertebrae, and the intervertebral discs.

Per the Radiological Society of North America, various tumors and disorders, especially neurological and vascular malformations, can be detected with spinal ultrasound (US). In newborns and infants up to six months of age, spinal cord lesions can be detected with US because the posterior elements are membranous rather than bony. Beyond this age, these elements calcify, reserving magnetic resonance imaging (MRI) for cases where spinal ultrasound is equivocal or has revealed a definite abnormality (Unsinn et al., 2000).

Spinal ultrasonography has also been used for investigation of neonatal Spinal Dysraphism, a disorder resulting from incomplete closure of the neural tube during gestation. This type of birth defect occurs in approximately 2 per 1000 live

births, and the resulting spinal disorders include spinal agenesis, low cord, tethered cord, Hydromyelia, Diastematomyelia, myelocystocele, and myelomeningocele. Spinal ultrasonography may be used as the primary screening tool, reserving magnetic resonance imaging (MRI) for cases where spinal ultrasound is equivocal or has revealed a definite abnormality.

In adults, spinal ultrasonography has been used to investigate degenerative disc disease to determine whether back pain is a consequence of fissuring or herniation of the gelatinous discs that separate the vertebrae. Spinal ultrasound has also been used in the assessment of injuries to paraspinal ligaments after spinal fractures. Although ultrasonography has limited ability to reveal bone and tissues surrounding bone, it has been studied as a means to assess the posterior ligament complex that contributes to the maintenance of spinal stability. Compared with computed tomography (CT) and magnetic resonance imaging (MRI), ultrasonography provides less detailed images of bone and the structures within and near bone. However, ultrasonography has the advantages of being simpler, more widely available, requiring no exposure to ionizing radiation, and having less susceptibility to patient movement.

Spinal ultrasonography is also being studied to determine if it can be used to guide rehabilitation of neuromusculoskeletal disorders and back pain. In this application, rehabilitative ultrasound imaging (RUSI) has been defined as a “procedure used by physical therapists to evaluate muscle and related soft tissue morphology and function during exercise and physical tasks. RUSI is used to assist in the application of therapeutic interventions, providing feedback to the patient and physical therapist.” This information assists in determining which exercise treatment or rehabilitation programs can improve neuromuscular function for the individual (Teyhen, 2006).

Clinical Evidence

Spinal and Paraspinal Ultrasonography in Neonates and Infants

Since the 1980’s, ultrasound (US) has been the first-line imaging modality for the assessment of spinal cord development abnormalities. Within the first 6 months of life the non-ossification of neuronal arcs provides an excellent acoustic window that allows a detailed depiction of the spinal canals, it’s content and the surrounding soft tissue (Valente, 2019).

Clinical Practice Guidelines

American College of Radiology (ACR)/American Institute of Ultrasound in Medicine (AIUM)/Society for Pediatric Radiology (SPR)/Society of Radiologists in Ultrasound (SRU)

In 2016 (updated, October 2021), the AIUM, ACR, SPR, and SRU jointly published a practice parameter for the performance of an ultrasound examination of the neonatal and infant spine stating the following for neonatal spinal ultrasound:

- Indications (including, but not limited to):
 - Lumbosacral stigmata known to be associated with spinal dysraphism and tethered spinal cord, including, but not limited to:
 - Midline or paramedian masses
 - Midline skin discolorations
 - Skin tags
 - Hair tufts
 - Hemangiomas
 - Atypical sacral dimples
 - The spectrum of caudal regression syndrome, including patients with sacral agenesis or anorectal malformations such as Currarino Triad, VACTERL association, Cloaca, and OEIS complex
 - Evaluation of suspected cord abnormalities such as cord tethering, diastematomyelia, hydromyelia, or syringomyelia
 - Detection of acquired abnormalities and complications such as:
 - Hematoma following injury
 - Infection or hemorrhage secondary to prior instrumentation, such as lumbar puncture
 - Post-traumatic leakage of cerebrospinal fluid (CSF)
 - Misplacement of devices and lines
 - Visualization of blood products within the spinal canal in patients with intracranial hemorrhage
 - Guidance for lumbar puncture
 - Postoperative assessment for recurrence of cord retethering
 - Evaluation for congenital spine tumors, for example, sacrococcygeal teratoma

- Contraindications:
 - Preoperative examination of an open spinal dysraphic defect. However, in such cases, the closed portion of the spinal canal away from the open defect can be examined for other suspected abnormalities, such as syrinx or diastematomyelia. These latter abnormalities should be identified preoperatively
 - Examination of the contents of a closed neural tube defect, if the skin overlying the defect is thin or no longer intact

The practice parameter states, “In experienced hands, ultrasound of the infant spine has been demonstrated to be an accurate and cost-effective examination that is comparable to MRI for evaluating congenital or acquired abnormalities in the neonate and young infant.”

Spinal and Paraspinal Ultrasonography in Adults or Individuals With Spinal Injuries

There is insufficient evidence in the peer-reviewed medical literature to establish the efficacy and clinical utility of spinal and paraspinal ultrasonography as a diagnostic tool in the management of back pain and radiculopathies.

An observational study/clinical trial (NCT04823637) was completed by Chang et al. (2021) to evaluate the relationship between diagnostic osteopathic manipulation and ultrasonographic (US) measurements of the thoracic spine utilizing inter-examiner agreement and correlation over a one-year period. The study included a total of 72 student volunteers recruited from the Midwestern University (MWU)—Glendale, AZ campus. A non-toxic, non-permanent marker was utilized to mark bony landmarks on the skin. Two neuromusculoskeletal board-certified physicians (OMM1, OMM2) separately performed structural exams by palpating T2–T5 transverse processes (TPs) to determine vertebral rotation. Two sonographers (US1, US2) separately scanned and measured the distance from the tip of the spinous process (SP) to the adjacent TPs of the vertebral segment below. Demographic variables were summarized with mean and standard deviation. Inter-examiner agreement was assessed with percent agreement, Cohen’s Kappa, and Fleiss’ Kappa. Correlation was measured by Spearman’s rank correlation coefficient. Recruitment and protocols were approved by the MWU Institutional Review Board (IRB). US had fair inter-examiner agreement for the overall most prominent segmental rotation of the T3–T5 thoracic spine, with Cohen’s Kappa at 0.27 (0.09, 0.45), and a total agreement percentage at 51.5%. Osteopathic palpation revealed low inter-examiner agreement for the overall most prominent vertebral rotation, with Cohen’s Kappa at 0.05 (0.0, 0.27), and 31.8%. Segment-specific vertebral analysis revealed slight agreement between US examiners, with a correlation coefficient of 0.23, whereas all other pairwise comparisons showed low agreement and correlation. At T4, US had slight inter-examiner agreement with 0.24 correlation coefficient, and osteopathic palpation showed low inter-examiner (OMM1 vs. OMM2) agreement (0.17 correlation coefficient). At T5, there was moderate agreement between the two sonographers with 0.44 (0.27, 0.60) and 63.6%, with a correlation coefficient of 0.57, and slight agreement between OMM1 and OMM2 with 0.12 (0.0, 0.28) and 42.4%, with 0.23 correlation coefficient. The authors concluded that there is a low-to-moderate inter-examiner reliability between sonographers, low-to-slight inter-examiner reliability between osteopathic physicians, and low inter-examiner reliability between OMM palpatory examination and ultrasonographic evaluation of the thoracic spine. The findings of this study need to be validated by well-designed studies. Further investigation is needed before clinical usefulness of this procedure is proven.

In a 2020 prospective cohort study, Herraets et al. examined the diagnostic accuracy of nerve ultrasound (US) in patients with a clinical suspicion of chronic inflammatory neuropathies (including chronic inflammatory demyelinating polyneuropathy, Lewis-Sumner syndrome, and multifocal motor neuropathy), and to determine the added value in the detection of treatment-responsive patients. One hundred consecutive patients with suspected chronic inflammatory neuropathy underwent nerve US, extensive standardized nerve conduction studies (NCS), and other relevant diagnostic investigations. A diagnosis of chronic inflammatory neuropathy was established when NCS were abnormal, or when the degree of nerve enlargement detected by sonography was compatible, and there was response to treatment. A diagnosis of chronic inflammatory neuropathy was established in 38 of these patients. Sensitivity and specificity of nerve ultrasound and NCS were 97.4% and 69.4% and 78.9% and 93.5%, respectively. The added value of nerve ultrasound in detection of treatment-responsive chronic inflammatory neuropathy was 21.1% compared to NCS alone. The authors concluded that this study provides Class IV evidence that these diagnostic modalities are complementary to and the addition of US to NCS significantly improves the diagnosis of chronic inflammatory neuropathies. Higher quality studies that include larger number of participants are needed to validate the clinical usefulness of nerve ultrasound.

Ahmed et al. (2018) conducted a systematic review of 73 studies regarding the findings of ultrasound imaging for different areas of the spine such as muscle, bone, disc, ligaments canals and joints. In the body of evidence researched, nearly all the structures of the spine were shown to be clearly visible via ultrasound imaging, (however less than 10% of the reviewed articles addressed US as a spinal diagnostic modality) with the most common use being an aid for procedures involving injections and the use of needles near the spine. There was also preliminary evidence that US has comparable accuracy to CT for planning the placement of pedicle screws, thoracolumbar burst fracture repositioning and evaluating posterior ligament injuries, however it cannot replace CT and MRI in general trauma evaluation. The authors concluded that functional aspects such as spinal curvature and mobility assessment can also be reliably imaged and can be useful in

assisting in diagnosis and therapeutic interventions. Standardized and reproducible education training is needed for performance and interpretation, and high-quality studies comparing diagnostic accuracy to CT and MRI are needed before broad implementation of US for spinal diagnostics.

Clinical Practice Guidelines

American College of Radiology (ACR)

In the ACR Appropriateness Criteria (2016, updated 2021) for inflammatory back pain and suspected axial spondyloarthritis, an expert panel on musculoskeletal imaging concluded that ultrasound (US) is not suggested as a routine diagnostic modality, or for the assessment of treatment response or disease progression due to a lack of diagnostic utility.

American Institute of Ultrasound in Medicine (AIUM)

The AIUM's statement regarding nonoperative spinal/paraspinal ultrasounds in adults was published in 2014 and reaffirmed in 2019. In the official statement, the authors reported there is insufficient evidence in the peer-reviewed medical literature establishing the value of nonoperative spinal/paraspinal ultrasound in adults. Therefore, the AIUM states that, at this time, the use of nonoperative spinal/paraspinal ultrasound in adults (for study of intervertebral discs, facet joints and capsules, central nerves and fascial edema, and other subtle paraspinal abnormalities) for diagnostic evaluation, screening, diagnostic evaluation, including pain or radiculopathy syndromes, and for monitoring of therapy has no proven clinical utility, and should be considered investigational.

Rehabilitative Ultrasound Imaging (RUSI)

No high-quality published studies on RUSI to guide the diagnosis and treatment of musculoskeletal rehabilitation were identified. Additional research is needed to define the role of RUSI, and its effect on rehabilitation outcomes.

Ellis et al. (2021) conducted a cross-sectional observational study to assess the reliability of ultrasound imaging in measuring sciatic nerve excursion and strain during forward bending movements. According to the authors, this is the first in vivo study on this topic. Thirty-one healthy males and females were recruited. Two different forward bending movements were performed to cause movement of the sciatic nerve; a bend with arms crossed (BAC) as far forward as was comfortable, and a full bend with arms allowed to hang freely (FB), and each bend was recorded over 8 seconds. Excursion of the sciatic nerve was measured simultaneously at two positions along the midposterior thigh of the left leg in all participants. The results showed US is moderately reliable for the measurement of sciatic nerve strain during both movements being measured. For sciatic nerve excursion, US showed excellent reliability, however, this can be strongly predicated through hip range of motion. The authors concluded that this study provides increased knowledge about sciatic nerve excursion and strain during forward bending movements, providing a foundation for future clinical studies on the use of USI and this will be beneficial in the assessment and management of patients with entrapment neuropathies.

There are conflicting conclusions from systematic reviews about the reliability of ultrasound imaging. Hebert, et al (2009) determined that there is good reliability of ultrasound imaging within the majority of research studies that measured the abdominal and lumbar trunk muscles. The levels of reliability were influenced by several factors: operator experience; measurement targets (measures of muscle thickness were more reliable than cross-sectional area); and calculation methodology (a mean of measures was more reliable). In another systematic review Costa, et al (2009) concluded, "The current evidence of the reproducibility of RUSI [rehabilitative ultrasound imaging] for measuring abdominal muscle activity is based mainly on studies with suboptimal designs and the study of people who were healthy." The authors highlighted a lack of studies investigating the reproducibility of muscle thickness changes and differences in thickness changes over time as a key limitation of existing research on the reliability of ultrasound imaging for assessing the abdominal wall muscles. In addition to systematic reviews on the reliability of rehabilitative ultrasound imaging, questions about the influence of gender, body mass index, posture, hand dominance, and different populations on muscle morphology remain unclear (Teyhen, 2006).

U.S. Food and Drug Administration (FDA)

This section is to be used for informational purposes only. FDA approval alone is not a basis for coverage.

The use of musculoskeletal ultrasound to diagnose low back pain is a procedure and as such, is not regulated by the FDA. However, the devices used to perform this procedure are regulated by the FDA and many ultrasound devices and probes have received FDA approval for marketing. Additional information, under product code IYO (subsequent product codes IXT and IYN), is available at: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmn.cfm>. (Accessed May 6, 2024)

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Instructions for Use

This Medical Policy provides assistance in interpreting UnitedHealthcare standard benefit plans. When deciding coverage, the member specific benefit plan document must be referenced as the terms of the member specific benefit plan may differ from the standard plan. In the event of a conflict, the member specific benefit plan document governs. Before using this policy, please check the member specific benefit plan document and any applicable federal or state mandates. UnitedHealthcare reserves the right to modify its Policies and Guidelines as necessary. This Medical Policy is provided for informational purposes. It does not constitute medical advice.

This Medical Policy may also be applied to Medicare Advantage plans in certain instances. In the absence of a Medicare National Coverage Determination (NCD), Local Coverage Determination (LCD), or other Medicare coverage guidance, CMS allows a Medicare Advantage Organization (MAO) to create its own coverage determinations, using objective evidence-based rationale relying on authoritative evidence ([Medicare IOM Pub. No. 100-16, Ch. 4, §90.5](#)).

UnitedHealthcare may also use tools developed by third parties, such as the InterQual[®] criteria, to assist us in administering health benefits. UnitedHealthcare Medical Policies are intended to be used in connection with the independent professional medical judgment of a qualified health care provider and do not constitute the practice of medicine or medical advice.