2.01.104	Vestibular Function Testing		
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Section:	2.0 Medicine	**Page:**	Page 1 of 18

Policy Statement

I. Vestibular function testing using an electronystagmography and videonystagmography testing batteries, caloric testing, or rotational chair testing may be considered **medically necessary** when the following conditions have been met:
   A. The individual has symptoms of a vestibular disorder (e.g., dizziness, vertigo, imbalance)
   B. A clinical evaluation, including maneuvers such as the Dix-Hallpike test if indicated, has failed to identify the cause of the symptoms

II. Vestibular evoked myogenic potential tests are considered **investigational**.

III. Vestibular function testing for the assessment of typical benign paroxysmal positional vertigo that can be diagnosed clinically is considered **investigational**.

IV. Repeat vestibular function testing when treatment resolves symptoms is considered **investigational**.

V. Vestibular function testing in all other situations is considered **investigational**.

VI. All other laboratory-based vestibular function tests not described above are considered **investigational**.

NOTE: Refer to Appendix A to see the policy statement changes (if any) from the previous version.

Policy Guidelines

Coding
See the Codes table for details.

Description

Dizziness, vertigo, and balance impairments can arise from a loss of vestibular function. A number of established laboratory-based tests are used to evaluate whether the symptoms are due to dysfunction of the semicircular canals. These tests are based on the vestibulo-ocular reflex, which is an involuntary movement of the eyes (nystagmus) in response to vestibular stimulation. Established laboratory tests include electronystagmography and videonystagmography test batteries, caloric stimulation, and rotational chair testing. Vestibular evoked myogenic potentials (VEMPs), triggered by sound and vibration, are also being evaluated for the diagnosis of otolith dysfunction.

Related Policies

- Dynamic Posturography

Benefit Application

Benefit determinations should be based in all cases on the applicable contract language. To the extent there are any conflicts between these guidelines and the contract language, the contract

language will control. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

Some state or federal mandates (e.g., Federal Employee Program [FEP]) prohibits plans from denying Food and Drug Administration (FDA)-approved technologies as investigational. In these instances, plans may have to consider the coverage eligibility of FDA-approved technologies on the basis of medical necessity alone.

Regulatory Status

Vestibular analysis devices are currently regulated by the U.S. Food and Drug Administration (FDA) through the 510(k) pathway, under FDA product code LXV.[5,] The term "vestibular analysis devices" includes both diagnostic devices (e.g., rotary chairs, multiaxial chairs) and therapeutic devices (e.g., balance training and balance rehabilitation devices). Some devices indicated for diagnostic testing are included in Table 1.

Table 1. Vestibular Analysis Devices Approved by the U.S. Food and Drug Administration

Device	Manufacturer	Date Cleared	510(k) No.
Gyrostim	UltraThera Technologies, Inc.	Apr 2022	K220231
Orion	Interacoustics A/S	Aug 2020	K200529
TRV	Interacoustics A/S	May 2020	K192652
ICS® Impulse	Otometrics	Feb 2013	K122550
Sway Balance™	Sway Medical (Capacity Sports)	Sep 2012	K121590
Nydiag 200 Rotary Chair	Interacoustics A/S	Dec 2010	K102364
Epley Omniax®	Vesticon	Jun 2008	K071973
VMT System	Target Health	Oct 1998	K971549
VORTEQ™ (Vestibular Ocular Reflex Test Equipment)	Micromedical Technologies	May 1989	K891008
RVT-50 Rotary Chair for Vestibular Testing	ICS Medical	Sep 1987	K872093
EquiTest®	Natus Medical (NeuroCom International)	Aug 1985	K851744
Chair, Vestibular, Rotary, Computerized	Contraves	Aug 1978	K781268

An example of equipment used for vestibular evoked myogenic potentials is the Bio-Logic Nav-Pro (Bio-logic Systems Corp), which in 2003 was cleared for marketing by the FDA through the 510(k) process (K994149) for use in the recording and displaying of human physiologic data, and for auditory screening and assisting in evaluation of auditory and hearing-related disorders using auditory brainstem responses recorded from electroencephalography electrodes placed on the scalp.

Rationale

Background

Vertigo

The vestibular system is an important component in balance control. It includes 5 end organs, 3 semicircular canals sensitive to head rotations, and 2 otolith organs (saccule, utricle) that sense gravity and straight-line (forward, backward, left, right, downward or upward) accelerations. Vertigo is the primary symptom of vestibular dysfunction. It can be experienced as illusory movements such as spinning, swaying, or tilting. Vertigo may be associated with a feeling of being pushed or pulled to the ground, blurred vision, nausea and vomiting, or postural and gait instability. Vertigo may arise

from damage or dysfunction of the vestibular labyrinth, vestibular nerve, or central vestibular structures in the brainstem.

Vertigo may be caused by loose particles (otoconia) from the otolith organs that pass into 1 of the semicircular canals, most frequently the posterior canal. Specific head movements cause the particle to stimulate the canal, causing brief benign paroxysmal positional vertigo.

Diagnosis

Brief benign paroxysmal positional vertigo can usually be diagnosed clinically based on a history of positional vertigo, response to the Dix-Hallpike maneuver or lateral roll tests, and resolution of symptoms with canal repositioning maneuvers.

If vertigo cannot be attributed to benign paroxysmal positional vertigo based on history, symptoms, or response to the standard maneuvers, a number of laboratory-based tests can be used to determine whether the vertigo is due to loss of vestibular function.[1,2,] These tests are based on the vestibulo-ocular reflex, which is an involuntary beating movement of the eyes (nystagmus) in response to vestibular stimulation. Nystagmus induced by these tests can help to distinguish between central and peripheral etiologies, in addition to determining whether the deficit is unilateral or bilateral. The typical tests include the electronystagmography (ENG) or videonystagmography (VNG) test batteries, caloric testing, and rotational chair testing.

Electronystagmography/Videonystagmography Test Batteries

The ENG/VNG test batteries include oculomotor evaluation and positional testing.

Electronystagmography uses electrodes at the canthus of the eyes to detect nystagmus while VNG uses infrared video monitoring with goggles to measure nystagmus.

Caloric Testing

Caloric testing evaluates unilateral vestibular function. In the caloric test, warm or cold water or warm or cold air is introduced into each of the external ear canals. In some descriptions, caloric testing is conducted as part of ENG/VNG test batteries.

Rotational Chair Testing

Rotational chair testing evaluates bilateral vestibular function. Rotational chair devices include a lightproof booth, computer-driven chair with a head restraint that rotates around a vertical axis, ENG recording, an infrared camera, and a 2-way communication system. Typically, the chair is rotated in 4 different patterns, constant acceleration followed by deceleration, rotating followed by a rapid stop, rotating at progressively increasing velocities, and alternating directions.

Passive rotational testing without a rotational chair may be performed when the rotational chair is not available. For the head impulse test, the patient is instructed to keep his or her eyes on a target. The examiner then turns the head rapidly by about 15°. With passive whole body testing, the examiner rotates the whole body to the rhythm of a metronome.

Vestibular Evoked Myogenic Potential Testing

Vestibular evoked myogenic potential (VEMP) tests are newer techniques that use loud sound (e.g., click, tone burst) or bone vibration (e.g., tendon hammer tap to the forehead or mastoid) to assess otolith function.[3,] Both the saccule and utricle are sensitive to sound as well as vibration and movement.

Cervical VEMPs are measured by surface electrodes on the ipsilateral sternocleidomastoid muscle in the neck and are thought to originate primarily in the saccule. Abnormality in any part of the auditory cervical VEMP pathway (saccule, inferior vestibular nerve, vestibular nucleus, medial vestibulospinal tract, the accessory nucleus, the eleventh nerve, sternocleidomastoid) can affect the response.

Ocular VEMPs detect subtle activity of an extraocular muscle using surface electrodes under the contralateral eye during an upward gaze and are thought to be due primarily to stimulation of the utricle. The vestibulo-ocular reflex stimulated by sound or vibration is very small, but synchronous bursts of activity of the extraocular muscles can be detected by electromyography. Lesions that affect the ocular VEMP may occur in the utricle, superior vestibular nerve, vestibular nucleus, and the crossed vestibulo-ocular reflex pathways.

Dynamic Posturography

Dynamic posturography may also be used to evaluate balance. Dynamic posturography is discussed in Blue Shield of California Medical Policy: Dynamic Posturography.

Treatment

The central vestibular system is able to compensate for loss of peripheral vestibular function. Thus, the primary therapy for peripheral vestibular dysfunction is exercise-based and includes exercises to promote gaze stability, habituate symptoms, and improve balance and gait.[4,] Medications such as vestibular suppressants or antiemetics may be used in the acute stage but are not recommended for chronic use. For patients who have recurrent symptoms uncontrolled by other methods, a surgical or ablative approach may be used. The objective of ablation is to stabilize the deficit to allow central compensation.

Literature Review

Evidence reviews assess whether a medical test is clinically useful. A useful test provides information to make a clinical management decision that improves the net health outcome. That is, the balance of benefits and harms is better when the test is used to manage the condition than when another test or no test is used to manage the condition.

The first step in assessing a medical test is to formulate the clinical context and purpose of the test. The test must be technically reliable, clinically valid, and clinically useful for that purpose. Evidence reviews assess the evidence on whether a test is clinically valid and clinically useful. Technical reliability is outside the scope of these reviews, and credible information on technical reliability is available from other sources.

Promotion of greater diversity and inclusion in clinical research of historically marginalized groups (e.g., People of Color [African-American, Asian, Black, Latino and Native American]; LGBTQIA (Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual); Women; and People with Disabilities [Physical and Invisible]) allows policy populations to be more reflective of and findings more applicable to our diverse members. While we also strive to use inclusive language related to these groups in our policies, use of gender-specific nouns (e.g., women, men, sisters, etc.) will continue when reflective of language used in publications describing study populations.

Laboratory-based vestibular function testing is well-established and has a large evidence base. In a 2000 technology assessment, the American Academy of Neurology (AAN) evaluated tests that stimulate the vestibular system (see Table 2).[1,] The AAN included caloric irrigation and rotational chair testing as established as effective, with passive examiner-generated head rotation testing and active head rotation as probably effective but not yet fully accepted by expert consensus. The group noted that quantitative vestibular testing is not always necessary, and a number of bedside methods can be used to evaluate nystagmus.

Suspected Benign Paroxysmal Positional Vertigo
Electronystagmography and Videonystagmography Test Batteries

Clinical Context and Test Purpose

The purpose of electronystagmography (ENG) and videonystagmography (VNG) test batteries is to provide a diagnostic option that is an alternative to or an improvement on existing tests, such as

clinical diagnosis, in individuals with a suspected vestibular disorder not clinically diagnosed as benign paroxysmal positional vertigo (BPPV).

The following PICO was used to select literature to inform this review.

Populations
The relevant population of interest is individuals with a suspected vestibular disorder not clinically diagnosed as BPPV.

Interventions
The tests being considered are ENG and VNG test batteries. These test batteries typically include oculomotor evaluation and positional testing. In ENG tests, nystagmus is detected by electrodes placed at the canthus of the eyes. Infrared video monitoring with goggles is used to measure nystagmus in VNG tests.

Comparators
The main comparator of interest is clinical diagnosis, which may include a detailed history of positional vertigo and assessment of response to the Dix-Hallpike maneuver or canal repositioning maneuvers.

Outcomes
The outcomes of interest are test accuracy, symptoms, functional outcomes, and quality of life. Symptoms of vestibular dysfunction include vertigo, blurred vision, nausea, vomiting, and postural and gait instability. Time for follow-up ranges from months to years for outcomes of interest.

Study Selection Criteria
Below are selection criteria for studies to assess whether a test is clinically valid and useful.

- The study population represents the population of interest. Eligibility and selection are described.
- The test is compared with a credible reference standard.
- If the test is intended to replace or be an adjunct to an existing test; it should also be compared with that test.
- Studies should report sensitivity, specificity, and predictive values. Studies that completely report true- and false-positive results are ideal. Studies reporting other measures (e.g., receiver operating characteristic, area under receiver operating characteristic, c-statistic, likelihood ratios) may be included but are less informative.
- Studies should also report reclassification of diagnostic or risk category.

Review of Evidence
The basic ENG and VNG test batteries include a spontaneous nystagmus test that measures the ability of the eyes to maintain a fixed position, a positional nystagmus test that measures the ability of the eyes to maintain a static position when the head is in different positions, an optokinetic nystagmus test that measures nystagmus caused by viewing a series of targets moving to the right and then to the left, and an oscillating tracking test that evaluates patient ability to track a moving target. The basic ENG/VNG test batteries with these 4 tests are well-established for evaluating vestibular function in patients who have a suspected vestibular disorder. A 2000 technology assessment by AAN concluded there was strong evidence (level A) of the usefulness of ENG and VNG testing, based on results from prospective and retrospective studies, as well as from expert consensus (see Table 2).

Gofrit et al (2017) assessed 135 patients with vestibular symptoms using physical exam, a specialized questionnaire (Dizziness Handicap Inventory), and ENG testing, which included caloric testing.[6,] The physical exam included spontaneous and gaze-evoked nystagmus, tandem and standard walk tests,

head shake test, and Rombert maneuver, but excluded the Dix-Hallpike test. Among those with a normal physical exam, testing identified 40 (48.8%) patients with abnormal ENG results (p=.46); conversely, among patients who had a normal ENG result, 17 (32.2%) had an abnormal physical exam. When severely disabled patients were selected by the Dizziness Handicap Inventory, these patients were equally as likely to have a normal (42.9%) ENG result as to have an abnormal (46.4%) ENG result. Physical examination excluded Dix-Hallpike test by necessity, and the authors noted this and the heterogeneous sample were study limitations.

Section Summary: Electronystagmography and Videonystagmography Test Batteries

Available evidence from controlled studies and expert consensus indicates that ENG/VNG is an appropriate test of vestibular function.

Caloric Testing

Clinical Context and Test Purpose

The purpose of caloric testing is to provide a diagnostic option that is an alternative to or an improvement on existing tests, such as clinical diagnosis, in individuals with a suspected vestibular disorder not clinically diagnosed as BPPV.

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with a suspected vestibular disorder not clinically diagnosed as BPPV.

Interventions

The test being considered is caloric testing. This procedure is intended to evaluate unilateral vestibular function and is performed by introducing hot or cold water or air into the external ear canals. Caloric testing is often conducted as part of ENG and VNG test batteries.

Comparators

The main comparator of interest is clinical diagnosis, which may include a detailed history of positional vertigo and assessment of response to the Dix-Hallpike maneuver or canal repositioning maneuvers.

Outcomes

The outcomes of interest are test accuracy, symptoms, functional outcomes, and quality of life. Symptoms of vestibular dysfunction are described above. Time for follow-up ranges from months to years for outcomes of interest.

Study Selection Criteria

Below are selection criteria for studies to assess whether a test is clinically valid and useful.

- The study population represents the population of interest. Eligibility and selection are described.
- The test is compared with a credible reference standard.
- If the test is intended to replace or be an adjunct to an existing test; it should also be compared with that test.
- Studies should report sensitivity, specificity, and predictive values. Studies that completely report true- and false-positive results are ideal. Studies reporting other measures (e.g., receiver operating characteristic, area under receiver operating characteristic, c-statistic, likelihood ratios) may be included but are less informative.
- Studies should also report reclassification of diagnostic or risk category.

Review of Evidence
Caloric testing is the most widely used vestibular function test and is considered the criterion standard for detecting unilateral vestibular loss.[1,2,] When warm or cold water or air is introduced into 1 of the external ear canals, the temperature change is transmitted through the middle ear and bone, causing a thermal gradient in the semicircular canal and resulting in nystagmus. Cold water will cause a movement response of the eye opposite to the stimulation, while warm water will induce nystagmus in the direction of the ear being stimulated. These eye movements can be measured by electrodes at the canthus or by video monitoring. An asymmetrical response after stimulating both ears indicates unilateral vestibular dysfunction. The 2000 AAN technology assessment concluded there was level A evidence supporting the use of caloric testing. This decision was based on controlled studies, as well as from expert consensus (see Table 2).

Section Summary: Caloric Testing
Available evidence from controlled studies and expert consensus indicates that caloric testing is an appropriate test of vestibular function.

Rotational Chair Testing
Clinical Context and Test Purpose
The purpose of rotational chair testing is to provide a diagnostic option that is an alternative to or an improvement on existing tests, such as clinical diagnosis, in individuals with a suspected vestibular disorder not clinically diagnosed as BPPV.

The following PICO was used to select literature to inform this review.

Populations
The relevant population of interest is individuals with a suspected vestibular disorder not clinically diagnosed as BPPV.

Interventions
The test being considered is the rotational chair test, which is intended to evaluate bilateral vestibular function. The rotational chair test utilizes a lightproof booth, computer-driven chair with a head restraint that rotates around a vertical axis, ENG recording, an infrared camera, and a 2-way communication system. The chair is typically rotated in 4 different patterns.

Comparators
The main comparator of interest is clinical diagnosis, which may include a detailed history of positional vertigo and assessment of response to the Dix-Hallpike maneuver or canal repositioning maneuvers.

Outcomes
The outcomes of interest are test accuracy, symptoms, functional outcomes, and quality of life. Symptoms of vestibular dysfunction are described above. Time for follow-up ranges from months to years for outcomes of interest.

Study Selection Criteria
Below are selection criteria for studies to assess whether a test is clinically valid and useful.

- The study population represents the population of interest. Eligibility and selection are described.
- The test is compared with a credible reference standard.
- If the test is intended to replace or be an adjunct to an existing test; it should also be compared with that test.
- Studies should report sensitivity, specificity, and predictive values. Studies that completely report true- and false-positive results are ideal. Studies reporting other measures (e.g.,

receiver operating characteristic, area under receiver operating characteristic, c-statistic, likelihood ratios) may be included but are less informative.
- Studies should also report reclassification of diagnostic or risk category.

Review of Evidence
Rotational chair testing is considered the criterion standard for detecting bilateral vestibular loss.[1,2,] Rotational chair devices include a lightproof booth, a computer-driven chair with a head restraint that rotates around a vertical axis, ENG recording, an infrared camera, and a 2-way communication system. Typically, the chair is rotated in 4 different patterns, constant acceleration followed by deceleration, rotation followed by a rapid stop, rotation at progressively increasing velocities, and alternating directions. Each pattern is repeated in both directions several times, and the accompanying post-rotation nystagmus, including parameters of gain, phase, and symmetry, is measured and averaged. Although traditionally used to detect bilateral vestibular loss, this battery can identify a unilateral vestibular deficit and identify the site of the lesion. The 2000 AAN technology assessment concluded there was level A evidence supporting the usefulness of rotational chair testing. This decision was based on the results of prospective and retrospective studies, as well as from expert consensus (see Table 2).

Section Summary: Rotational Chair Testing
Available evidence from prospective studies, retrospective studies, and expert consensus indicate that rotational chair testing is an appropriate test of vestibular function.

Vestibular Evoked Myogenic Potential Testing
Clinical Context and Test Purpose
The purpose of vestibular evoked myogenic potential (VEMP) testing is to provide a diagnostic option that is an alternative to or an improvement on existing tests, such as clinical diagnosis, in individuals with a suspected vestibular disorder not clinically diagnosed as BPPV.

The following PICO was used to select literature to inform this review.

Populations
The relevant population of interest is individuals with a suspected vestibular disorder not clinically diagnosed as BPPV.

Interventions
The test being considered is VEMP testing. VEMP tests use sound or vibration to stimulate the otolith organs. Cervical VEMP (cVEMP) measures evoked electrical potentials in the ipsilateral sternocleidomastoid muscle following stimulation of the saccule, while ocular VEMP (oVEMP) measures electrical potentials in the extraocular muscles contralateral to the utricle.

Comparators
The main comparator of interest is clinical diagnosis, which may include a detailed history of positional vertigo and assessment of response to the Dix-Hallpike maneuver or canal repositioning maneuvers.

Outcomes
The outcomes of interest are test accuracy, symptoms, functional outcomes, and quality of life. Symptoms of vestibular dysfunction are described above. Time for follow-up ranges from months to years for outcomes of interest.

Study Selection Criteria
Below are selection criteria for studies to assess whether a test is clinically valid and useful.
- The study population represents the population of interest. Eligibility and selection are described.

- The test is compared with a credible reference standard.
- If the test is intended to replace or be an adjunct to an existing test; it should also be compared with that test.
- Studies should report sensitivity, specificity, and predictive values. Studies that completely report true- and false-positive results are ideal. Studies reporting other measures (e.g., receiver operating characteristic, area under receiver operating characteristic, c-statistic, likelihood ratios) may be included but are less informative.
- Studies should also report reclassification of diagnostic or risk category.

Review of Evidence

There is a large and rapidly growing literature on VEMPs for the assessment of otolith function, although most studies assess how cVEMP and oVEMP change with various disease states. Vestibular evoked myogenic potentials have been evaluated in superior canal dehiscence, vestibular neuritis, BPPV, vestibular schwannoma, Meniere disease, vestibular migraine, and central vestibular disorders.[7,]

There are a number of concerns about using VEMPs to assess the otolith organs. One issue is that sound and bone conduction stimuli are likely to influence senses other than the saccule and utricle, and stimulation of structures other than the utricle can affect the VEMP. In addition, VEMP responses have been shown to decrease with age, with a high rate of absent responses in normal older adults.[8,] Another is that latency and amplitude measures are very sensitive to variables that can be introduced by the examiner, as observed in a 2016 study that included 1038 patients whose ailments included vestibular migraine or neuritis, BPPV, somatoform, phobic postural vertigo, unilateral or bilateral vestibulopathy, Meniere disease, downbeat nystagmus syndrome, and other diagnoses.[9,] The authors observed significant differences between examiners for measures of oVEMP and cVEMP latencies, concluding that the field should "work on a better standard for VEMP recordings."
A cohort study by Verrecchia et al (2019) evaluated oVEMP testing in individuals experiencing dizziness.[10,] The study included 10 patients diagnosed with superior canal dehiscence syndrome and 135 individuals with dizziness that was not already diagnosed as superior canal dehiscence syndrome. The study included 4 oVEMP parameters (amplitude, latency, amplitude asymmetry ratio, and interaural latency difference). Of the parameters, the amplitude to air-conducted stimulation had the greatest diagnostic accuracy (area under the curve score, 0.96). A cutoff point of 16.7 μV resulted in a sensitivity of 100% and specificity of 89%.

A cohort study (Hunter et al [2017]) compared cVEMP and oVEMP testing in 39 individuals who had known superior semicircular canal dehiscence, with a control cohort of 84 age-matched symptom-free individuals.[11,] Primary endpoints included peak-to-peak amplitudes of the 2 treatments and sensitivity and specificity. The authors observed that between cVEMP and oVEMP, cVEMP peak amplitudes (>214.3 μV) were less effective overall for diagnosis of semicircular canal dehiscence (area under the curve, 0.731). At the 2 treatment centers from which patients were drawn, oVEMP amplitudes and cVEMP thresholds proved to be the superior tests (overall area under the curve scores, 0.856 and 0.912, respectively). For patients between 50 and 60 years of age, testing cVEMP threshold (<75 decibels) provided sensitivity of 100%, as well as good specificity (92.9%). Overall, findings suggested superiority of cVEMP thresholds or oVEMP amplitudes over measurement of cVEMP amplitudes.

Section Summary: Vestibular Evoked Myogenic Potential Testing

The available evidence has indicated that the use of VEMP tests to evaluate suspected vestibular disorders is at a very early stage of development. Standardization of procedures and studies on the diagnostic accuracy of these procedures in the appropriate populations are needed.

Diagnosed Benign Paroxysmal Positional Vertigo
Laboratory-Based Vestibular Function Testing

Clinical Context and Test Purpose
The purpose of laboratory-based vestibular function testing is to provide a diagnostic option that is an alternative to or an improvement on existing tests, such as clinical diagnosis, in individuals with a diagnosed BPPV.

The following PICO was used to select literature to inform this review.

Populations
The relevant population of interest is individuals with clinically diagnosed BPPV with typical presentation.

Interventions
The test being considered is laboratory-based vestibular function testing.

Comparators
The main comparator of interest is clinical diagnosis, which may include a detailed history of positional vertigo and assessment of response to the Dix-Hallpike maneuver or canal repositioning maneuvers.

Outcomes
The general outcomes of interest are test accuracy, symptoms, functional outcomes, and quality of life. Symptoms of vestibular dysfunction are described above. Time for follow-up ranges from months to years for outcomes of interest.

Study Selection Criteria
Below are selection criteria for studies to assess whether a test is clinically valid and useful.

- The study population represents the population of interest. Eligibility and selection are described.
- The test is compared with a credible reference standard.
- If the test is intended to replace or be an adjunct to an existing test; it should also be compared with that test.
- Studies should report sensitivity, specificity, and predictive values. Studies that completely report true- and false-positive results are ideal. Studies reporting other measures (e.g., receiver operating characteristic, area under receiver operating characteristic, c-statistic, likelihood ratios) may be included but are less informative.
- Studies should also report reclassification of diagnostic or risk category.

Review of Evidence
Benign paroxysmal positional vertigo with a typical presentation is usually diagnosed clinically with a combination of a history of periods of brief positional vertigo, recurrence of symptoms with the Dix-Hallpike maneuver or lateral roll procedures, and/or alleviation of symptoms after canal repositioning maneuver. The Dix-Hallpike maneuver is the criterion standard for the diagnosis of posterior canal BPPV, limiting evaluation of its performance characteristics.[12,13,] The 2008 practice guidelines from the American Academy of Otolaryngology-Head and Neck Surgery gave a strong recommendation for the diagnosis of BPPV of the posterior canal when vertigo associated with nystagmus has been provoked by the Dix-Hallpike maneuver.[13,] If the Dix-Hallpike maneuver is negative, but the history is consistent with BPPV, a lateral roll test can be used to assess BPPV of the horizontal canal. In the event that both the Dix-Hallpike maneuver and lateral roll tests are negative, alleviation of symptoms with the canal repositioning maneuver supports a diagnosis of BPPV. The Academy has recommended against vestibular testing in patients who meet clinical criteria for the

diagnosis of BPPV.[13,] The Academy cited the weak nature of the evidence, which included expert opinion, case reports, and reason from first principles, as the basis for its recommendation. The AAN came to a similar conclusion in its 2017 practice guidelines, citing insufficient (level C) evidence to recommend vestibular testing for BPPV patients.[14,] If the clinical presentation is atypical, if Dix-Hallpike testing elicits equivocal or unusual nystagmus findings, if symptoms do not resolve following treatment, or if there are additional symptoms or signs, vestibular function testing may be indicated.

Section Summary: Laboratory-Based Vestibular Function Testing

There is sufficient evidence to suggest that laboratory-based vestibular function testing is not indicated in patients who are diagnosed with BPPV.

Supplemental Information

The purpose of the following information is to provide reference material. Inclusion does not imply endorsement or alignment with the evidence review conclusions.

Practice Guidelines and Position Statements

Guidelines or position statements will be considered for inclusion in 'Supplemental Information if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

American Academy of Audiology

The American Academy of Audiology published a position statement in 2005 on the audiologist's role in the diagnosis and treatment of vestibular disorders.[15,] Citing a 2004 scope of practice report, the Academy stated that "An audiologist is a person who, by virtue of academic degree, clinical training, and license to practice and/or professional credential, is uniquely qualified to provide a comprehensive array of professional services related to the prevention of hearing loss and the audiologic identification, assessment, diagnosis, and treatment of persons with impairment of auditory and vestibular function, and to the prevention of impairments associated with them."[16,] Evaluations of vestibular and extravestibular systems may include:

- video-oculography, videonystagmography, and electronystagmography
- tests of dynamic visual acuity,
- tests of active and passive rotation,
- tests of postural stability, and
- tests of vestibular evoked myogenic potentials.

Vestibular treatment and therapy protocols that fall within the scope of practice are also described. The Academy considers vestibular function testing following treatment to be an essential part of the clinical practice.

American Academy of Neurology

In 2000, the American Academy of Neurology (AAN) published a technology assessment on vestibular testing techniques in adults and children.[1,] Although the assessment was retired in 2021, it compared various vestibular testing techniques (see Table 2).

Table 2. Comparison of Vestibular Test Techniques and Level of Evidence

Technique	Advantages	Disadvantages	SOR and QOE[a]
Clinical head-shaking test	Inexpensive, easily performed during examination	Nonquantitative; may not detect bilateral vestibular loss or mild unilateral vestibular loss	Class III

Technique	Advantages	Disadvantages	SOR and QOE[a]
Vibration-induced nystagmus	Inexpensive, easily performed during examination	Nonquantitative; may not detect bilateral vestibular loss or mild unilateral vestibular loss	Class III
Clinical head thrust sign	Inexpensive, easily performed during examination	Nonquantitative; may not detect bilateral vestibular loss or mild unilateral vestibular loss	Class III
Caloric testing (ENG or infrared VNG)	"Gold standard" study for detecting unilateral vestibular loss	Intensity of caloric stimulation depends on anatomy and irrigation technique; less sensitive and specific than rotational chair testing for bilateral vestibular loss	Strength: A; Quality: classes II, III, IV, and expert consensus
Rotational chair testing (computer-driven chair rotations)	"Gold standard" study for detecting bilateral vestibular loss	Not widely available; generally not effective for testing frequencies >1.0 Hz; less sensitive than caloric testing for unilateral vestibular hypofunction	Strength: A; Quality: classes II, III, IV, and expert consensus
Passive examiner-generated head rotation testing	Portable alternative to rotational chair testing	Probably not practical at frequencies >2 Hz and may be difficult for patients with neck pain; not sensitive to unilateral vestibular loss	Strength: B; Quality: class II, not yet fully accepted by expert consensus
Active head rotation (self-generated head turns)	Allows testing of vestibule-ocular reflex from 1-5 Hz; portable; inexpensive	Normative data limited; some patients cannot rotate head sufficiently well to test at higher frequencies; may not detect partial unilateral vestibular loss	Strength: B; Quality: class II, not yet fully accepted by expert consensus

ENG: electronystagmography; QOE: quality of evidence; SOR: strength of recommendation; VNG: videonystagmography.
[a] The American Academy of Neurology strength of evidence rating system is as follows. For strength of recommendation: A: established as useful or predictive; B: probably useful or predictive. For quality of evidence: class II: Evidence provided by a prospective study of a narrow spectrum of persons with the suspected condition, or a well-designed retrospective study of a broad spectrum of persons with an established condition (by "gold standard") compared with a broad spectrum of control subjects, in which the test is applied in a blinded evaluation, and enabling the assessment of appropriate measures of diagnostic accuracy; class III: Evidence provided by a retrospective study, in which either persons with the established condition or control subjects are of a narrow spectrum, and in which the test is applied in a blinded evaluation; class IV: Any design in which the test is not applied in a blinded evaluation, OR evidence is provided by the expert opinion alone or in descriptive case series (without control subjects).

The 2017 practice guidelines from AAN (reaffirmed 2021) assessed the diagnostic value of vestibular evoked myogenic potential testing in individuals with vestibular symptoms.[14,] The conditions of

interest included superior canal dehiscence syndrome, vestibular neuritis or migraine, Meniere disease, and benign paroxysmal positional vertigo (BPPV). The evidence for testing in BPPV was drawn from 2 class III studies, neither of which presented sufficient diagnostic value of vestibular evoked myogenic potential testing for the treatment to be recommended (level C evidence).

American Academy of Otolaryngology – Head and Neck Surgery

In 2008, the American Academy of Otolaryngology - Head and Neck Surgery (AAO-HNS) published practice guidelines on BPPV.[13,] The guidelines were endorsed by AAN and the American Academy of Family Physicians. The panel made strong recommendations for the diagnosis of BPPV when vertigo associated with nystagmus is provoked by the Dix-Hallpike maneuver. The panel recommended against vestibular testing, unless the diagnosis is uncertain or there are additional symptoms or signs unrelated to BPPV that warrant testing.

In 2017, the AAO-HNS updated its guidelines on BPPV, retaining the recommendation for the diagnosis of BPPV if a Dix-Hallpike maneuver elicits vertigo associated with nystagmus.[17,] The panel recommended a canalith repositioning procedure as treatment for posterior canal BPPV, although subsequent postprocedural postural restrictions were strongly warned against. Patients with symptoms similar to BPPV but for whom the Dix-Hallpike does not evoke nystagmus should be subjected to a supine roll test. Potential diagnoses of BPPV should be distinguished from confounding factors, and patients should have regular reassessment and follow-up. The panel did not recommend radiographic imaging, vestibular testing, or vestibular suppressant medications as treatment for BPPV, although disease management options for caregivers include vestibular rehabilitation and/or observation.

International Federation of Clinical Neurophysiology

A 2014 expert consensus document on cervical vestibular evoked myogenic potential methods from the International Federation of Clinical Neurophysiology has stated that the clinical use of vestibular evoked myogenic potential "is evolving and questions still exist about its physiology and measurement."[18,]

U.S. Preventive Services Task Force Recommendations

Not applicable.

Medicare National Coverage

There is no national coverage determination. In the absence of a national coverage determination, coverage decisions are left to the discretion of local Medicare carriers.

Ongoing and Unpublished Clinical Trials

Some currently ongoing or unpublished trials that might influence this review are listed in Table 3.

Table 3. Summary of Key Trials

NCT No.	Trial Name	Planned Enrollment	Completion Date
Unpublished			
NCT02483429[a]	Acute-Video-oculography for Vertigo in Emergency Rooms for Rapid Triage (AVERT)	195 (actual)	Mar 2023 (actual)

NCT: national clinical trial.
[a] Denotes industry-sponsored or cosponsored trial.

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Documentation for Clinical Review

Please provide the following documentation:

- History and physical and/or consultation notes including:
  - Type of vestibular function testing
  - Reason for testing
  - Documented signs of vestibular disorder
- Previous testing and results

Post Service (in addition to the above, please include the following):

- Procedure report(s)

Coding

This Policy relates only to the services or supplies described herein. Benefits may vary according to product design; therefore, contract language should be reviewed before applying the terms of the Policy.

The following codes are included below for informational purposes. Inclusion or exclusion of a code(s) does not constitute or imply member coverage or provider reimbursement policy. Policy Statements are intended to provide member coverage information and may include the use of some codes for clarity. The Policy Guidelines section may also provide additional information for how to interpret the Policy Statements and to provide coding guidance in some cases.

Type	Code	Description
CPT®	92517	Vestibular evoked myogenic potential (VEMP) testing, with interpretation and report; cervical (cVEMP)
	92518	Vestibular evoked myogenic potential (VEMP) testing, with interpretation and report; ocular (oVEMP)
	92519	Vestibular evoked myogenic potential (VEMP) testing, with interpretation and report; cervical (cVEMP) and ocular (oVEMP)
	92537	Caloric vestibular test with recording, bilateral; bithermal (i.e., one warm and one cool irrigation in each ear for a total of four irrigations)
	92538	Caloric vestibular test with recording, bilateral; monothermal (i.e., one irrigation in each ear for a total of two irrigations)
	92540	Basic vestibular evaluation, includes spontaneous nystagmus test with eccentric gaze fixation nystagmus, with recording, positional nystagmus test, minimum of 4 positions, with recording, optokinetic nystagmus test, bidirectional foveal and peripheral stimulation, with recording, and oscillating tracking test, with recording
	92541	Spontaneous nystagmus test, including gaze and fixation nystagmus, with recording
	92542	Positional nystagmus test, minimum of 4 positions, with recording
	92544	Optokinetic nystagmus test, bidirectional, foveal or peripheral stimulation, with recording
	92545	Oscillating tracking test, with recording
	92546	Sinusoidal vertical axis rotational testing
	92547	Use of vertical electrodes (List separately in addition to code for primary procedure)
	92700	Unlisted otorhinolaryngological service or procedure
HCPCS	None	

Policy History

This section provides a chronological history of the activities, updates and changes that have occurred with this Medical Policy.

Effective Date	Action
06/01/2017	BCBSA Medical Policy adoption
04/01/2018	Policy revision without position change
04/01/2019	Policy revision without position change
05/01/2024	Policy reactivated. Previously archived from 05/01/2020 to 04/30/2024.

Definitions of Decision Determinations

Medically Necessary: Services that are Medically Necessary include only those which have been established as safe and effective, are furnished under generally accepted professional standards to treat illness, injury or medical condition, and which, as determined by Blue Shield, are: (a) consistent with Blue Shield medical policy; (b) consistent with the symptoms or diagnosis; (c) not furnished primarily for the convenience of the patient, the attending Physician or other provider; (d) furnished at the most appropriate level which can be provided safely and effectively to the patient; and (e) 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 the Member's illness, injury, or disease.

Investigational/Experimental: A treatment, procedure, or drug is investigational when it has not been recognized as safe and effective for use in treating the particular condition in accordance with generally accepted professional medical standards. This includes services where approval by the federal or state governmental is required prior to use, but has not yet been granted.

Split Evaluation: Blue Shield of California/Blue Shield of California Life & Health Insurance Company (Blue Shield) policy review can result in a split evaluation, where a treatment, procedure, or drug will be considered to be investigational for certain indications or conditions, but will be deemed safe and effective for other indications or conditions, and therefore potentially medically necessary in those instances.

Prior Authorization Requirements and Feedback (as applicable to your plan)

Within five days before the actual date of service, the provider must confirm with Blue Shield that the member's health plan coverage is still in effect. Blue Shield reserves the right to revoke an authorization prior to services being rendered based on cancellation of the member's eligibility. Final determination of benefits will be made after review of the claim for limitations or exclusions.

Questions regarding the applicability of this policy should be directed to the Prior Authorization Department at (800) 541-6652, or the Transplant Case Management Department at (800) 637-2066 ext. 3507708 or visit the provider portal at www.blueshieldca.com/provider.

We are interested in receiving feedback relative to developing, adopting, and reviewing criteria for medical policy. Any licensed practitioner who is contracted with Blue Shield of California or Blue Shield of California Promise Health Plan is welcome to provide comments, suggestions, or concerns. Our internal policy committees will receive and take your comments into consideration.

For utilization and medical policy feedback, please send comments to: MedPolicy@blueshieldca.com

Disclaimer: This medical policy is a guide in evaluating the medical necessity of a particular service or treatment. Blue Shield of California may consider published peer-reviewed scientific literature, national guidelines, and local standards of practice in developing its medical policy. Federal and state law, as well as contract language, including definitions and specific contract provisions/exclusions, take precedence over medical policy and must be considered first in determining covered services. Member contracts may differ in their benefits. Blue Shield reserves the right to review and update policies as appropriate.

Appendix A

POLICY STATEMENT	
BEFORE	**AFTER** **Blue font: Verbiage Changes/Additions**
Reactivated Policy **Policy Statement:** N/A	**Vestibular Function Testing 2.01.104** **Policy Statement:** I. Vestibular function testing using an electronystagmography and videonystagmography testing batteries, caloric testing, or rotational chair testing may be considered **medically necessary** when the following conditions have been met: A. The individual has symptoms of a vestibular disorder (e.g., dizziness, vertigo, imbalance) B. A clinical evaluation, including maneuvers such as the Dix-Hallpike test if indicated, has failed to identify the cause of the symptoms II. Vestibular evoked myogenic potential tests are considered **investigational**. III. Vestibular function testing for the assessment of typical benign paroxysmal positional vertigo that can be diagnosed clinically is considered **investigational**. IV. Repeat vestibular function testing when treatment resolves symptoms is considered **investigational**. V. Vestibular function testing in all other situations is considered **investigational**. VI. All other laboratory-based vestibular function tests not described above are considered **investigational**.