



An Independent Licensee of the Blue Cross Blue Shield Association

EVIDENCE-BASED CRITERIA
SECTION: MEDICINE

ORIGINAL EFFECTIVE DATE: 09/19/22
LAST REVIEW DATE: 08/06/24
CURRENT EFFECTIVE DATE: 08/06/24
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QUANTITATIVE SENSORY TESTING

Non-Discrimination Statement and Multi-Language Interpreter Services information are located at the end of this document.

Coverage for services, procedures, medical devices and drugs are dependent upon benefit eligibility as outlined in the member's specific benefit plan. This Evidence-Based Criteria must be read in its entirety to determine coverage eligibility, if any.

This Evidence-Based Criteria provides information related to coverage determinations only and does not imply that a service or treatment is clinically appropriate or inappropriate. The provider and the member are responsible for all decisions regarding the appropriateness of care. Providers should provide BCBSAZ complete medical rationale when requesting any exceptions to these guidelines.

The section identified as "Description" defines or describes a service, procedure, medical device or drug and is in no way intended as a statement of medical necessity and/or coverage.

The section identified as "Criteria" defines criteria to determine whether a service, procedure, medical device or drug is considered medically necessary or experimental or investigational.

State or federal mandates, e.g., FEP program, may dictate that any drug, device or biological product approved by the U.S. Food and Drug Administration (FDA) may not be considered experimental or investigational and thus the drug, device or biological product may be assessed only on the basis of medical necessity.

Evidence-Based Criteria are subject to change as new information becomes available.

For purposes of this Evidence-Based Criteria, the terms "experimental" and "investigational" are considered to be interchangeable.

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QUANTITATIVE SENSORY TESTING

Description:

Quantitative sensory testing (QST) systems are used for the noninvasive assessment and quantification of sensory nerve function in individuals with symptoms of, or the potential for, neurologic damage or disease. Types of sensory testing include current perception threshold testing, pressure-specified sensory testing, vibration perception testing (VPT), and thermal sensory testing. Information on sensory deficits identified using QST has been used in research settings to better understand neuropathic pain. It could be used to diagnose conditions linked to nerve damage and disease, and to improve individual outcomes by impacting management strategies.

Quantitative Sensory Testing

Quantitative sensory test systems measure and quantify the amount of physical stimuli required for sensory perception to occur. As sensory deficits increase, the perception threshold of QST will increase, which may be informative in documenting the progression of neurologic damage or disease. Currently, QST has not been established for use as a sole tool for diagnosis and management but has been used with standard evaluative and management procedures (e.g., physical and neurologic examination, monofilament testing, pinprick, grip and pinch strength, Tinel sign, and Phalen and Roos test) to enhance the diagnosis and treatment-planning process, and to confirm physical findings with quantifiable data. Stimuli used in QST include touch, pressure, pain, thermal (warm and cold), or vibratory stimuli.

The criterion standard for evaluation of myelinated, large fibers is the electromyography nerve conduction study. However, the function of smaller myelinated and unmyelinated sensory nerves, which may show pathologic changes before the involvement of the motor nerves, cannot be detected by nerve conduction studies. Small fiber neuropathy has traditionally been a diagnosis of exclusion in individuals who have symptoms of distal neuropathy and a negative nerve conduction study.

Depending on the type of stimuli used, QST can assess both small and large fiber dysfunction. Touch and vibration measure the function of large myelinated A alpha and A beta sensory fibers. Thermal stimulation devices are used to evaluate pathology of small myelinated and unmyelinated nerve fibers; they can be used to assess heat and cold sensation, as well as thermal pain thresholds. Pressure-specified sensory devices assess large myelinated sensory nerve function by quantifying the thresholds of pressure detected with light, static, and moving touch. Finally, current perception threshold testing involves the quantification of the sensory threshold to transcutaneous electrical stimulation. In current perception threshold testing, typically 3 frequencies are tested: 5 Hz, designed to assess C fibers; 250 Hz, designed to assess A delta fibers; and 2000 Hz, designed to assess A beta fibers. Results are compared with those of a reference population.

Because QST combines the objective physical, sensory stimuli with the subject individual response, it is psychophysical and requires individuals who are alert, able to follow directions, and cooperative. Also, to get reliable results, examinations need to include standardized instructions to the individuals, and stimuli must be applied consistently by trained staff. Psychophysical tests have greater inherent variability, making their results more difficult to reproduce.

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Primarily, QST has been applied in individuals with conditions associated with nerve damage and neuropathic pain. There have also been preliminary investigations to identify sensory deficits associated with conditions such as autism spectrum disorder, Tourette syndrome, restless legs syndrome, musculoskeletal pain, and response to opioid treatment.

Criteria:

- Quantitative sensory testing is considered **experimental or investigational** when any **ONE** or more of the following criteria are met:
1. Lack of final approval from the appropriate governmental regulatory bodies (e.g., Food and Drug Administration); or
 2. Insufficient scientific evidence to permit conclusions concerning the effect on health outcomes; or
 3. Insufficient evidence to support improvement of the net health outcome; or
 4. Insufficient evidence to support improvement of the net health outcome as much as, or more than, established alternatives, or
 5. Insufficient evidence to support improvement outside the investigational setting

These tests include, *but are not limited to*:

- Current perception threshold testing
- Pressure-specified sensory device testing
- Vibration perception threshold testing
- Thermal threshold testing

Resources:

Literature reviewed 08/06/24. We do not include marketing materials, poster boards and non-published literature in our review.

Resources prior 08/01/23 may be requested from the BCBSAZ Medical Policy and Technology Research Department.

1. Abraham A, Albulaihe H, Alabdali M, et al. Elevated Vibration Perception Thresholds in CIDP Patients Indicate More Severe Neuropathy and Lower Treatment Response Rates. *PLoS One*. 2015;10(11):e0139689. doi:10.1371/journal.pone.0139689
2. American Academy of Neurology. Quantitative Sensory Testing. 2003 (reaffirmed 2022). Accessed April 10, 2024. <https://www.aan.com/Guidelines/home/GuidelineDetail/87>

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3. Anand P, Privitera R, Yiangou Y, Donatien P, Birch R, Misra P. Trench Foot or Non-Freezing Cold Injury As a Painful Vaso-Neuropathy: Clinical and Skin Biopsy Assessments. *Front Neurol.* 2017;8:514. doi:10.3389/fneur.2017.00514
4. Azzopardi K, Gatt A, Chockalingam N, Formosa C. Hidden dangers revealed by misdiagnosed diabetic neuropathy: A comparison of simple clinical tests for the screening of vibration perception threshold at primary care level. *Prim Care Diabetes.* Apr 2018;12(2):111-115. doi:10.1016/j.pcd.2017.09.004
5. Centers for Medicare & Medicaid Services (CMS). National Coverage Determination (NCD) for sensory Nerve Conduction Threshold Tests (sNCTs) (160.23) 2004. Accessed April 10, 2024. <https://www.cms.gov/medicare-coverage-database/view/ncd.aspx?NCDId=270&ncdver=2>
6. Chong PS, Cros DP. Technology literature review: quantitative sensory testing. *Muscle Nerve.* May 2004;29(5):734-47. doi:10.1002/mus.20053
7. Devigili G, Tugnoli V, Penza P, et al. The diagnostic criteria for small fibre neuropathy: from symptoms to neuropathology. *Brain.* Jul 2008;131(Pt 7):1912-25. doi:10.1093/brain/awn093
8. ElSayed NA, Aleppo G, Aroda VR, et al. 12. Retinopathy, Neuropathy, and Foot Care: Standards of Care in Diabetes-2023. *Diabetes Care.* Jan 1 2023;46(Suppl 1):S203-S215. doi:10.2337/dc23-S012
9. England JD, Gronseth GS, Franklin G, et al. Distal symmetrical polyneuropathy: definition for clinical research. *Muscle Nerve.* Jan 2005;31(1):113-23. doi:10.1002/mus.20233
10. Fabry V, Gerdelat A, Acket B, et al. Which Method for Diagnosing Small Fiber Neuropathy? *Front Neurol.* 2020;11:342. doi:10.3389/fneur.2020.00342
11. Ferdousi M, Kalteniece A, Azmi S, et al. Corneal confocal microscopy compared with quantitative sensory testing and nerve conduction for diagnosing and stratifying the severity of diabetic peripheral neuropathy. *BMJ Open Diabetes Res Care.* Dec 2020;8(2)doi:10.1136/bmjdr-2020-001801
12. Forstenpointner J, Ruscheweyh R, Attal N, et al. No pain, still gain (of function): the relation between sensory profiles and the presence or absence of self-reported pain in a large multicenter cohort of patients with neuropathy. *Pain.* Mar 1 2021;162(3):718-727. doi:10.1097/j.pain.0000000000002058
13. Goel A, Shivaprasad C, Kolly A, Sarathi HAV, Atluri S. Comparison of electrochemical skin conductance and vibration perception threshold measurement in the detection of early diabetic neuropathy. *PLoS One.* 2017;12(9):e0183973. doi:10.1371/journal.pone.0183973
14. Hubscher M, Moloney N, Leaver A, Rebbeck T, McAuley JH, Refshauge KM. Relationship between quantitative sensory testing and pain or disability in people with spinal pain-a systematic review and meta-analysis. *Pain.* Sep 2013;154(9):1497-1504. doi:10.1016/j.pain.2013.05.031

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15. Lefaucheur JP, Wahab A, Plante-Bordeneuve V, et al. Diagnosis of small fiber neuropathy: A comparative study of five neurophysiological tests. *Neurophysiol Clin*. Dec 2015;45(6):445-55. doi:10.1016/j.neucli.2015.09.012
16. Mythili A, Kumar KD, Subrahmanyam KA, Venkateswarlu K, Butchi RG. A Comparative study of examination scores and quantitative sensory testing in diagnosis of diabetic polyneuropathy. *Int J Diabetes Dev Ctries*. Jan 2010;30(1):43-8. doi:10.4103/0973-3930.60007
17. Nath RK, Bowen ME, Eichhorn MG. Pressure-specified sensory device versus electrodiagnostic testing in brachial plexus upper trunk injury. *J Reconstr Microsurg*. May 2010;26(4):235-42. doi:10.1055/s-0030-1248231
18. Papanas N, Pafili K, Demetriou M, et al. The Diagnostic Utility of VibraTip for Distal Symmetrical Polyneuropathy in Type 2 Diabetes Mellitus. *Diabetes Ther*. Jan 2020;11(1):341-346. doi:10.1007/s13300-019-00738-4
19. Park R, Wallace MS, Schulteis G. Relative sensitivity to alfentanil and reliability of current perception threshold vs von Frey tactile stimulation and thermal sensory testing. *J Peripher Nerv Syst*. Dec 2001;6(4):232-40. doi:10.1046/j.1529-8027.2001.01025.x
20. Shy ME, Frohman EM, So YT, et al. Quantitative sensory testing: report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. *Neurology*. Mar 25 2003;60(6):898-904. doi:10.1212/01.wnl.0000058546.16985.11
21. Spanakis EK, Golden SH. Race/ethnic difference in diabetes and diabetic complications. *Curr Diab Rep*. Dec 2013;13(6):814-23. doi:10.1007/s11892-013-0421-9
22. Suokas AK, Walsh DA, McWilliams DF, et al. Quantitative sensory testing in painful osteoarthritis: a systematic review and meta-analysis. *Osteoarthritis Cartilage*. Oct 2012;20(10):1075-85. doi:10.1016/j.joca.2012.06.009
23. Taylor YJ, Davis ME, Mahabaleshwarkar R, et al. Racial/ethnic disparities in diabetes care and outcomes: A mixed methods study. *Journal of Health Disparities Research and Practice*. Accessed April 10, 2024. <https://digitalscholarship.unlv.edu/jhdrp/vol11/iss2/9>
24. Weber RA, Schuchmann JA, Albers JH, Ortiz J. A prospective blinded evaluation of nerve conduction velocity versus Pressure-Specified Sensory Testing in carpal tunnel syndrome. *Ann Plast Surg*. Sep 2000;45(3):252-7. doi:10.1097/0000637-200045030-00005
25. Ziccardi VB, Dragoo J, Eliav E, Benoliel R. Comparison of current perception threshold electrical testing to clinical sensory testing for lingual nerve injuries. *J Oral Maxillofac Surg*. Feb 2012;70(2):289-94. doi:10.1016/j.joms.2011.08.019



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Coding:

CPT: 0106T, 0107T, 0108T, 0109T, 0110T
HCPCS: G0255

History:

Date:

Activity:

Medical Policy Panel	08/06/24	Review with revisions
Medical Policy Panel	08/01/23	Review with revisions
Medical Policy Panel	08/30/22	Approved guideline (Effective 9/19/22)

Policy Revisions:

08/06/24	Updated:	Description section, Resources section
08/01/23	Added:	“Insufficient evidence to support improvement of the net health outcome; or”, and “Insufficient evidence to support improvement of the net health outcome as much as, or more than, established alternatives, or” to experimental or investigational criteria.



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Non-Discrimination Statement:

Blue Cross Blue Shield of Arizona (BCBSAZ) complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability or sex. BCBSAZ provides appropriate free aids and services, such as qualified interpreters and written information in other formats, to people with disabilities to communicate effectively with us. BCBSAZ also provides free language services to people whose primary language is not English, such as qualified interpreters and information written in other languages. If you need these services, call (602) 864-4884 for Spanish and (877) 475-4799 for all other languages and other aids and services.

If you believe that BCBSAZ has failed to provide these services or discriminated in another way on the basis of race, color, national origin, age, disability or sex, you can file a grievance with: BCBSAZ's Civil Rights Coordinator, Attn: Civil Rights Coordinator, Blue Cross Blue Shield of Arizona, P.O. Box 13466, Phoenix, AZ 85002-3466, (602) 864-2288, TTY/TDD (602) 864-4823, crc@azblue.com. You can file a grievance in person or by mail or email. If you need help filing a grievance BCBSAZ's Civil Rights Coordinator is available to help you. You can also file a civil rights complaint with the U.S. Department of Health and Human Services, Office for Civil Rights electronically through the Office for Civil Rights Complaint Portal, available at <https://ocrportal.hhs.gov/ocr/portal/lobby.jsf>, or by mail or phone at: U.S. Department of Health and Human Services, 200 Independence Avenue SW., Room 509F, HHH Building, Washington, DC 20201, 1-800-368-1019, 800-537-7697 (TDD). Complaint forms are available at <http://www.hhs.gov/ocr/office/file/index.html>

Multi-Language Interpreter Services:

Spanish: Si usted, o alguien a quien usted está ayudando, tiene preguntas acerca de Blue Cross Blue Shield of Arizona, tiene derecho a obtener ayuda e información en su idioma sin costo alguno. Para hablar con un intérprete, llame al 602-864-4884.

Navajo: Díí kwe'é atah nilinígíí Blue Cross Blue Shield of Arizona haada yit'éego bina'idíílkidgo éí doodago Háida bíjá anilyeedígíí t'áadoo le'é yina'idíílkidgo beehaz'ánii hólo díí t'áa hazaadk'ehjí háká a'doowołgo bee haz'ą doo baqah ilinígóó. Ata' halne'ígíí kojí' bich'í' hodíilnih 877-475-4799.

Chinese: 如果您，或是您正在協助的對象，有關於插入項目的名稱 Blue Cross Blue Shield of Arizona 方面的問題，您有權利免費以您的母語得到幫助和訊息。洽詢一位翻譯員，請撥電話 在此插入數字 877-475-4799。

Vietnamese: Nếu quý vị, hay người mà quý vị đang giúp đỡ, có câu hỏi về Blue Cross Blue Shield of Arizona quý vị sẽ có quyền được giúp và có thêm thông tin bằng ngôn ngữ của mình miễn phí. Để nói chuyện với một thông dịch viên, xin gọi 877-475-4799.

Arabic:

إن كان لديك أو لدى شخص تساعد أسئلة بخصوص Blue Cross Blue Shield of Arizona، فلديك الحق في الحصول على المساعدة والمعلومات الضرورية بلغتك من دون أية تكلفة. للتحدث مع مترجم اتصل بـ 877-475-4799.

