



MASSACHUSETTS

Blue Cross Blue Shield of Massachusetts is an Independent Licensee of the Blue Cross and Blue Shield Association

Medical Policy Thermography

Table of Contents

- [Policy: Commercial](#)
- [Policy: Medicare](#)
- [Authorization Information](#)
- [Coding Information](#)
- [Description](#)
- [Policy History](#)
- [Information Pertaining to All Policies](#)
- [References](#)

Policy Number: 342

BCBSA Reference Number: 6.01.12 (For Plan internal use only)

Related Policies

- Scintimammography and Gamma Imaging of the Breast and Axilla, [#494](#)
- Temporomandibular Joint Disorder, [#035](#)

Policy

Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity

The use of any form of thermography is [INVESTIGATIONAL](#).

Prior Authorization Information

Inpatient

- For services described in this policy, precertification/preauthorization **IS REQUIRED** for all products if the procedure is performed **inpatient**.

Outpatient

- For services described in this policy, see below for products where prior authorization **might be required** if the procedure is performed **outpatient**.

	Outpatient
Commercial Managed Care (HMO and POS)	This is not a covered service.
Commercial PPO and Indemnity	This is not a covered service.

CPT Codes / HCPCS Codes / ICD Codes

Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.

CPT Codes

There is no specific CPT code for this test.

ICD Diagnosis Codes

Investigational for all diagnoses.

Description

Infrared radiation from the skin or organ tissue reveals temperature variations by producing brightly colored patterns on a liquid crystal display. Thermography involves the use of an infrared scanning device and can include various types of telethermographic infrared detector images and heat-sensitive cholesteric liquid crystal systems.

Interpretation of the color patterns is thought to assist in the diagnosis of many disorders such as complex regional pain syndrome (previously known as reflex sympathetic dystrophy), breast cancer, Raynaud phenomenon, digital artery vasospasm in hand-arm vibration syndrome, peripheral nerve damage following trauma, impaired spermatogenesis in infertile men, degree of burns, deep vein thrombosis, gastric cancer, tear-film layer stability in dry-eye syndrome, Frey syndrome, headaches, lower back pain, and vertebral subluxation.

Thermography may also assist in treatment planning and procedure guidance by accomplishing the following tasks: identifying restricted areas of perfusion in coronary artery bypass grafting, identifying unstable atherosclerotic plaques, assessing response to methylprednisone in rheumatoid arthritis, and locating high undescended testicles.

Summary

Description

Thermography is a noninvasive imaging technique that measures temperature distribution in organs and tissues. The visual display of this temperature information is known as a thermogram. Thermography has been proposed as a diagnostic tool for treatment planning and for evaluation of treatment effects for a variety of conditions.

Summary of Evidence

For individuals who have an indication for breast cancer screening or diagnosis who receive thermography, the evidence includes diagnostic accuracy studies and systematic reviews. Relevant outcomes are overall survival, disease-specific survival, and test validity. Using histopathologic findings compared to the reference standard, a series of systematic reviews of studies have evaluated the accuracy of thermography to screen and/or diagnose breast cancer and reported wide ranges of sensitivities and specificities. To date, no study has demonstrated that thermography is sufficiently accurate to replace or supplement mammography for breast cancer diagnosis. Moreover, there are no studies on the impact of thermography on patient management or health outcomes for patients with breast cancer. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have musculoskeletal injuries who receive thermography, the evidence includes diagnostic accuracy studies, a longitudinal prospective study, and a systematic review. Relevant outcomes are test validity, symptoms, and functional outcomes. A systematic review of studies on thermography for diagnosing musculoskeletal injuries found moderate levels of accuracy compared with other diagnostic imaging tests. There is no consistent reference standard. This evidence does not permit conclusions as to whether thermography is sufficiently accurate to replace or supplement standard testing. Moreover, there are no high-quality or randomized studies on the impact of thermography on patient management or health outcomes for patients with musculoskeletal injuries. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have temporomandibular joint (TMJ) disorder who receive thermography, the evidence includes a systematic review. Relevant outcomes are test validity, symptoms, and functional outcomes. A systematic review of studies on thermography for diagnosing TMJ disorder found a wide variation in accuracy compared to other diagnostics. There is no consistent reference standard. The evidence does not permit conclusions as to whether thermography is sufficiently accurate to replace or supplement standard testing. Moreover, there are no studies on the impact of thermography on patient

management or health outcomes for patients with the TMJ disorder. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have miscellaneous conditions (eg, herpes zoster, pressure ulcers, diabetic foot) who receive thermography, the evidence primarily includes diagnostic accuracy studies. Outcomes in these studies are test validity, symptoms, and functional outcomes. Most studies assessed temperature gradients or the association between temperature differences and the clinical condition. Due to the small number of studies for each indication, diagnostic accuracy could not adequately be evaluated. The clinical utility of thermography has only been considered in a single study of diabetic foot ulcers. For other miscellaneous conditions, the clinical utility of thermography has not been investigated. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Policy History

Date	Action
10/2022	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2021	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
1/2021	Medicare information removed. See MP #132 Medicare Advantage Management for local coverage determination and national coverage determination reference.
11/2020	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2019	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2018	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2017	Annual policy review. New references added.
10/2016	Annual policy review. New references added.
7/2015	Annual policy review. New references added.
6/2013	Annual policy review. New references added.
11/2011-4/2012	Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements.
7/2011	Reviewed - Medical Policy Group - Hematology and Oncology. No changes to policy statements.
9/2010	Reviewed - Medical Policy Group - Hematology and Oncology. No changes to policy statements.
9/2009	Reviewed - Medical Policy Group - Hematology and Oncology. No changes to policy statements.
4/09	Updated coding and references. No changes to policy statements.
10/08	Reviewed - Medical Policy Group - Hematology/Oncology. No changes to policy statements.
9/07	Reviewed - Medical Policy Group - Hematology/Oncology. No changes to policy statements.

Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:

[Medical Policy Terms of Use](#)

[Managed Care Guidelines](#)

[Indemnity/PPO Guidelines](#)

[Clinical Exception Process](#)

[Medical Technology Assessment Guidelines](#)

References

1. Vreugdenburg TD, Willis CD, Mundy L, et al. A systematic review of elastography, electrical impedance scanning, and digital infrared thermography for breast cancer screening and diagnosis. *Breast Cancer Res Treat.* Feb 2013; 137(3): 665-76. PMID 23288346
2. Fitzgerald A, Berentson-Shaw J. Thermography as a screening and diagnostic tool: a systematic review. *N Z Med J.* Mar 09 2012; 125(1351): 80-91. PMID 22426613
3. Morales-Cervantes A, Kolosovas-Machuca ES, Guevara E, et al. An automated method for the evaluation of breast cancer using infrared thermography. *EXCLI J.* 2018; 17: 989-998. PMID 30564079
4. Neal CH, Flynt KA, Jeffries DO, et al. Breast Imaging Outcomes following Abnormal Thermography. *Acad Radiol.* Mar 2018; 25(3): 273-278. PMID 29275941
5. Omraniipour R, Kazemian A, Alipour S, et al. Comparison of the Accuracy of Thermography and Mammography in the Detection of Breast Cancer. *Breast Care (Basel).* Aug 2016; 11(4): 260-264. PMID 27721713
6. Rassiwalla M, Mathur P, Mathur R, et al. Evaluation of digital infra-red thermal imaging as an adjunctive screening method for breast carcinoma: a pilot study. *Int J Surg.* Dec 2014; 12(12): 1439-43. PMID 25448668
7. Sanchis-Sanchez E, Vergara-Hernandez C, Cibrian RM, et al. Infrared thermal imaging in the diagnosis of musculoskeletal injuries: a systematic review and meta-analysis. *AJR Am J Roentgenol.* Oct 2014; 203(4): 875-82. PMID 25247955
8. Corte AC, Pedrinelli A, Martos A, et al. Infrared thermography study as a complementary method of screening and prevention of muscle injuries: pilot study. *BMJ Open Sport Exerc Med.* 2019; 5(1): e000431. PMID 30687515
9. de Melo DP, Bento PM, Peixoto LR, et al. Is infrared thermography effective in the diagnosis of temporomandibular disorders? A systematic review. *Oral Surg Oral Med Oral Pathol Oral Radiol.* Feb 2019; 127(2): 185-192. PMID 30482738
10. Han SS, Jung CH, Lee SC, et al. Does skin temperature difference as measured by infrared thermography within 6 months of acute herpes zoster infection correlate with pain level?. *Skin Res Technol.* May 2010; 16(2): 198-201. PMID 20456100
11. Park J, Jang WS, Park KY, et al. Thermography as a predictor of postherpetic neuralgia in acute herpes zoster patients: a preliminary study. *Skin Res Technol.* Feb 2012; 18(1): 88-93. PMID 21605168
12. Romano CL, Logoluso N, Dell'Oro F, et al. Telethermographic findings after uncomplicated and septic total knee replacement. *Knee.* Jun 2012; 19(3): 193-7. PMID 21441031
13. Oliveira AL, Moore Z, O Connor T, et al. Accuracy of ultrasound, thermography and subepidermal moisture in predicting pressure ulcers: a systematic review. *J Wound Care.* May 02 2017; 26(5): 199-215. PMID 28475447
14. Nakagami G, Sanada H, Iizaka S, et al. Predicting delayed pressure ulcer healing using thermography: a prospective cohort study. *J Wound Care.* Nov 2010; 19(11): 465-6, 468, 470 passim. PMID 21135794
15. Bilska A, Stangret A, Pyzlak M, et al. Skin surface infrared thermography in pressure ulcer outcome prognosis. *J Wound Care.* Dec 02 2020; 29(12): 707-718. PMID 33320753
16. Wu CL, Yu KL, Chuang HY, et al. The application of infrared thermography in the assessment of patients with coccygodynia before and after manual therapy combined with diathermy. *J Manipulative Physiol Ther.* May 2009; 32(4): 287-93. PMID 19447265
17. Hara Y, Shiraishi A, Yamaguchi M, et al. Evaluation of allergic conjunctivitis by thermography. *Ophthalmic Res.* 2014; 51(3): 161-6. PMID 24603108
18. Singer AJ, Relan P, Beto L, et al. Infrared Thermal Imaging Has the Potential to Reduce Unnecessary Surgery and Delays to Necessary Surgery in Burn Patients. *J Burn Care Res.* Nov/Dec 2016; 37(6): 350-355. PMID 26720102
19. Dang J, Lin M, Tan C, et al. Use of Infrared Thermography for Assessment of Burn Depth and Healing Potential: A Systematic Review. *J Burn Care Res.* Jun 12 2021. PMID 34120173
20. Martinez-Jimenez MA, Ramirez-GarciaLuna JL, Kolosovas-Machuca ES, et al. Development and validation of an algorithm to predict the treatment modality of burn wounds using thermographic scans: Prospective cohort study. *PLoS One.* 2018; 13(11): e0206477. PMID 30427892

21. Dong F, Tao C, Wu J, et al. Detection of cervical lymph node metastasis from oral cavity cancer using a non-radiating, noninvasive digital infrared thermal imaging system. *Sci Rep.* May 08 2018; 8(1): 7219. PMID 29739969
22. Agazzi A, Fadanelli G, Vittadello F, et al. Reliability of LoSCAT score for activity and tissue damage assessment in a large cohort of patients with Juvenile Localized Scleroderma. *Pediatr Rheumatol Online J.* Jun 18 2018; 16(1): 37. PMID 29914516
23. Ranhosz-Janicka I, Lis-Swiety A, Skrzypek-Salamon A, et al. Detecting and quantifying activity/inflammation in localized scleroderma with thermal imaging. *Skin Res Technol.* Mar 2019; 25(2): 118-123. PMID 30030915
24. Cruz-Segura A, Cruz-Dominguez MP, Jara LJ, et al. Early Detection of Vascular Obstruction in Microvascular Flaps Using a Thermographic Camera. *J Reconstr Microsurg.* Sep 2019; 35(7): 541-548. PMID 31067581
25. Unger M, Markfort M, Halama D, et al. Automatic detection of perforator vessels using infrared thermography in reconstructive surgery. *Int J Comput Assist Radiol Surg.* Mar 2019; 14(3): 501-507. PMID 30519870
26. Chen R, Huang ZQ, Chen WL, et al. Value of a smartphone-compatible thermal imaging camera in the detection of peroneal artery perforators: Comparative study with computed tomography angiography. *Head Neck.* May 2019; 41(5): 1450-1456. PMID 30636085
27. Li DG, Dewan AK, Xia FD, et al. The ALT-70 predictive model outperforms thermal imaging for the diagnosis of lower extremity cellulitis: A prospective evaluation. *J Am Acad Dermatol.* Dec 2018; 79(6): 1076-1080.e1. PMID 30003987
28. Al Shakarchi J, Inston N, Dabare D, et al. Pilot study on the use of infrared thermal imaging to predict infrainguinal bypass outcome in the immediate post-operative period. *Vascular.* Dec 2019; 27(6): 663-667. PMID 31067207
29. Magalhaes C, Vardasca R, Rebelo M, et al. Distinguishing melanocytic nevi from melanomas using static and dynamic infrared thermal imaging. *J Eur Acad Dermatol Venereol.* Sep 2019; 33(9): 1700-1705. PMID 30974494
30. Anzengruber F, Alotaibi F, Kaufmann LS, et al. Thermography: High sensitivity and specificity diagnosing contact dermatitis in patch testing. *Allergol Int.* Apr 2019; 68(2): 254-258. PMID 30598404
31. Aydemir U, Sarigoz T, Ertan T, et al. Role of digital infrared thermal imaging in diagnosis of acute appendicitis. *Ulus Travma Acil Cerrahi Derg.* Nov 2021; 27(6): 647-653. PMID 34710229
32. Umapathy S, Thulasi R, Gupta N, et al. Thermography and colour Doppler ultrasound: a potential complementary diagnostic tool in evaluation of rheumatoid arthritis in the knee region. *Biomed Tech (Berl).* May 26 2020; 65(3): 289-299. PMID 31821162
33. Jones B, Hassan I, Tsuyuki RT, et al. Hot joints: myth or reality? A thermographic joint assessment of inflammatory arthritis patients. *Clin Rheumatol.* Sep 2018; 37(9): 2567-2571. PMID 29679167
34. Schiavon G, Capone G, Frize M, et al. Infrared Thermography for the Evaluation of Inflammatory and Degenerative Joint Diseases: A Systematic Review. *Cartilage.* Dec 2021; 13(2_suppl): 1790S-1801S. PMID 34933442
35. Branco JHL, Branco RLL, Siqueira TC, et al. Clinical applicability of infrared thermography in rheumatic diseases: A systematic review. *J Therm Biol.* Feb 2022; 104: 103172. PMID 35180959
36. Gatt A, Falzon O, Cassar K, et al. The Application of Medical Thermography to Discriminate Neuroischemic Toe Ulceration in the Diabetic Foot. *Int J Low Extrem Wounds.* Jun 2018; 17(2): 102-105. PMID 29947290
37. Gatt A, Falzon O, Cassar K, et al. Establishing Differences in Thermographic Patterns between the Various Complications in Diabetic Foot Disease. *Int J Endocrinol.* 2018; 2018: 9808295. PMID 29721019
38. Balbinot LF, Robinson CC, Achaval M, et al. Repeatability of infrared plantar thermography in diabetes patients: a pilot study. *J Diabetes Sci Technol.* Sep 01 2013; 7(5): 1130-7. PMID 24124938
39. van Doremalen RFM, van Netten JJ, van Baal JG, et al. Validation of low-cost smartphone-based thermal camera for diabetic foot assessment. *Diabetes Res Clin Pract.* Mar 2019; 149: 132-139. PMID 30738090
40. Sandi S, Yusuf S, Kaelan C, et al. Evaluation risk of diabetic foot ulcers (DFUs) using infrared thermography based on mobile phone as advanced risk assessment tool in the community setting: A multisite cross-sectional study. *Enferm Clin.* Mar 2020; 30 Suppl 2: 453-457. PMID 32204210

41. Hazenberg CE, van Netten JJ, van Baal SG, et al. Assessment of signs of foot infection in diabetes patients using photographic foot imaging and infrared thermography. *Diabetes Technol Ther.* Jun 2014; 16(6): 370-7. PMID 24690146
42. Petrova NL, Donaldson NK, Tang W, et al. Infrared thermography and ulcer prevention in the high-risk diabetic foot: data from a single-blind multicentre controlled clinical trial. *Diabet Med.* Jan 2020; 37(1): 95-104. PMID 31629373
43. Qaseem A, Lin JS, Mustafa RA, et al. Screening for Breast Cancer in Average-Risk Women: A Guidance Statement From the American College of Physicians. *Ann Intern Med.* Apr 16 2019; 170(8): 547-560. PMID 30959525
44. Mainiero MB, Moy L, Baron P, et al. ACR Appropriateness Criteria (R) Breast Cancer Screening. *J Am Coll Radiol.* Nov 2017; 14(11S): S383-S390. PMID 29101979
45. National Comprehensive Cancer Network (NCCN). NCCN Clinical Practice Guidelines in Oncology: Breast Cancer Screening and Diagnosis. Version 1.2022; https://www.nccn.org/professionals/physician_gls/pdf/breast-screening.pdf. Accessed July 12, 2022.
46. U.S. Preventive Services Task Force. Breast Cancer: Screening. 2016; <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/breast-cancer-screening>. Accessed July 12, 2022.
47. Centers for Medicare & Medicaid Services (CMS). National Coverage Determination for Thermography (220.11). 1992; <https://www.cms.gov/medicare-coverage-database/details/ncd-details.aspx?NCDId=164&ncdver=1&DocID=220.11>. Accessed July 12, 2022.