



If a conflict arises between a Clinical Payment and Coding Policy (“CPCP”) and any plan document under which a member is entitled to Covered Services, the plan document will govern. If a conflict arises between a CPCP and any provider contract pursuant to which a provider participates in and/or provides Covered Services to eligible member(s) and/or plans, the provider contract will govern. “Plan documents” include, but are not limited to, Certificates of Health Care Benefits, benefit booklets, Summary Plan Descriptions, and other coverage documents. BCBSOK may use reasonable discretion interpreting and applying this policy to services being delivered in a particular case. BCBSOK has full and final discretionary authority for their interpretation and application to the extent provided under any applicable plan documents.

Providers are responsible for submission of accurate documentation of services performed. Providers are expected to submit claims for services rendered using valid code combinations from Health Insurance Portability and Accountability Act (“HIPAA”) approved code sets. Claims should be coded appropriately according to industry standard coding guidelines including, but not limited to: Uniform Billing (“UB”) Editor, American Medical Association (“AMA”), Current Procedural Terminology (“CPT®”), CPT® Assistant, Healthcare Common Procedure Coding System (“HCPCS”), ICD-10 CM and PCS, National Drug Codes (“NDC”), Diagnosis Related Group (“DRG”) guidelines, Centers for Medicare and Medicaid Services (“CMS”) National Correct Coding Initiative (“NCCI”) Policy Manual, CCI table edits and other CMS guidelines.

Claims are subject to the code edit protocols for services/procedures billed. Claim submissions are subject to claim review including but not limited to, any terms of benefit coverage, provider contract language, medical policies, clinical payment and coding policies as well as coding software logic. Upon request, the provider is urged to submit any additional documentation.

Cardiac Biomarkers for Myocardial Infarction

Policy Number: CPCPLAB046

Version 1.0

Plan Effective Date: Nov. 1, 2022

Description

BCBSOK has implemented certain lab management reimbursement criteria. Not all requirements apply to each product. Providers are urged to review Plan documents for eligible coverage for services rendered.

Reimbursement Information:

1. Measurement of cardiac troponin (troponin T or I) for the diagnosis of myocardial infarction (MI) **may be reimbursable** in all patients presenting with signs and symptoms of acute coronary syndrome* (please see Note 1)
2. Measurement of following cardiac biomarkers for the diagnosis and/or prognosis of MI **is not reimbursable** in patients presenting with signs and symptoms of acute coronary syndrome*:
 - a. Aspartate aminotransferase (AST/SGOT)
 - b. Cardiac creatine kinase isoenzyme MB (CKMB)
 - c. Creatine kinase (CK)

- d. Creatine kinase Isoenzymes
 - e. Lactate Dehydrogenase (LD, LDH)
 - f. Myoglobin
3. Measurement of cardiac biomarkers in patients presenting with signs and symptoms of acute coronary syndrome* in an outpatient setting which is not capable of performing adequate clinical MI evaluation (e.g., independent lab or physician's office) **is not reimbursable**.
 4. Measurement of the following cardiac biomarkers for the diagnosis and/or prognosis of MI **are not reimbursable** in patients presenting with signs and symptoms of acute coronary syndrome*:
 - a. Copeptin
 - b. Troponin C
 - c. C-reactive protein
 - d. Heart-type fatty acid binding protein (H-FABP)
 - e. Any other cardiac biomarkers not listed above

***Note 1:**

Acute Coronary Syndrome/Myocardial Infarction Common Signs and Symptoms (Reeder, 2020):

- Ischemic chest pain with radiation to an upper extremity, radiation to both arms, and pain associated with diaphoresis or with nausea and vomiting.
- Squeezing, tightness, pressure, constriction, crushing, strangling, burning, heartburn, fullness in the chest, band-like sensation, knot in the center of the chest, lump in throat, ache, heavy weight on chest and toothache (when there is radiation to the lower jaw).
- Ischemic pain often radiates to other parts of the body including the upper abdomen (epigastrium), shoulders, arms (upper and forearm), wrist, fingers, neck and throat, lower jaw and teeth (but not upper jaw), and not infrequently to the back (specifically the interscapular region).
- Shortness of breath, belching, nausea, indigestion, vomiting, diaphoresis, dizziness, lightheadedness, clamminess, and fatigue.

Atypical Signs and Symptoms (Reeder, 2020):

Dyspnea alone, weakness, nausea and/or vomiting, epigastric pain or discomfort, palpitations, syncope, or cardiac arrest.

Reimbursement Limitations:

Maximum of 4 serial troponin tests will be reimbursed (e.g., Repeat troponin measurements) in the first 24-72 hours after presentation

Procedure Codes

Codes
82550, 82552, 82553, 82554, 82725, 83615, 83625, 83874, 84450, 84484, 84512, 84588, 86140, 84999

References:

Amsterdam, E. A., Wenger, N. K., Brindis, R. G., Casey, D. E., Ganiats, T. G., Holmes, D. R., . . . Zieman, S. J. (2014). 2014 AHA/ACC Guideline for the Management of Patients With Non–ST-Elevation Acute Coronary Syndromes. *A Report of the American College of Cardiology/American*

Heart Association Task Force on Practice Guidelines, 130(25), e344-e426.
doi:10.1161/cir.000000000000134

Anand, A., Shah, A. S. V., Beshiri, A., Jaffe, A. S., & Mills, N. L. (2019). Global Adoption of High-Sensitivity Cardiac Troponins and the Universal Definition of Myocardial Infarction. *Clin Chem*, 65(3), 484-489. doi:10.1373/clinchem.2018.298059

Anderson, P. A., Malouf, N. N., Oakeley, A. E., Pagani, E. D., & Allen, P. D. (1991). Troponin T isoform expression in humans. A comparison among normal and failing adult heart, fetal heart, and adult and fetal skeletal muscle. *Circ Res*, 69(5), 1226-1233.

ASCP. (2015). Retrieved from <https://www.choosingwisely.org/clinician-lists/american-society-clinical-pathology-myoglobin-to-diagnose-acute-myocardial-infarction/>

Bessman, S. P., & Carpenter, C. L. (1985). The creatine-creatine phosphate energy shuttle. *Annu Rev Biochem*, 54, 831-862. doi:10.1146/annurev.bi.54.070185.004151

Bodor, G. S., Porterfield, D., Voss, E. M., Smith, S., & Apple, F. S. (1995). Cardiac troponin-I is not expressed in fetal and healthy or diseased adult human skeletal muscle tissue. *Clin Chem*, 41(12 Pt 1), 1710-1715.

Bodor, G. S., Survant, L., Voss, E. M., Smith, S., Porterfield, D., & Apple, F. S. (1997). Cardiac troponin T composition in normal and regenerating human skeletal muscle. *Clin Chem*, 43(3), 476-484.

Boeddinghaus, J., Nestelberger, T., Koechlin, L., Wussler, D., Lopez-Ayala, P., Walter, J.E., ...Geigy, N. (2020). Early Diagnosis of Myocardial Infarction With Point-of-Care High-Sensitivity Cardiac Troponin I. *Journal of the American College of Cardiology*, 75(10), 1111-1124. doi:doi:10.1016/j.jacc.2019.12.065

Collet, J.P., Thiele, H., Barbato, E., Barthelémy, O., Bauersachs, J., Bhatt, D.L.,...Siontis, G.C.M. (2021). 2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. *Eur Heart J*, 42(14), 1289-1367. doi:10.1093/eurheartj/ehaa575

Danese, E., & Montagnana, M. (2016). An historical approach to the diagnostic biomarkers of acute coronary syndrome. *Ann Transl Med*, 4(10), 194. doi:10.21037/atm.2016.05.19

Dillon, M. C., Calbreath, D. F., Dixon, A. M., Rivin, B. E., Roark, S. F., Ideker, R. E., & Wagner, G. S. (1982). Diagnostic problem in acute myocardial infarction: CK-MB in the absence of abnormally elevated total creatine kinase levels. *Arch Intern Med*, 142(1), 33-38.

Eggers, K. M., Oldgren, J., Nordenskjold, A., & Lindahl, B. (2004). Diagnostic value of serial measurement of cardiac markers in patients with chest pain: limited value of adding myoglobin to troponin I for exclusion of myocardial infarction. *Am Heart J*, 148(4), 574-581. doi:10.1016/j.ahj.2004.04.030

Engel, G., & Rockson, S.G. (2020). Feasibility and Reliability of Rapid Diagnosis of Myocardial Infarction. *The American Journal of the Medical Sciences*, 359(2), 73-78. doi:<https://doi.org/10.1016/j.amjms.2019.12.012>

Gencer, B., Brotons, C., Mueller, C., Mukherjee, D., Chew, D. P., Andreotti, F., . . . Group, E. S. C. S. D. (2016). 2015 ESC Guidelines for the management of acute coronary syndromes in patients

presenting without persistent ST-segment elevation: Task Force for the Management of Acute Coronary Syndromes in Patients Presenting without Persistent ST-Segment Elevation of the European Society of Cardiology (ESC). *European Heart Journal*, 37(3), 267-315. doi:10.1093/eurheartj/ehv320

Glatz, J. F., & van der Vusse, G. J. (1990). Cellular fatty acid-binding proteins: current concepts and future directions. *Mol Cell Biochem*, 98(1-2), 237-251.

Greaser, M. L., & Gergely, J. (1971). Reconstitution of troponin activity from three protein components. *J Biol Chem*, 246(13), 4226-4233.

Heller, G. V., Blaustein, A. S., & Wei, J. Y. (1983). Implications of increased myocardial isoenzyme level in the presence of normal serum creatine kinase activity. *Am J Cardiol*, 51(1), 24-27.

Hillinger, P., Twerenbold, R., Jaeger, C., Wildi, K., Reichlin, T., Gimenez, M. R., . . . Mueller, C. (2015). Optimizing Early Rule-Out Strategies for Acute Myocardial Infarction: Utility of 1-Hour Copeptin. *Clin Chem*, 61(12), 1466-1474. doi:10.1373/clinchem.2015.242743

Jaffe, A. S., Chaitman, B. R., Morrow, D. A., Bax, J. J., White, H. D., Alpert, J. S., . . . Group, E. S. C. S. D. (2018). Fourth universal definition of myocardial infarction (2018). *Eur Heart J*, 40(3), 237-269. doi:10.1093/eurheartj/ehy462

Jaffe, A. S., & Morrow, D. A. (2017, 07/03/2017). Biomarkers of cardiac injury other than troponin. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/biomarkers-of-cardiac-injury-other-than-troponin>

Jaffe, A. S., & Morrow, D. A. (2019, 3/21/2019). Biomarkers of cardiac injury other than troponin. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/biomarkers-of-cardiac-injury-other-than-troponin>

Jeong, J. H., Seo, Y. H., Ahn, J. Y., Kim, K. H., Seo, J. Y., Chun, K. Y., . . . Park, P. W. (2020). Performance of Copeptin for Early Diagnosis of Acute Myocardial Infarction in an Emergency Department Setting. *Ann Lab Med*, 40(1), 7-14. doi:10.3343/alm.2020.40.1.7

Kavsak, P. A., MacRae, A. R., Newman, A. M., Lustig, V., Palomaki, G. E., Ko, D. T., . . . Jaffe, A. S. (2007). Effects of contemporary troponin assay sensitivity on the utility of the early markers myoglobin and CKMB isoforms in evaluating patients with possible acute myocardial infarction. *Clin Chim Acta*, 380(1-2), 213-216. doi:10.1016/j.cca.2007.01.001

Khan, S. Q., Dhillon, O. S., O'Brien, R. J., Struck, J., Quinn, P. A., Morgenthaler, N. G., . . . Ng, L. L. (2007). C-Terminal Provasopressin (Copeptin) as a Novel and Prognostic Marker in Acute Myocardial Infarction. *Leicester Acute Myocardial Infarction Peptide (LAMP) Study*, 115(16), 2103-2110. doi:10.1161/circulationaha.106.685503

Knuuti, J., Wijns, W., Saraste, A., Capodanno, D., Barbato, E., Funck-Brentano, C., . . . Group, E. S. C. S. D. (2019). 2019 ESC Guidelines for the diagnosis and management of chronic coronary syndromes: The Task Force for the diagnosis and management of chronic coronary syndromes of the European Society of Cardiology (ESC). *European Heart Journal*, 41(3), 407-477. doi:10.1093/eurheartj/ehz425

Maisel, A., Mueller, C., Neath, S.-X., Christenson, R. H., Morgenthaler, N. G., McCord, J., . . . Peacock, W. F. (2013). Copeptin Helps in the Early Detection of Patients With Acute Myocardial Infarction: Primary Results of the CHOPIN Trial (Copeptin Helps in the early detection Of Patients

with acute myocardial INfarction). *Journal of the American College of Cardiology*, 62(2), 150-160. doi:<https://doi.org/10.1016/j.jacc.2013.04.011>

Marshall, T., Williams, J., & Williams, K. M. (1991). Electrophoresis of serum isoenzymes and proteins following acute myocardial infarction. *J Chromatogr*, 569(1-2), 323-345.

McLaurin, M. D., Apple, F. S., Voss, E. M., Herzog, C. A., & Sharkey, S. W. (1997). Cardiac troponin I, cardiac troponin T, and creatine kinase MB in dialysis patients without ischemic heart disease: evidence of cardiac troponin T expression in skeletal muscle. *Clin Chem*, 43(6 Pt 1), 976-982.

Moussa, I. D., Klein, L. W., Shah, B., Mehran, R., Mack, M. J., Brilakis, E. S., . . . Stone, G. W. (2013). Consideration of a new definition of clinically relevant myocardial infarction after coronary revascularization: an expert consensus document from the Society for Cardiovascular Angiography and Interventions (SCAI). *J Am Coll Cardiol*, 62(17), 1563-1570. doi:10.1016/j.jacc.2013.08.720

Neumann, J. T., Twerenbold, R., Ojeda, F., Sorensen, N. A., Chapman, A. R., Shah, A. S. V., . . . Blankenberg, S. (2019). Application of High-Sensitivity Troponin in Suspected Myocardial Infarction. *N Engl J Med*, 380(26), 2529-2540. doi:10.1056/NEJMoa1803377

Nguyen, T. N., Le, P. X. M., Le, T. X., Nguyen, K. D. A., Nguyen, T. T., Nguyen, T. M., & Tran, V. T. (2020). THE VALUE OF HEART-FATTY ACID BINDING PROTEIN (H-FABP) IN THE EARLY DIAGNOSTIC OF PATIENTS WITH ACUTE MYOCARDIAL INFARCTION. *Journal of the American College of Cardiology*, 75(11_Supplement_1), 18-18. doi:doi:10.1016/S0735-1097(20)30645-8

NICE. (2016). Chest pain of recent onset: assessment and diagnosis. Retrieved from <https://www.nice.org.uk/guidance/cg95/chapter/Recommendations>

NICE. (2020). High-sensitivity troponin tests for the early rule out of NSTEMI. Retrieved from <https://www.nice.org.uk/guidance/dg40/chapter/1-Recommendations>

O'Connor Robert, E., Al Ali Abdulaziz, S., Brady William, J., Ghaemmaghmi Chris, A., Menon, V., Welsford, M., & Shuster, M. (2015). Part 9: Acute Coronary Syndromes. *Circulation*, 132(18_suppl_2), S483-S500. doi:10.1161/CIR.0000000000000263

Olasveengen, T. M., de Caen, A. R., Mancini, M. E., Maconochie, I. K., Aickin, R., Atkins, D. L., . . . Nolan, J. P. (2017). 2017 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations Summary. *Circulation*, 136(23), e424-e440. doi:10.1161/cir.0000000000000541

Patel, M. R., Calhoun, J. H., Dehmer, G. J., Grantham, J. A., Maddox, T. M., Maron, D. J., & Smith, P. K. (2016). ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2016 Appropriate Use Criteria for Coronary Revascularization in Patients With Acute Coronary Syndromes. *A Report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and the Society of Thoracic Surgeons*. doi:10.1016/j.jacc.2016.10.034

Penttila, I., Penttila, K., & Rantanen, T. (2000). Laboratory diagnosis of patients with acute chest pain. *Clin Chem Lab Med*, 38(3), 187-197. doi:10.1515/cclm.2000.027

Reeder, G., S., Awtry, E., Mahler, S., A. (2020). Initial evaluation and management of suspected acute coronary syndrome (myocardial infarction, unstable angina) in the emergency department. Retrieved from <http://www.uptodate.com> UpToDate Inc <http://www.uptodate.com>

ResponseBio. (2020). POINT OF CARE CARDIAC. Retrieved from <https://responsebio.com/acute-care-diagnostics/cardiovascular/>

Roche. (2020). Roche CARDIAC Trop T Sensitive test (visual). Retrieved from <https://diagnostics.roche.com/global/en/products/params/roche-cardiac-trop-t-sensitive-test-visual.html>

Saggin, L., Gorza, L., Ausoni, S., & Schiaffino, S. (1990). Cardiac troponin T in developing, regenerating and denervated rat skeletal muscle. *Development*, *110*(2), 547-554.

Seino, Y., Ogata, K., Takano, T., Ishii, J., Hishida, H., Morita, H., . . . Kitaura, Y. (2003). Use of a whole blood rapid panel test for heart-type fatty acid-binding protein in patients with acute chest pain: comparison with rapid troponin T and myoglobin tests. *Am J Med*, *115*(3), 185-190.

Tamis-Holland Jacqueline, E., Jneid, H., Reynolds Harmony, R., Agewall, S., Brilakis Emmanouil, S., Brown Todd, M., . . . null, n. (2019). Contemporary Diagnosis and Management of Patients With Myocardial Infarction in the Absence of Obstructive Coronary Artery Disease: A Scientific Statement From the American Heart Association. *Circulation*, *139*(18), e891-e908. doi:10.1161/CIR.0000000000000670

Thygesen, K., Alpert, J. S., Jaffe, A. S., Simoons, M. L., Chaitman, B. R., & White, H. D. (2012). Third Universal Definition of Myocardial Infarction. *Circulation*, *126*(16), 2020-2035. doi:10.1161/CIR.0b013e31826e1058

Thygesen, K., Alpert, J. S., & White, H. D. (2007). Universal Definition of Myocardial Infarction. *Circulation*, *116*(22), 2634-2653. doi:10.1161/circulationaha.107.187397

Van Nieuwenhoven, F. A., Kleine, A. H., Wodzig, W. H., Hermens, W. T., Kragten, H. A., Maessen, J. G., . . . Glatz, J. F. (1995). Discrimination between myocardial and skeletal muscle injury by assessment of the plasma ratio of myoglobin over fatty acid-binding protein. *Circulation*, *92*(10), 2848-2854.

WHO. (1979). Nomenclature and criteria for diagnosis of ischemic heart disease. Report of the Joint International Society and Federation of Cardiology/World Health Organization task force on standardization of clinical nomenclature. Retrieved from <https://www.ahajournals.org/doi/pdf/10.1161/01.CIR.59.3.607>

Yusuf, S., Collins, R., Lin, L., Sterry, H., Pearson, M., & Sleight, P. (1987). Significance of elevated MB isoenzyme with normal creatine kinase in acute myocardial infarction. *Am J Cardiol*, *59*(4), 245-250.

Policy Update History:

11/1/2022	New policy
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