



BlueCross BlueShield of Oklahoma

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.

Biomarkers for Myocardial Infarction and Chronic Heart Failure

Policy Number: CPCPLAB046

Version 1.0

Enterprise Clinical Payment and Coding Policy Committee Approval Date:

Plan Effective Date: March 1, 2024

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. For individuals presenting with signs and symptoms of acute coronary syndrome (see **NOTE 1**), **quantitative** measurement of cardiac troponin (troponin T or I) for the diagnosis of myocardial

infarction (MI) (when tested at an outpatient facility capable of performing an adequate clinical MI evaluation) **may be reimbursable** up to four times within the first 72 hours following initial presentation.

2. For individuals presenting with signs and symptoms of acute coronary syndrome (see **NOTE 1**), measurement of the following cardiac biomarkers for the diagnosis and/or prognosis of MI **is not reimbursable**:
 - 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 B-type natriuretic peptide (BNP) **or** N-terminal proBNP (NT-proBNP) **may be reimbursable** in **any** of the following situations:
 - a. To diagnose heart failure in individuals presenting with dyspnea;
 - b. To establish disease severity in individuals with chronic heart failure (up to four times per year in the outpatient setting).
4. For individuals presenting with signs and symptoms of acute coronary syndrome (see **NOTE 1**) measurement of cardiac biomarkers 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**.
5. In the outpatient setting, **qualitative** measurement of cardiac troponin (troponin T or I) **is not reimbursable**.
6. For individuals presenting with signs and symptoms of acute coronary syndrome (see **NOTE 1**), measurement of the following cardiac biomarkers for the diagnosis and/or prognosis of MI **are not reimbursable**:
 - 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.
7. For all situations in the outpatient setting, analysis of ST2 and/or its isoforms (e.g., Presage ST2) **is not reimbursable**.

Note 1:

Acute Coronary Syndrome/Myocardial Infarction Common Signs and Symptoms (Reeder, 2023):

- 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, 2023):

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

Procedure Codes

The following is not an all-encompassing code list. The inclusion of a code does not guarantee it is a covered service or eligible for reimbursement.

Codes
82550, 82552, 82553, 82554, 82725, 83006, 83615, 83625, 83874, 83880, 84450, 84484, 84512, 84588, 84999, 86140

References:

Amsterdam, E. A., Wenger, N. K., Brindis, R. G., Casey, D. E., Ganiats, T. G., Holmes, D. R., Jaffe, A. S., Jneid, H., Kelly, R. F., Kontos, M. C., Levine, G. N., Liebson, P. R., Mukherjee, D., Peterson, E. D., Sabatine, M. S., Smalling, R. W., & 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.

<https://doi.org/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.

<https://doi.org/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. <https://doi.org/10.1161/01.res.69.5.1226>

ASCP. (2015, February 3). *Don't test for myoglobin or CK-MB in the diagnosis of acute myocardial infarction (AMI). Instead, use troponin I or T.* <https://www.choosingwisely.org/clinician-lists/american-society-clinical-pathology-myoglobin-to-diagnose-acute-myocardial-infarction/>

Bayes-Genis, A., Zhang, Y., & Ky, B. (2015). ST2 and patient prognosis in chronic heart failure. *Am J Cardiol*, 115(7 Suppl), 64b-69b. <https://doi.org/10.1016/j.amjcard.2015.01.043>

Bessman, S. P., & Carpenter, C. L. (1985). The creatine-creatine phosphate energy shuttle. *Annu Rev Biochem*, 54, 831-862. <https://doi.org/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. <https://pubmed.ncbi.nlm.nih.gov/7497610/>

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. <https://doi.org/10.1093/clinchem/43.3.476>

Boeddinghaus, J., Nestelberger, T., Koechlin, L., Wussler, D., Lopez-Ayala, P., Walter, J. E., Troester, V., Ratmann, P. D., Seidel, F., Zimmermann, T., Badertscher, P., Wildi, K., Giménez, M. R., Potlukova, E., Strebel, I., Freese, M., Miró, Ò., Martín-Sánchez, F. J., Kawecki, D., . . . 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. <https://doi.org/doi:10.1016/j.jacc.2019.12.065>

Boman, K., Thormark Frost, F., Bergman, A. R., & Olofsson, M. (2018). NTproBNP and ST2 as predictors for all-cause and cardiovascular mortality in elderly patients with symptoms suggestive for heart failure. *Biomarkers*, *23*(4), 373-379. <https://doi.org/10.1080/1354750x.2018.1431692>

Chow, S. L., Maisel, A. S., Anand, I., Bozkurt, B., de Boer Rudolf, A., Felker, G. M., Fonarow, G. C., Greenberg, B., Januzzi, J. L., Kiernan, M. S., Liu, P. P., Wang, T. J., Yancy, C. W., & Zile, M. R. (2017). Role of Biomarkers for the Prevention, Assessment, and Management of Heart Failure: A Scientific Statement From the American Heart Association. *Circulation*, *135*(22), e1054-e1091. <https://doi.org/10.1161/CIR.0000000000000490>

Collet, J. P., Thiele, H., Barbato, E., Barthélémy, O., Bauersachs, J., Bhatt, D. L., Dendale, P., Dorobantu, M., Edvardsen, T., Folliguet, T., Gale, C. P., Gilard, M., Jobs, A., Jüni, P., Lambrinou, E., Lewis, B. S., Mehilli, J., Meliga, E., Merkely, B., . . . 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. <https://doi.org/10.1093/eurheartj/ehaa575>

Colucci, W. (2021, January 27). *Prognosis of heart failure*. <https://www.uptodate.com/contents/prognosis-of-heart-failure>

Colucci, W. (2023, May 23, 20232). *Overview of the therapy of heart failure with reduced ejection fraction*. <https://www.uptodate.com/contents/overview-of-the-management-of-heart-failure-with-reduced-ejection-fraction-in-adults>

Colucci, W., & Dunlay, S. (2022, August 10, 2022). *Clinical manifestations and diagnosis of advanced heart failure*. <https://www.uptodate.com/contents/clinical-manifestations-and-diagnosis-of-advanced-heart-failure>

Cresci, S., Pereira Naveen, L., Ahmad, F., Byku, M., de las Fuentes, L., Lanfear David, E., Reilly Carolyn, M., Owens Anjali, T., Wolf Matthew, J., & null, n. (2019). Heart Failure in the Era of Precision Medicine: A Scientific Statement From the American Heart Association. *Circulation: Genomic and Precision Medicine*, *12*(10), e000058. <https://doi.org/10.1161/HCG.0000000000000058>

Crespo-Leiro, M. G., Metra, M., Lund, L. H., Milicic, D., Costanzo, M. R., Filippatos, G., Gustafsson, F., Tsui, S., Barge-Caballero, E., De Jonge, N., Frigerio, M., Hamdan, R., Hasin, T., Hulsmann, M., Nalbantgil, S., Potena, L., Bauersachs, J., McDonagh, T., Seferovic, P., & Ruschitzka, F. (2018). Advanced heart

failure: a position statement of the Heart Failure Association of the European Society of Cardiology. *Eur J Heart Fail*. <https://doi.org/10.1002/ejhf.1236>

Danese, E., & Montagnana, M. (2016). An historical approach to the diagnostic biomarkers of acute coronary syndrome. *Ann Transl Med*, 4(10), 194. <https://doi.org/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. <https://doi.org/10.1001/archinte.1982.00340140035009>

Dimitropoulos, S., Mystakidi, V. C., Oikonomou, E., Siasos, G., Tsigkou, V., Athanasiou, D., Gouliopoulos, N., Bletsas, E., Kalampogias, A., Charalambous, G., Tsioufis, C., Vavuranakis, M., & Tousoulis, D. (2020). Association of Soluble Suppression of Tumorigenesis-2 (ST2) with Endothelial Function in Patients with Ischemic Heart Failure. *Int J Mol Sci*, 21(24). <https://doi.org/10.3390/ijms21249385>

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. <https://doi.org/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. <https://doi.org/10.1016/j.amjms.2019.12.012>

FDA. (2011). *SUBSTANTIAL EQUIVALENCE DETERMINATION* https://www.accessdata.fda.gov/cdrh_docs/reviews/K111452.pdf

Gencer, B., Brotons, C., Mueller, C., Mukherjee, D., Chew, D. P., Andreotti, F., Hasenfuss, G., Collet, J.-P., Bax, J. J., Mehilli, J., Kjeldsen, K., Valgimigli, M., Borger, M. A., Lancellotti, P., Storey, R. F., Windecker, S., Landmesser, U., Patrono, C., Roffi, M., & 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. <https://doi.org/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. <https://doi.org/10.1007/bf00231390>

Greaser, M. L., & Gergely, J. (1971). Reconstitution of troponin activity from three protein components. *J Biol Chem*, 246(13), 4226-4233. [https://doi.org/10.1016/S0021-9258\(18\)62075-7](https://doi.org/10.1016/S0021-9258(18)62075-7)

Heidenreich, P. A., Bozkurt, B., Aguilar, D., Allen, L. A., Byun, J. J., Colvin, M. M., Deswal, A., Drazner, M. H., Dunlay, S. M., Evers, L. R., Fang, J. C., Fedson, S. E., Fonarow, G. C., Hayek, S. S., Hernandez, A. F., Khazanie, P., Kittleson, M. M., Lee, C. S., Link, M. S., & Milano, C. A. (2022). 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure. *Journal of the American College of Cardiology*. <https://doi.org/10.1016/j.jacc.2021.12.012>

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.
[https://doi.org/10.1016/s0002-9149\(83\)80006-x](https://doi.org/10.1016/s0002-9149(83)80006-x)

Hillinger, P., Twerenbold, R., Jaeger, C., Wildi, K., Reichlin, T., Gimenez, M. R., Engels, U., Miró, O., Boeddinghaus, J., Puelacher, C., Nestelberger, T., Röthlisberger, M., Ernst, S., Rentsch, K., & Mueller, C. (2015). Optimizing Early Rule-Out Strategies for Acute Myocardial Infarction: Utility of 1-Hour Copeptin. *Clin Chem*, *61*(12), 1466-1474. <https://doi.org/10.1373/clinchem.2015.242743>

Hou, Z. W., Yu, H. B., Liang, Y. C., Gao, Y., Xu, G. Q., Wu, M., Mei, Z., Wang, Z. L., Li, Z. G., Li, Y. Y., Song, H. X., Li, J. Y., & Han, Y. L. (2020). Circulating Soluble ST2 Predicts All-Cause Mortality in Severe Heart Failure Patients with an Implantable Cardioverter Defibrillator. *Cardiol Res Pract*, *2020*, 4375651.
<https://doi.org/10.1155/2020/4375651>

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

Jaffe, A. S., & Morrow, D. A. (2021, February 15). *Biomarkers of cardiac injury other than troponin*. Wolters Kluwer. <https://www.uptodate.com/contents/biomarkers-of-cardiac-injury-other-than-troponin>

Januzzi, J. L., Horne, B. D., Moore, S. A., Galenko, O., Snow, G. L., Brunisholz, K. D., Muhlestein, J. B., Alharethi, R., Carlquist, J. F., Budge, D., Rasmussen, K., & Kfoury, A. G. (2013). Interleukin receptor family member ST2 concentrations in patients following heart transplantation. *Biomarkers*, *18*(3), 250-256.
<https://doi.org/10.3109/1354750x.2013.773081>

Januzzi, J. L., Mebazaa, A., & Di Somma, S. (2015). ST2 and prognosis in acutely decompensated heart failure: the International ST2 Consensus Panel. *Am J Cardiol*, *115*(7 Suppl), 26b-31b.
<https://doi.org/10.1016/j.amjcard.2015.01.037>

Jeong, J. H., Seo, Y. H., Ahn, J. Y., Kim, K. H., Seo, J. Y., Chun, K. Y., Lim, Y. S., & 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. <https://doi.org/10.3343/alm.2020.40.1.7>

Kavsak, P. A., MacRae, A. R., Newman, A. M., Lustig, V., Palomaki, G. E., Ko, D. T., Tu, J. V., & 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. <https://doi.org/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., Squire, I. B., Davies, J. E., Bergmann, A., & 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. <https://doi.org/10.1161/circulationaha.106.685503>

Knuuti, J., Wijns, W., Saraste, A., Capodanno, D., Barbato, E., Funck-Brentano, C., Prescott, E., Storey, R. F., Deaton, C., Cuisset, T., Agewall, S., Dickstein, K., Edvardsen, T., Escaned, J., Gersh, B. J., Svitil, P., Gilard, M., Hasdai, D., Hatala, R., . . . 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. <https://doi.org/10.1093/eurheartj/ehz425>

Ky, B., French, B., McCloskey, K., Rame, J. E., McIntosh, E., Shahi, P., Dries, D. L., Tang, W. H., Wu, A. H., Fang, J. C., Boxer, R., Sweitzer, N. K., Levy, W. C., Goldberg, L. R., Jessup, M., & Cappola, T. P. (2011). High-sensitivity ST2 for prediction of adverse outcomes in chronic heart failure. *Circ Heart Fail*, 4(2), 180-187. <https://doi.org/10.1161/circheartfailure.110.958223>

Maisel, A., Mueller, C., Neath, S.-X., Christenson, R. H., Morgenthaler, N. G., McCord, J., Nowak, R. M., Vilke, G., Daniels, L. B., Hollander, J. E., Apple, F. S., Cannon, C., Nagurney, J. T., Schreiber, D., deFilippi, C., Hogan, C., Diercks, D. B., Stein, J. C., Headden, G., . . . 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. <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. [https://doi.org/10.1016/0378-4347\(91\)80236-6](https://doi.org/10.1016/0378-4347(91)80236-6)

McDonagh, T. A., Metra, M., Adamo, M., Gardner, R. S., Baumbach, A., Böhm, M., Burri, H., Butler, J., Čelutkienė, J., Chioncel, O., Cleland, J. G. F., Coats, A. J. S., Crespo-Leiro, M. G., Farmakis, D., Gilard, M., Heymans, S., Hoes, A. W., Jaarsma, T., Jankowska, E. A., . . . Kathrine Skibelund, A. (2021). 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Eur Heart J*, 42(36), 3599-3726. <https://doi.org/10.1093/eurheartj/ehab368>

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. <https://doi.org/10.1093/clinchem/43.6.976>

Moussa, I. D., Klein, L. W., Shah, B., Mehran, R., Mack, M. J., Brilakis, E. S., Reilly, J. P., Zoghbi, G., Holper, E., & 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. <https://doi.org/10.1016/j.jacc.2013.08.720>

Neumann, J. T., Twerenbold, R., Ojeda, F., Sorensen, N. A., Chapman, A. R., Shah, A. S. V., Anand, A., Boeddinghaus, J., Nestelberger, T., Badertscher, P., Mokhtari, A., Pickering, J. W., Troughton, R. W., Greenslade, J., Parsonage, W., Mueller-Hennesen, M., Gori, T., Jernberg, T., Morris, N., . . . Blankenberg, S. (2019). Application of High-Sensitivity Troponin in Suspected Myocardial Infarction. *N Engl J Med*, 380(26), 2529-2540. <https://doi.org/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. [https://doi.org/doi:10.1016/S0735-1097\(20\)30645-8](https://doi.org/doi:10.1016/S0735-1097(20)30645-8)

- NICE. (2016). Chest pain of recent onset: assessment and diagnosis. <https://www.nice.org.uk/guidance/cg95/chapter/Recommendations>
- NICE. (2018, September 12). *Chronic heart failure in adults: diagnosis and management*. <https://www.nice.org.uk/guidance/ng106>
- NICE. (2020). High-sensitivity troponin tests for the early rule out of NSTEMI. <https://www.nice.org.uk/guidance/dg40/chapter/1-Recommendations>
- O'Connor Robert, E., Al Ali Abdulaziz, S., Brady William, J., Ghaemmaghami Chris, A., Menon, V., Welsford, M., & Shuster, M. (2015). Part 9: Acute Coronary Syndromes. *Circulation*, 132(18_suppl_2), S483-S500. <https://doi.org/10.1161/CIR.0000000000000263>
- Pascual-Figal, D. A., & Januzzi, J. L. (2015). The biology of ST2: the International ST2 Consensus Panel. *Am J Cardiol*, 115(7 Suppl), 3b-7b. <https://doi.org/10.1016/j.amjcard.2015.01.034>
- Penttila, I., Penttila, K., & Rantanen, T. (2000). Laboratory diagnosis of patients with acute chest pain. *Clin Chem Lab Med*, 38(3), 187-197. <https://doi.org/10.1515/cclm.2000.027>
- Ponikowski, P., Voors, A. A., Anker, S. D., Bueno, H., Cleland, J. G. F., Coats, A. J. S., Falk, V., González-Juanatey, J. R., Harjola, V.-P., Jankowska, E. A., Jessup, M., Linde, C., Nihoyannopoulos, P., Parissis, J. T., Pieske, B., Riley, J. P., Rosano, G. M. C., Ruilope, L. M., Ruschitzka, F., . . . Group, E. S. C. S. D. (2016). 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. *European Heart Journal*, 37(27), 2129-2200. <https://doi.org/10.1093/eurheartj/ehw128>
- Reeder, G., S., Awtry, E., Mahler, S., A. (2023). *Initial evaluation and management of suspected acute coronary syndrome (myocardial infarction, unstable angina) in the emergency department*. <https://www.uptodate.com/contents/initial-evaluation-and-management-of-suspected-acute-coronary-syndrome-myocardial-infarction-unstable-angina-in-the-emergency-department>
- ResponseBio. (2023). POINT OF CARE CARDIAC. <https://responsebio.com/acute-care-diagnostics/cardiovascular/>
- Roche. (2023). Roche CARDIAC Trop T Sensitive test (visual). <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. <https://doi.org/10.1242/dev.110.2.547>
- Seino, Y., Ogata, K., Takano, T., Ishii, J., Hishida, H., Morita, H., Takeshita, H., Takagi, Y., Sugiyama, H., Tanaka, T., & 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. [https://doi.org/10.1016/s0002-9343\(03\)00325-5](https://doi.org/10.1016/s0002-9343(03)00325-5)
- Tamis-Holland Jacqueline, E., Jneid, H., Reynolds Harmony, R., Agewall, S., Brilakis Emmanouil, S., Brown Todd, M., Lerman, A., Cushman, M., Kumbhani Dharam, J., Arslanian-Engoren, C., Bolger Ann, F.,

Beltrame John, F., & 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. <https://doi.org/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. <https://doi.org/10.1161/CIR.0b013e31826e1058>

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

Van Nieuwenhoven, F. A., Kleine, A. H., Wodzig, W. H., Hermens, W. T., Kragten, H. A., Maessen, J. G., Punt, C. D., Van Dieijen, M. P., Van der Vusse, G. J., & 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. <https://doi.org/10.1161/01.CIR.92.10.2848>

Wang, T. J., Wollert, K. C., Larson, M. G., Coglianese, E., McCabe, E. L., Cheng, S., Ho, J. E., Fradley, M. G., Ghorbani, A., Xanthakis, V., Kempf, T., Benjamin, E. J., Levy, D., Vasani, R. S., & Januzzi, J. L. (2012). Prognostic utility of novel biomarkers of cardiovascular stress: the Framingham Heart Study. *Circulation*, *126*(13), 1596-1604. <https://doi.org/10.1161/circulationaha.112.129437>

Wang, Y., Tan, X., Gao, H., Yuan, H., Hu, R., Jia, L., Zhu, J., Sun, L., Zhang, H., Huang, L., Zhao, D., Gao, P., & Du, J. (2018). Magnitude of Soluble ST2 as a Novel Biomarker for Acute Aortic Dissection. *Circulation*, *137*(3), 259-269. <https://doi.org/10.1161/circulationaha.117.030469>

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. <https://www.ahajournals.org/doi/pdf/10.1161/01.CIR.59.3.607>

Wijk, S. S.-v., Maeder, M. T., Nietlispach, F., Rickli, H., Estlinbaum, W., Erne, P., Rickenbacher, P., Peter, M., Pfisterer, M. P., & Rocca, H.-P. B.-L. (2014). Long-Term Results of Intensified, N-Terminal-Pro-B-Type Natriuretic Peptide-Guided Versus Symptom-Guided Treatment in Elderly Patients With Heart Failure. *Circulation: Heart Failure*, *7*(1), 131-139. <https://doi.org/doi:10.1161/CIRCHEARTFAILURE.113.000527>

Wilson S Colucci, H. H. C. (2023). Natriuretic peptide measurement in heart failure. <https://www.uptodate.com/contents/natriuretic-peptide-measurement-in-heart-failure>

Yancy, C. W., Jessup, M., Bozkurt, B., Butler, J., Casey, D. E., Colvin, M. M., Drazner, M. H., Filippatos, G. S., Fonarow, G. C., Givertz, M. M., Hollenberg, S. M., Lindenfeld, J., Masoudi, F. A., McBride, P. E., Peterson, P. N., Stevenson, L. W., & Westlake, C. (2017). 2017 ACC/AHA/HFSA Focused Update of the 2013 ACCF/AHA Guideline for the Management of Heart Failure. *Journal of the American College of Cardiology*, *70*(6), 776-803. <https://doi.org/doi:10.1016/j.jacc.2017.04.025>

Yancy, C. W., Jessup, M., Bozkurt, B., Butler, J., Casey, D. E., Drazner, M. H., Fonarow, G. C., Geraci, S. A., Horwich, T., Januzzi, J. L., Johnson, M. R., Kasper, E. K., Levy, W. C., Masoudi, F. A., McBride, P. E., McMurray, J. J. V., Mitchell, J. E., Peterson, P. N., Riegel, B., . . . Wilkoff, B. L. (2013). 2013 ACCF/AHA

Guideline for the Management of Heart Failure: Executive Summary.

<https://doi.org/10.1161/CIR.0b013e31829e8807>

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.

[https://doi.org/10.1016/0002-9149\(87\)90793-4](https://doi.org/10.1016/0002-9149(87)90793-4)

Policy Update History:

Effective Date	Summary of Change
03/01/2024	Document updated with literature review. The following changes were made to Reimbursement Information: Added #3: "Measurement of B-type natriuretic peptide (BNP) or N-terminal proBNP (NT-proBNP) may be reimbursable in any of the following situations: a) To diagnose heart failure in individuals presenting with dyspnea; b) To establish disease severity in individuals with chronic heart failure (up to four times per year in the outpatient setting). Edited #5 for clarity, changing "for all situations" to "in the outpatient setting." Added code 88380. References revised.
11/01/2023	Document updated with literature review. The following changes were made to Reimbursement Information: Added 4. For all situations, qualitative measurement of cardiac troponin (troponin T or I) is not reimbursable. 6. For all situations in the outpatient setting, analysis of ST2 and/or its isoforms (e.g., Presage ST2) is not reimbursable. Other changes made for clarity. Title changed from Cardiac Biomarkers for Myocardial Infarction. References revised.
11/1/2022	New policy