

## Corporate Medical Policy

### Computed Tomography to Detect Coronary Artery Calcification

<b>File Name:</b>	computed_tomography_to_detect_coronary_artery_calcification
<b>Origination:</b>	3/1994
<b>Last CAP Review</b>	10/2020
<b>Next CAP Review:</b>	10/2021
<b>Last Review:</b>	10/2020

#### Description of Procedure or Service

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Coronary artery calcium (CAC) has been recognized to be associated with coronary artery disease (CAD) on the basis of anatomic studies. The development of fast computed tomography (CT) scanners has allowed the measurement of CAC in clinical practice. CAC has been evaluated in several clinical settings. The most widely studied indication is for the use of CAC in the prediction of future risk for CAD in patients with subclinical disease, with the goal of instituting appropriate risk-reducing therapy (eg, statin treatment; lifestyle modifications) to improve outcomes. In addition, CAC has been evaluated in patients with symptoms potentially consistent with CAD, but in whom a diagnosis is unclear.

Several types of fast computed tomography (CT) imaging, including electron beam computed tomography (EBCT) and spiral CT, allow the quantification of calcium in coronary arteries. Coronary artery calcium (CAC) is associated with coronary artery disease (CAD). The use of CAC scores has been studied in the prediction of future risk of CAD and in the diagnosis of CAD in symptomatic patients.

EBCT (also known as ultrafast CT) and spiral CT (or helical CT) may be used as an alternative to conventional CT scanning due to their faster throughput. In both methods, speed of image acquisition gives them unique value for imaging of the moving heart. The rapid image acquisition time virtually eliminates motion artifact related to cardiac contraction, permitting visualization of the calcium in the epicardial coronary arteries. EBCT software permits quantification of calcium area and density, which are translated into calcium scores. Calcium scores have been investigated as a technique for detecting coronary artery calcification, both as a diagnostic technique in symptomatic patients to rule out an atherosclerotic etiology of symptoms, or, in asymptomatic patients, as a screening technique for risk stratification for coronary artery disease.

EBCT and multi-detector computed tomography (MDCT) were initially the primary fast CT methods for measurement of coronary artery calcification. A fast CT study for coronary artery calcium measurement generally takes 10 to 15 minutes and requires only a few seconds of scanning time. More recently, CT angiography has been used to assess coronary calcium. Because of the basic similarity between EBCT and CT angiography in measuring coronary calcium, it is expected that CT angiography provides information on coronary calcium that is similar to EBCT.

CT scan-derived coronary calcium measures have been used to evaluate coronary atherosclerosis. Coronary calcium is present in coronary atherosclerosis, but atherosclerosis detected may or may not be causing ischemia or symptoms. Coronary calcium measures may be correlated with the presence of critical coronary stenoses or serve as a measure of the patient's proclivity toward atherosclerosis and future coronary disease. Thus, coronary calcium could serve as a variable to be used in a risk assessment calculation to determine appropriate preventive treatment in asymptomatic patients. Alternatively, in other clinical scenarios, coronary calcium scores might help determine whether there is an atherosclerotic etiology or component to the presenting clinical problem in symptomatic patients, thus helping to direct further workup for the clinical problem. In this second scenario, a calcium score of zero usually indicates that the patient's clinical problem is unlikely to be due to atherosclerosis and that other etiologies should be more strongly considered. In neither case does the test determine a specific diagnosis. Most clinical

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studies have examined the use of coronary calcium for its potential use in estimating the risk of future coronary heart disease (CHD) events.

Coronary calcium levels can be expressed in many ways. The most common method is the Agatston score, which is a weighted summed total of calcified coronary artery area observed on CT. This value can be expressed as an absolute number, commonly ranging from 0 (low risk) to 400 (high risk). These values can be translated into age and sex-specific percentile values. Different imaging methods and protocols will produce different values based on the specific algorithm used to create the score, but the correlation between any 2 methods appears to be high, and scores from 1 method can be translated into scores from a different method.

**\*\*\*Note: This Medical Policy is complex and technical. For questions concerning the technical language and/or specific clinical indications for its use, please consult your physician.**

## Policy

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**BCBSNC will not provide coverage for Computed Tomography to Detect Coronary Artery Calcification. The use of computed tomography (e.g., electron beam CT, spiral or helical CT, multislice or multi-detector CT) to detect coronary artery calcification is considered investigational. BCBSNC does not cover investigational services or procedures.**

## Benefits Application

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Please refer to Certificate for availability of benefits. This policy relates only to the services or supplies described herein. Benefits may vary according to benefit design, therefore certificate language should be reviewed before applying the terms of the policy.

## When Computed Tomography to Detect Coronary Artery Calcification is covered

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Not applicable.

## When Computed Tomography to Detect Coronary Artery Calcification is not covered

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Computed tomography to detect coronary artery calcification is considered investigational for all services, including:

- detection of coronary artery calcification as a screening examination for asymptomatic patients
- as a diagnostic study in symptomatic patients
- assessment of coronary artery bypass graft patency
- measurement of cardiac perfusion.

## Policy Guidelines

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The evidence for individuals who are asymptomatic with risk of CAD who receive CAC scoring, includes multiple systematic reviews, randomized controlled trials and, nonrandomized observational studies. Relevant outcomes are overall survival, test accuracy and validity, morbid events, and resource utilization. There is extensive evidence on the predictive value of coronary artery calcium (CAC) score screening for cardiovascular disease among asymptomatic patients, and this evidence has demonstrated that scanning has incremental predictive accuracy above traditional risk factor measurement. However, evidence from high quality studies demonstrating that the use of CAC score measurement in clinical practice leads to changes in patient management or in individual risk behaviors that improve cardiac outcomes is lacking. A meta-analysis of RCTs reported no significant change in coronary risk profile, downstream testing, or

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revascularization following screening using CAC scoring compared to no CAC scoring. The evidence is insufficient to determine the effects of the technology on health outcomes.

The evidence for individuals with signs and/or symptoms suggestive of CAD who receive CAC scoring before other diagnostic testing, includes prospective and retrospective nonrandomized studies. Relevant outcomes are overall survival, test accuracy and validity, morbid events, and resource utilization. CAC scoring has potential as a diagnostic test to rule out coronary artery disease (CAD) in patients presenting with symptoms or as a “gatekeeper” test before invasive imaging is performed. Evidence from observational studies suggests that negative results on CAC scoring rule out coronary artery disease with good reliability. However, the evidence has been inconsistent, with some studies reporting lack of value when using a zero calcium score to rule out CAD. Further prospective trials would be needed to demonstrate that such a strategy is effective in practice and is at least as effective as alternative strategies for ruling out CAD. To demonstrate that use of calcium scores improves the efficiency or accuracy of the diagnostic workup of symptomatic patients, rigorous studies that define exactly how coronary calcium scores are used in combination with other tests to triage of patients would be necessary. The evidence is insufficient to determine the effects of the technology on health outcomes.

## **Billing/Coding/Physician Documentation Information**

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This policy may apply to the following codes. Inclusion of a code in this section does not guarantee that it will be reimbursed. For further information on reimbursement guidelines, please see Administrative Policies on the Blue Cross Blue Shield of North Carolina web site at [www.bcbsnc.com](http://www.bcbsnc.com). They are listed in the Category Search on the Medical Policy search page.

*Applicable codes: S8092, 75571, 0623T, 0624T, 0625T, 0626T*

BCBSNC may request medical records for determination of medical necessity. When medical records are requested, letters of support and/or explanation are often useful, but are not sufficient documentation unless all specific information needed to make a medical necessity determination is included.

## **Scientific Background and Reference Sources**

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### **From Policy titled: Electron Beam Computed Tomography for Imaging of Coronary Artery Disease**

BCBSA Medical Policy Reference Manual - 12/95

Blue Cross Blue Shield Association Policy, 6.01.03, reviewed 7/31/97

Medical Policy Advisory Group, 11/98

Medical Policy Advisory Group 12/2/1999

Specialty Matched Consultant Advisory Panel - 8/2000

Medical Policy Advisory Group 10/2000

BCBSA Medical Policy Reference Manual 6.01.03, 8/15/01

Specialty Matched Consultant Advisory Panel - 9/2002

BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 04/29/03

ECRI Health Technology Forecast. (2004, April 9). Computed tomography for cardiovascular disease screening. Retrieved on April 12, 2004 from [http://www.ta.ecri.org/Forecast/Prod/summary/detail.aspx?doc\\_id=5035&q=ct+for+cardiovascular+disease+screening&anm](http://www.ta.ecri.org/Forecast/Prod/summary/detail.aspx?doc_id=5035&q=ct+for+cardiovascular+disease+screening&anm).

Walsh CR, Larson MG, Kupka JM, Levy D, Vasan RS, Benjamin EJ, et al. (February 2004). Association of aortic valve calcium detected by electron beam computed tomography with echocardiographic aortic valve disease and with calcium deposits in the coronary arteries and thoracic aorta. *Am J Cardiol*,

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American Medical Association Report 10 of the Council on Scientific Affairs (A-03). Commercialized Medical Screening. Retrieved on April 13, 2004 from <http://www.ama-assn.org/ama/pub/article/print/2036-7820.html>.

Specialty Matched Consultant Advisory Panel - 6/2004

ECRI Target Report #529 (2004, August) Electron-beam computed tomography (EBCT) for coronary artery disease (CAD) screening. Retrieved on December 9, 2005 from [http://www.target.ecri.org/summary/detail.aspx?e=5&doc\\_id=518&q=computed+tomographic+angiography&anm](http://www.target.ecri.org/summary/detail.aspx?e=5&doc_id=518&q=computed+tomographic+angiography&anm)

## **For Policy renamed: Computed Tomography to Detect Coronary Artery Calcification**

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BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 4/17/07

Institute for Clinical Systems Improvement (ICSI). Electron-Beam and Helical Computed Tomography for Coronary Artery Disease. Technology Assessment # 34. Bloomington, MN: ICSI; May 2004. Retrieved 10/ 23/07 from <http://www.icsi.org>

California Technology Assessment Forum (CTAF). Utility of Coronary Artery Calcium Measurement in Cardiovascular Disease. San Francisco, CA: CTAF; February 2005. Retrieved 10/23/07 from <http://www.ctaf.org/content/general/detail/570>.

Waugh N, Black C, Walker S, McIntyre L, Cummins E, Hillis G. The effectiveness and cost-effectiveness of computed tomography screening for coronary artery disease: systematic review. *Health Technol Assess.* 2006 Oct;10(39):1-60. Retrieved 1/7/08 from <http://www.hta.nhsweb.nhs.uk/execsum/summ1039.htm>

Medical Advisory Secretariat, Ontario Ministry of Health and Long-Term Care for the Ontario Health Technology Advisory Committee. (May 2007). Multidetector Computed Tomography for Coronary Artery Disease Screening in Asymptomatic Populations. Retrieved 10/23/07 from [http://www.health.gov.on.ca/english/providers/program/ohtac/tech/reviews/pdf/rev\\_mdct\\_20070926.pdf](http://www.health.gov.on.ca/english/providers/program/ohtac/tech/reviews/pdf/rev_mdct_20070926.pdf)

BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 7/09/09

National Heart, Lung, and Blood Institute (NHLBI). Adding Coronary Calcium Score to Traditional Risk Factors Improves Risk Assessment for Heart Disease. April 2010. Retrieved on September 15, 2010 from <http://www.nih.gov/news/health/apr2010/nhlbi-27.htm>

National Institutes of Health (NIH). Multi-Ethnic Study of Atherosclerosis (MESA). Retrieved on September 15, 2010 from <http://www.clinicaltrials.gov/ct2/show/NCT00005487>

U.S. Preventive Services Task Force (USPSTF). Using Nontraditional Risk Factors In Coronary Heart Disease Risk Assessment. October 2009. Retrieved on September 15, 2010 from <http://www.uspreventiveservicestaskforce.org/uspstf/uspstfcoronaryhd.htm>

Specialty Matched Consultant Advisory Panel review 10/2010

Greenland P, Alpert JS, Beller GA et al. 2010 ACCF/AHA guideline for assessment of cardiovascular risk in asymptomatic adults: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol.* 2010; 56(25):e50-103. Retrieved on August 15, 2011 from <http://www.asnc.org/imageuploads/CV%20Risk.pdf>

Rozanski A, Gransar H, Shaw LJ, et al. Impact of coronary artery calcium scanning on coronary risk factors and downstream testing. *J Amer Coll Cardiol.* 2011;57:1622-1632. Retrieved on August 15, 2011 from <http://content.onlinejacc.org/cgi/content/full/j.jacc.2011.01.019v1>

BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 7/14/11

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Specialty Matched Consultant Advisory Panel review 10/2011

BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 7/12/12

Ferret BS, Genders TS, Colkesen EB et al. Systematic review of guidelines on imaging of asymptomatic coronary artery disease. *J Am Coll Cardiol*. 2011; 57(15):1591-600. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0735109711004104>

Specialty Matched Consultant Advisory Panel review 10/2012

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BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 6/13/13

Specialty Matched Consultant Advisory Panel review 10/2013

Medical Director review 10/2013

Taylor AJ, Cerqueira M, Hodgson JM et al. NCCF/SCCT/ACR/AHA/ASE/ASNC/NASCI/SCAI/SCMR 2010 appropriate use criteria for cardiac computed tomography. A report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, the Society of Cardiovascular Computed Tomography, the American College of Radiology, the American Heart Association, the American Society of Echocardiography, the American Society of Nuclear Cardiology, the North American Society for Cardiovascular Imaging, the Society for Cardiovascular Angiography and Interventions, and the Society for Cardiovascular Magnetic Resonance.

Budoff MJ, Mohlenkamp S, McClelland R et al. A comparison of outcomes with coronary artery calcium scanning in unselected populations: the Multi-Ethnic Study of Atherosclerosis (MESA) and Heinz Nixdorf RECALL study (HNR). *J Cardiovasc Comput Tomogr* 2013; 7(3):182-91. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3732186/>

Polonsky TS, McClelland RL, Jorgensen NW et al. Coronary artery calcium score and risk classification for coronary heart disease prediction. *JAMA* 2010; 303(16):1610-6. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3033741/>

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BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 5/22/14

Specialty Matched Consultant Advisory Panel review 11/2014

Senior Medical Director review 11/2014

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BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 5/21/15

Specialty Matched Consultant Advisory Panel review 10/2015

Medical Director review 10/2015

BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 9/2016

Specialty Matched Consultant Advisory Panel review 10/2016

Medical Director review 10/2016

BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 9/2017

Specialty Matched Consultant Advisory Panel review 10/2017

Medical Director review 10/2017

BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 9/2018

Specialty Matched Consultant Advisory Panel review 10/2018

Medical Director review 10/2018

BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 9/2019

Specialty Matched Consultant Advisory Panel review 10/2019

Medical Director review 10/2019

BCBSA Medical Policy Reference Manual [Electronic Version]. 6.01.03, 9/2020

Specialty Matched Consultant Advisory Panel review 10/2020

Medical Director review 10/2020

## **Policy Implementation/Update Information**

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### **From Policy titled: Electron Beam Computed Tomography for Imaging of Coronary Artery Disease**

11/93	Evaluated: Investigational for detection of coronary artery calcification, assessment of coronary artery bypass graft patency and measurement of cardiac perfusion.
6/96	Reaffirmed: National Association reviewed 12/95. No changes.
9/98	Reaffirmed. Association reviewed 7/31/97, no changes.
6/99	Reformatted, Description of procedure revised, Medical Term Definitions added.
12/99	Reaffirmed, Medical Policy Advisory Group
10/00	Specialty Matched Consultant Advisory Panel. No change in criteria. System coding changes. Medical Policy Advisory Group review. No change in criteria. Approve.
5/01	Policy key words added.
11/01	Coding format change.

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- 9/02 Specialty Matched Consultant Advisory Panel review. No change to policy criteria.
- 1/03 Code S8092 added to policy. Removed 76120 from policy. Added statement to billing and coding section regarding the possible ordering of medical records. System coding changes.
- 3/04 Benefits Application and Billing/Coding sections updated for consistency.
- 7/15/04 Specialty Matched Consultant Advisory Panel review with no changes made to policy criteria. References added.
- 10/14/04 Code S8093 added to the Billing/Coding section.
- 12/15/05 Code S8093 removed from Billing/Coding section of the policy.
- 3/30/06 Specialty Matched Consultant Advisory Panel review 2/27/06. No changes made to policy criteria. Description of procedure expanded for clarity. Rationale added to Policy Guidelines. Policy number added to Key Words. References and CPT codes updated.

## **For Policy renamed: Computed Tomography to Detect Coronary Artery Calcification**

- 7/10/06 Added statement to description "Although most of the research regarding imaging of coronary artery calcification has focused on EBCT, helical or spiral CT and multislice or multi-detector CT have also been used for this purpose." Policy statement clarified to read "the use of computed tomography (e.g., electron beam CT, spiral or helical CT, multislice or multi-detector CT) to detect coronary artery calcification is considered investigational." Additional statement added to section When Electron Beam CT is Not Covered that indicates electron beam CT is not covered "as a diagnostic study in symptomatic patients." Rationale for investigational status added to Policy Guidelines section. References updated. (adn)
- 4/7/08 References updated. Specialty Matched Consultant Advisory Panel review 3/12/08. No change to policy statement. (adn)
- 5/11/10 Description section extensively revised. Policy Guidelines and References updated. CPT codes 0144T, 0147T, 0149T deleted. CPT code 75571 added to the Billing/Coding section. (adn)
- 6/22/10 Medical Policy number removed.
- 11/23/10 Specialty Matched Consultant Advisory Panel review 10/10. Policy Guidelines updated. References updated.(mco)
- 8/30/11 Updated Policy Guidelines. Updated References. No changes to Policy Statements. (mco)
- 11/8/11 Specialty Matched Consultant Advisory Panel review 10/2011. References updated. No changes to Policy Statements. (mco)
- 9/4/12 References updated. No changes to Policy Statements. (mco)
- 10/30/12 Specialty Matched Consultant Advisory Panel review 10/2012. References updated. Policy Guidelines updated. (mco)
- 7/30/13 Description section updated. References updated. No changes to Policy Statement. (mco)
- 11/12/13 Specialty Matched Consultant Advisory Panel review 10/2013. Medical Director review 10/2013. No changes to Policy Statements. (mco)
- 7/15/14 Description section updated. Policy Guidelines updated. References updated. No changes to Policy Statement. (mco)
- 1/13/15 References updated. Specialty Matched Consultant Advisory Panel review 11/2014. Senior Medical Director review 11/2014. Added CPT codes: 75572, 75573, 75574. No changes to Policy statement. (td)

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- 3/10/15 Billing/Coding section updated to remove CPT codes: 75572, 75573, 75574. (td)
- 7/28/15 Description section updated. Policy Guidelines section updated. References updated. Policy Statements remain unchanged. (td)
- 12/30/15 References updated. Specialty Matched Consultant Advisory Panel review 10/29/2015. Medical Director review 10/2015. (td)
- 11/22/16 Specialty Matched Consultant Advisory Panel review 10/2016. Medical Director review 10/2016. (jd)
- 11/10/17 Policy Guidelines revised; no change to policy intent. References updated. Specialty Matched Consultant Advisory Panel review 10/2017. Medical Director review 10/2017. (jd)
- 11/9/18 References updated. Specialty Matched Consultant Advisory Panel review 10/2018. Medical Director review 10/2018. (jd)
- 10/29/19 References updated. Specialty Matched Consultant Advisory Panel review 10/2019. Medical Director review 10/2019. (jd)
- 11/10/20 References updated. Specialty Matched Consultant Advisory Panel review 10/2020. Medical Director review 10/2020. (jd)
- 12/20/20 The following codes were added to the Billing/Coding section, effective 1/1/21: 0623T, 0624T, 0625T, 0626T. (jd)

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Medical policy is not an authorization, certification, explanation of benefits or a contract. Benefits and eligibility are determined before medical guidelines and payment guidelines are applied. Benefits are determined by the group contract and subscriber certificate that is in effect at the time services are rendered. This document is solely provided for informational purposes only and is based on research of current medical literature and review of common medical practices in the treatment and diagnosis of disease. Medical practices and knowledge are constantly changing and BCBSNC reserves the right to review and revise its medical policies periodically.