



**CARDIAC COMPUTED TOMOGRAPHY
(CT) ANGIOGRAPHY
HS-022**



Harmony Behavioral Health, Inc.

Harmony Behavioral Health of Florida, Inc.

Harmony Health Plan of Illinois, Inc.

HealthEase of Florida, Inc.

*'Ohana Health Plan, a plan offered by
WellCare Health Insurance of Arizona, Inc.*

WellCare Health Insurance of Illinois, Inc.

WellCare Health Insurance of New York, Inc.

WellCare Health Plans of New Jersey, Inc.

WellCare of Florida, Inc.

WellCare of Connecticut, Inc.

WellCare of Georgia, Inc.

WellCare of Kentucky, Inc.

WellCare of Louisiana, Inc.

WellCare of New York, Inc.

WellCare of Ohio, Inc.

WellCare of Texas, Inc.

WellCare Prescription Insurance, Inc.

**Cardiac Computed
Tomography (CT)
Angiography**

Policy Number: HS-022

Original Effective Date: 5/15/2008

**Revised Date(s): 7/16/2009; 2/26/2010;
2/26/2011**

DISCLAIMER

The Clinical Coverage Guideline is intended to supplement certain standard WellCare benefit plans. The terms of a member's particular Benefit Plan, Evidence of Coverage, Certificate of Coverage, etc., may differ significantly from this Coverage Position. For example, a member's benefit plan may contain specific exclusions related to the topic addressed in this Clinical Coverage Guideline. When a conflict exists between the two documents, the Member's Benefit Plan always supersedes the information contained in the Clinical Coverage Guideline. Additionally, Clinical Coverage Guidelines relate exclusively to the administration of health benefit plans and are NOT recommendations for treatment, nor should they be used as treatment guidelines. The application of the Clinical Coverage Guideline is subject to the benefit determinations set forth by the Centers for Medicare and Medicaid Services (CMS) National and Local Coverage Determinations and state-specific Medicaid mandates, if any.

APPLICATION STATEMENT

The application of the Clinical Coverage Guideline is subject to the benefit determinations set forth by the Centers for Medicare and Medicaid Services (CMS) National and Local Coverage Determinations and state-specific Medicaid mandates, if any.

BACKGROUND

Coronary artery disease (CAD), also called coronary heart disease (CHD), is the most common cardiac disorder and the leading cause of death in the United States. Approximately 17 million people have CAD and CAD accounts for more than 650,000 deaths annually.

A diagnosis of CAD is generally made when there is at least one high-grade stenosis in the coronary tree; patients may or may not be symptomatic. A diagnosis of CAD is generally indicated if there is presence of at least one high-grade stenosis in the coronary tree. In general, symptoms include chest pain (angina), dizziness or light-headedness, rapid or irregular heartbeats, and shortness of breath. Some patients, however, may not present with symptoms. To diagnose and treat the disorder effectively, many experts consider that the development of accurate cardiac imaging techniques is critical. Current techniques used to detect and diagnose CAD include but are not limited to (Hayes, 2007):

- Stress tests: Comparison of blood flow with and without exercise
- Echocardiograms combined with stress tests and nuclear ventriculography: High-resolution visualization of the heart using radioactive tracers
- Coronary angiography (CAG): Invasive visualization of blood flow through the arteries using contrast material
- Electron-beam computed tomography (EBCT): Detects calcium within vessel walls
- Intravascular ultrasound (IVUS): Visualization of arteries using sound waves
- Magnetic resonance angiography (MRA): Magnetic fields and radio waves used to view arteries

To diagnose and treat the disorder effectively, the development of accurate cardiac imaging techniques is critical. Modalities for detecting and diagnosing CAD include but are not limited to stress tests, echocardiograms combined with nuclear ventriculography, coronary angiography (CAG), electron-beam computed tomography (EBCT), intravascular ultrasound (IVUS), and magnetic resonance angiography (MRA). Multislice computed tomography (MSCT) is also known as multidetector computed tomography (MDCT), multidetector-row computed tomography (MDCT), and multisection computed tomography. As early as 2001, MSCT has been investigated as a viable tool for diagnosing CAD. MSCT is noninvasive and is currently the standard procedure used in several imaging applications. The MSCT scanner generates multiple cross-sectional images at a very fast rate. During the last 2 years, aggressive advancements in MSCT have moved this technology to the verge of being useful for diagnosing CAD. There have been improvements in temporal resolution, spatial resolution, and speed of volume coverage (from 4 slices through 64 slices).

There is sufficient evidence in the peer-reviewed scientific literature supporting the use of noninvasive multidetector-row computed tomography angiography (CTA) as a vascular imaging technique that can be performed rapidly and safely for the assessment of many vascular diseases. Studies have demonstrated the high degree of accuracy of CTA compared to invasive angiography for imaging of vessels of the head, neck, thorax and abdomen. CTA is indicated for patients with suspected congenital anomalies of coronary circulation or great vessels. CTA has shown comparable diagnostic accuracy to DSA in the detection of pulmonary embolism. Also, CTA was shown to be at least as good as DSA in imaging peripheral vascular disease.

Also, there is sufficient evidence in the peer-reviewed scientific literature to support the use of 64-slice CTA as an adjunct to other testing as medically indicated in a specific cardiac population subset with intermediate pretest probability of coronary artery disease (CAD). Physicians should utilize established methods of determining risk/probability of CAD (e.g., ACC/AHA Multiple-Risk-Factor Assessment [Age, Gender, and Symptoms], Framingham Risk Score calculation). The literature regarding CTA performed on a multidetector-row scanner with less than 64 slices is not consistent, as is 64-slice literature in demonstrating high accuracy for the detailed diagnosis of CAD. Because of improved spatial and temporal resolution, 64-slice provides improvement in the

assessable segments and inclusion of more distal branches for analysis. However, current literature does not provide sufficient evidence to support a role for CTA in any other CAD population. The literature does not support its use as a screening tool.

Although definitive patient selection criteria have not been established, there is evidence to support the use of MSCT as a triage tool to rule out CAD in symptomatic patients with no history of CAD and who are at low risk for CAD to decide whether patients should be referred for invasive CAG. There is some evidence to suggest that high body mass index (BMI) and calcium scores affect the diagnostic accuracy of MSCT. Generally, patients must be able to tolerate iodinated contrast media and beta-blockers, have sinus rhythm, and be able to hold their breath for at least 12 seconds.

Chest Pain Syndrome and Acute Chest Pain (Angina)

Determination of CT angiogram use is dependent on several factors including whether the patient is presenting with Chest Pain Syndrome or acute chest pain (angina). (Note: see policy for exact use of these determinations).

Chest Pain Syndrome is defined by the American College of Cardiology (ACC, 2006) as “any constellation of symptoms that the physician feels may represent a complaint consistent with obstructive CAD. Examples of such symptoms include, but are not exclusive to: chest pain, chest tightness, burning, dyspnea, shoulder pain, and jaw pain.” Namely, the definition of the syndrome includes pain that is not localized to the chest area. Upon determination of the presence of symptoms consistent with obstructive CAD, pre-test probability of CAD should be determined.

According to the ACC, angina can be classified into two types: 1) typical, (definite) and 2) atypical (probable). Typical angina is defined as a) substernal chest pain or discomfort that is b) provoked by exertion or emotional stress and can c) be relieved by rest and/or nitroglycerin. Atypical angina is chest pain or discomfort that lacks one of the characteristics of typical angina. Angina can also be defined as acute chest pain, localized to the substernal region. Lastly, non-anginal chest pain is chest pain or discomfort that meets one or none of the typical angina characteristics.

During the pre-test evaluation period a patient can be considered asymptomatic (presenting with no symptomatology of CAD) or symptomatic (presenting with symptoms consistent with CAD). This symptom grading is essential to the proper pre-test evaluation of the patient and determines whether a CT angiogram should be performed.

Pre-Test Probability of CAD

The pre-test probability of Coronary Artery Disease in symptomatic members should be determined *before* CT angiography or any other cardiac assessment is performed. Pre-test probability of CAD is determined by analyzing factors such as age, gender, and symptoms. These factors are analyzed using a matrix style grid (see adapted table below).

Table B1. Pre-Test Probability of CAD by Age, Gender, and Symptoms*

Age (yrs)	Gender	Typical/Definite Angina Pectoris	Atypical/Probable Angina Pectoris	Nonanginal Chest Pain	Asymptomatic
30–39	Men	Intermediate	Intermediate	Low	Very low
	Women	Intermediate	Very low	Very low	Very low
40–49	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Low	Very low	Very low
50–59	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Intermediate	Low	Very low
60–69	Men	High	Intermediate	Intermediate	Low
	Women	High	Intermediate	Intermediate	Low

High: Greater than 90% pre-test probability; Intermediate: Between 10% and 90% pre-test probability; Low: Between 5% and 10% pre-test probability; Very Low: Less than 5% pre-test probability. *No data exist for patients less than 30 years or greater than 69 years, but it can be assumed that prevalence of CAD increases with age. In a few cases, patients with ages at the extremes of the decades listed may have probabilities slightly outside the high or low range.
 Reproduced with permission from ACC/AHA 2002 Guideline Update for Exercise Testing (11).

POSITION STATEMENT

WellCare considers Cardiac Computed Tomography/Computed Tomography Angiography^{A/B/C} (including calcium scoring when appropriate) medically necessary for any (ONE) of the following indications:

- 1) Evaluation of Chest Pain Syndrome in patients with *intermediate* pre-test probability of CAD and an uninterpretable ECG or inability to exercise.
- 2) Evaluation of Chest Pain Syndrome in patients with an uninterpretable or equivocal stress test (exercise, perfusion, or stress echo).
- 3) Evaluation of Acute Chest Pain in patients determined to be at *intermediate* pre-test probability of CAD with no ECG changes and serial enzymes are negative.
- 4) Evaluation of Chest Pain Syndrome or Acute Chest Pain in patients with suspected structural coronary anomalies.
- 5) Assessment of complex congenital heart disease including anomalies of coronary circulation, great vessels, and cardiac chambers and valves.
- 6) Evaluation of coronary arteries in patients with new onset heart failure to assess etiology.
- 7) Evaluation of suspected aortic dissection or thoracic aortic aneurysm.*
- 8) Evaluation of suspected pulmonary embolism.*
- 9) Evaluation of cardiac mass (suspected tumor or thrombus) or pericardial conditions (pericardial mass, constrictive pericarditis, or complications of cardiac surgery) following echocardiogram, MRI, or TEE resulting in technically limited images.
- 10) Evaluation of pulmonary vein anatomy prior to invasive radiofrequency ablation for atrial fibrillation.
- 11) Noninvasive coronary vein mapping prior to placement of biventricular pacemaker.
- 12) Noninvasive coronary arterial mapping, including internal mammary artery prior to repeat cardiac surgical revascularization.

WellCare considers all other indications for Computed Tomography Angiography, Cardiac Computed Tomography, or Calcium Scoring **not medically necessary** as there are other diagnostic procedures available, and the American College of Cardiology has determined that the appropriateness of this technology in evaluating these other indications is either inappropriate or uncertain.

Notes

- ^A For CT angiography, patients are assumed not to present with any of the following:
- a. Irregular rhythm (e.g., atrial fibrillation/flutter, frequent irregular premature ventricular contractions or premature atrial contractions, and high grade heart block);
 - b. Very obese patients, body mass index greater than 40 kg/m²;
 - c. Renal insufficiency, creatinine greater than 1.8 mg/dL;
 - d. Heart rate greater than 70 beats/min refractory to heart-rate-lowering agents (e.g., a combination of beta-blocker and calcium-channel blocker);

- e. Metallic interference (e.g., surgical clips, pacemaker, and/or defibrillator wires, or tissue expander).
- ^B For CT angiography, patients must be able to:
 - a. Hold still;
 - b. Follow breathing instruction;
 - c. Take nitroglycerin (for performing coronary CT angiography only);
 - d. Take iodine in spite of steroid prep for contrast allergy;
 - e. Lift both arms above the shoulders.
- ^C Cardiac computed tomography imaging equipment and personnel are available that have the minimal technical capabilities required for the indication (the number of detector rows, spatial and temporal resolution, and acquisition protocols).
- * Non-gated CT angiogram which has a sufficiently large field of view for these specific indications.

CODING

Covered CPT® Codes

Note: CPT Category Codes 0144T-0151T have been deleted effective 12/31/2009 and replaced by CPT codes 75571-75574

- 75571** Computed Tomography, Heart, without contrast material, with quantitative evaluation of coronary calcium
- 75572** Computed Tomography, Heart, with contrast material for evaluation of cardiac structure and morphology (including 3D Image postprocessing, assessment of cardiac function, and evaluation of venous structures, if performed)
- 75573** Computed Tomography, Heart, with contrast material, for evaluation of cardiac structure and morphology in the setting of Congenital Heart Disease (including 3D image postprocessing, assessment of LV cardiac function, RV structure and function and evaluation of venous structures, if performed)
- 75574** Computed Tomographic Angiography, Heart, Coronary Arteries and Bypass Grafts (when present), with contrast material, including 3D Image postprocessing (including evaluation of cardiac structure and morphology, assessment of cardiac function, and evaluation of venous structures, if performed.)

ICD-9 Procedure Code

- 87.42** CT Angiography – Cardiac Computed Tomography

HCPCS Level II Codes - No applicable codes

Covered ICD-9 Diagnosis Codes

Note: It is not enough to link the procedure code to a correct, payable ICD-9-CM code. The diagnosis or clinical signs/symptoms must be present for the procedure to be paid.

- 402.00 - 402.91** Malignant Hypertensive Heart Disease without Heart Failure, Unspecified Hypertensive Heart Disease with Heart Failure
- 411.1** Intermediate Coronary Syndrome
- 412** Old Myocardial Infarction
- 413.0 - 413.9** Angina Decubitis – Other and Unspecified Angina Pectoris
- 414.00 - 414.07** Coronary Atherosclerosis of Unspecified Type of Vessel Native or Graft –Coronary Atherosclerosis of Bypass Graft (Artery) (Vein) of Transplanted Heart
- 414.10 - 414.19** Aneurysm of Heart (Wall) – Other Aneurysm of Heart
- 414.8** Other Specified Forms of Chronic Ischemic Heart Disease
- 414.9** Chronic Ischemic Heart Disease Unspecified
- 415.11 - 415.19** Pulmonary Embolism

420.0 - 420.99	Acute Pericarditis in Diseases Classified Elsewhere – Other Acute Pericarditis
424.3	Pulmonary Valve Disorders (Pulmonary Outflow Obstruction)
427.31	Atrial Fibrillation – Evaluation of Pulmonary Veins Pre and Post Ablation (<i>Not covered for persons in atrial fibrillation</i>).
428.0 - 428.9	Congestive Heart Failure
441.0 - 441.9	Aortic Aneurysm and Dissection
444.0 - 444.9	Arterial Embolism and Arthrosis
745.0 - 745.9	Common Truncus – Unspecified Defect of Septal Closure
746.00 - 746.9	Congenital Pulmonary Valve Anomaly Unspecified – Unspecified Congenital Anomaly of Heart
747.40 - 747.49	Congenital Anomaly of Great Veins Unspecified – Other Anomalies of Great Veins
786.05	Shortness of Breath
786.50	Unspecified Chest Pain
786.51	Precordial Pain
786.59	Other Chest Pain
794.30	Unspecified Abnormal Function Study of Cardiovascular System
794.31	Nonspecific Abnormal Electrocardiogram (ECG) (EKG)

*Current Procedural Terminology (CPT®) ©2010 American Medical Association: Chicago, IL

REFERENCES

Peer Reviewed

1. Agatston AS, Janowitz WR, Hildner FJ, et al. Quantification of coronary artery calcium using ultrafast computed tomography. *J Am Coll Cardiol.* 1990;15:827-832.
2. Antman EM, Anbe DT, Armstrong PW, et al. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to revise the 1999 guidelines). Bethesda, MD: American College of Cardiology, American Heart Association; 2004.
3. Arad Y, Spadaro LA, Goodman K, et al. Predictive value of electron beam computed tomography of the coronary arteries: 19-month follow-up of 1173 asymptomatic subjects. *Circulation.* 1996;93:1951-1953.
4. Bardach A, Garcia Marti S, Lopez A, Glujovsky D. Usefulness of multislice computed tomography (MSCT) for coronary disease. Report IRR No. 49. Buenos Aires, Argentina: Institute for Clinical Effectiveness and Health Policy (IECS); 2005.
5. Berry E, Kelly S, Hutton J, et al. A systematic literature review of spiral and electron beam computed tomography: With particular reference to clinical applications in hepatic lesions, pulmonary embolus, and coronary artery disease. *Health Technol Assess.* 1999;3(18):i-iv, 1-118.
6. Bielak LF, Rumberger JA, Sheedy PF 2nd, et al. Probabilistic model for predication of angiographically defined obstructive coronary artery disease using electron beam computed tomography Calcium Score Strata. *Circulation.* 2000;102(4):380-385.
7. Breen JF, Sheedy PF, Shwartz RS, et al. Coronary artery calcification detected with ultrafast CT as an indication of coronary artery disease. *Radiology.* 1992;185:435-439.
8. Budoff MJ, Achenbach S, Blumenthal RS, et al. Assessment of coronary artery disease by cardiac computed tomography. A Scientific Statement from the American Heart Association Committee on Cardiovascular Imaging and Intervention, Council on Cardiovascular Radiology and Intervention, and Committee on Cardiac Imaging, Council on Clinical Cardiology. *Circulation.* 2006;114:1761-1791.
9. Budoff MJ, Mao S, Zalace CP, et al. Comparison of spiral and electron beam tomography in the evaluation of coronary calcification in asymptomatic persons. *Int J Cardiol.* 2001;77(2-3):181-188.
10. Budoff MJ, Georgiou D, Brody A, et al. Ultrafast computed tomography as a diagnostic modality in the detection of coronary artery disease: A multicenter study. *Circulation.* 1996;93:898-904.
11. Carr JJ, Crouse JR 3rd, Goff DC Jr, et al. Evaluation of subsecond gated spiral CT for quantification of coronary

- artery calcium and comparison with electron beam CT. *AJR Am J Roentgenol.* 2000;174(4):915-921.
12. Detrano R, Wong ND, Doherty TM, et al. Coronary calcium does not accurately predict near-term future coronary events in high-risk adults. *Circulation.* 1999;99(20):2633-2638.
 13. Detrano R, Hsai T, Wang S, et al. Prognostic value of coronary calcification and angiographic stenoses in patients undergoing coronary angiography. *J Am Coll Cardiol.* 1996;27:285-290.
 14. Eagle KA, Berger PB, Calkins H, et al. ACC/AHA guideline update for perioperative cardiovascular evaluation for noncardiac surgery-executive summary: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1996 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery). *J Am Coll Cardiol.* 2002;39:542-53.
 15. Ewy GA. The search for the "holy grail" of clinically significant coronary atherosclerosis. *Arch Intern Med.* 2004;164(12):1266-1268.
 16. Fallavollita JA, Brody AS, Bunnell IL, et al. Fast computed tomography detection of coronary calcification in the diagnosis of coronary artery disease: Comparison with angiography in patients < 50 years old. *Circulation.* 1994;89(1):285-290.
 17. Finnish Medical Society Duodecim. Coronary heart disease (CHD): Symptoms, diagnosis and treatment. In: EBM Guidelines. Evidence-Based Medicine [CD-ROM]. Helsinki, Finland: Duodecim Medical Publications Ltd.; September 14, 2004.
 18. Finnish Medical Society Duodecim. Coronary angiography and indications for CABG or angioplasty. In: EBM Guidelines. Evidence-Based Medicine [CD-ROM]. Helsinki, Finland: Duodecim Medical Publications Ltd.; September 14, 2004.
 19. Finnish Medical Society Duodecim. Unstable angina pectoris. In: EBM Guidelines. Evidence-Based Medicine [CD-ROM]. Helsinki, Finland: Duodecim Medical Publications Ltd.; September 14, 2004.
 20. Foerster V, Murtagh J, Lentle BC, et al. CT and MRI for selected clinical disorders: A systematic review of clinical systematic reviews. Technology Report No. 59. Ottawa, ON: Canadian Coordinating Office for Health Technology Assessment (CADTH); 2005.
 21. Gibbons RJ, Balady GJ, Beasley JW, et al. ACC/AHA guidelines for exercise testing. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing). *J Am Coll Cardiol.* 1997 30(1):260-311.
 22. Greenland P. Improving risk of coronary heart disease. *JAMA.* 2003;289:2270-2272.
 23. Guerci AD, Spadaro LA, Popma JJ, et al. Relation of coronary calcium score by electron beam computed tomography to arteriography findings in asymptomatic and symptomatic adults. *Am J Cardiol.* 1997;79:128-133.
 24. HAYES, Multislice Computed Tomography for Detection of Coronary Artery Disease, July 19, 2007.
 25. Hendel RC, Patel MR, Kramer CM, Poon M. ACCF/ACR/SCCT/SCMR/ASNC/NASCI/SCAI/SIR appropriateness criteria for cardiac computed tomography and cardiac magnetic resonance imaging. A Report of the American College of Cardiology Foundation Quality Strategic Directions Committee Appropriateness Criteria Working Group, American College of Radiology, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, American Society of Nuclear Cardiology, North American Society for Cardiac Imaging, Society for Cardiovascular Angiography and Interventions, and Society for Interventional Radiology. *J Am Coll Cardiol.* 2006;48(7). Available at: <http://www.acc.org/qualityandscience/clinical/pdfs/CCT.CMR.pdf> Accessed August 7, 2006.
 26. Jacoby DS, Mohler III ER, Rader DJ. Noninvasive atherosclerosis imaging for predicting cardiovascular events and assessing therapeutic interventions. *Curr Atheroscler Rep.* 2004;6(1):20-26.
 27. Kaufmann RB, Peyser PA, Sheedy PF, et al. Quantification of coronary artery calcium by electron beam computed tomography for determination of severity of angiographic disease in younger patients. *J Am Coll Cardiol.* 1995;25:626-632.
 28. Laudon DA. Use of electron-beam computed tomography in the evaluation of chest pain patients in the emergency department. *Ann Emerg Med.* 1999;33(1):15-21.
 29. Lauer M, Froelicher ES, Williams M, Kligfield P. Exercise testing in asymptomatic adults: A statement for professionals from the American Heart Association Council on Clinical Cardiology, Subcommittee on Exercise, Cardiac Rehabilitation, and Prevention. *Circulation.* 2005;112(5):771-776.

30. Mann JM, Davies MJ. Vulnerable plaque: Relation of characteristics to degree of stenosis in human coronary arteries. *Circulation*. 1996;94:928-931.
31. Marwick TH. Screening for coronary artery disease. *Med Clin North Am*. 1999; 83(6):1375-1402.
32. Matchar DB, Mark DB, Patel MR, et al. Noninvasive imaging for coronary artery disease. Technology Assessment. Prepared by the Duke Evidence-Based Practice Center (EPC) for the Agency for Healthcare Research and Quality (AHRQ). Rockville, MD:AHRQ; October 3, 2006. Available at: <http://www.cms.hhs.gov/mcd/viewtechassess.asp?where=index&tid=34> Accessed May 27, 2007.
33. Mazzone T. The role of electron beam computed tomography for measuring coronary artery atherosclerosis. *Curr Diab Rep*. 2004;4(1):20-25.
34. Murtagh J, Foerster V, Warburton RN, et al. Clinical and cost effectiveness of CT and MRI for selected clinical disorders: Results of two systematic reviews. Technology Overview No. 22. Ottawa, ON: Canadian Agency for Drugs and Technologies in Health (CADTH); 2006.
35. Murtagh J, Warburton RN, Foerster V, et al. CT and MRI for selected clinical disorders: A systematic review of economic evaluations. Technology Report No. 68. Ottawa, ON: Canadian Agency for Drugs and Technologies in Health (CADTH); 2006.
36. Naghavi M, Madjid M, Khan MR, et al. New developments in the detection of vulnerable plaque. *Curr Atheroscler Rep*. 2001;3(2):125-135.
37. Nieman K, van Geuns RJ, Wielopolski P, et al. Noninvasive coronary imaging in the new millennium: A comparison of computed tomography and magnetic resonance techniques. *Rev Cardiovasc Med*. 2002;3(2):77-84.
38. No author listed. AHA will not endorse EBT to assess heart attack risk [news]. *Pharmaceutical Executive*. October 10, 2004. Available at: <http://www.pharmexec.com/> Accessed November 3, 2004.
39. No authors listed. Potential value of ultrafast computed tomography to screen for coronary artery disease. Committee on Advanced Cardiac Imaging and Technology, Council on Clinical Cardiology, and Committee on Newer Imaging Modalities, Council on Cardiovascular Radiology, American Heart Association. *Circulation*. 1993;87(6):2071.
40. O'Malley PG, Feuerstein IM, Taylor AJ. Impact of electron beam tomography, with or without case management, on motivation, behavioral change, and cardiovascular risk profile: A randomized controlled trial. *JAMA*. 2003;289(17):2215-2223.
41. O'Malley PG. Rationale and design of the Prospective Army Coronary Calcium (PACC) Study: Utility of electron beam computed tomography as a screening test for coronary artery disease and as an intervention for risk factor modification among young, asymptomatic, active-duty United States Army Personnel. *Am Heart J*. 1999;137(5):932-941.
42. O'Rourke RA, Brundage BH, Froelicher VF, et al. American College of Cardiology/American Heart Association expert consensus document on electron-beam computed tomography for the diagnosis and prognosis of coronary artery disease. *J Am Coll Cardiol*. 2000;36(1):326-340.
43. Pletcher MJ, Tice JA, Pignone M, Browner WS. Using the coronary artery calcium score to predict coronary heart disease events: A systematic review and meta-analysis. *Arch Intern Med*. 2004;164(12):1285-1292.
44. Pwee KH. Multislice/spiral computed tomography for screening for coronary artery disease. Issues in Emerging Health Technologies. Issue 43. Ottawa, ON: Canadian Coordinating Office for Health Technology Assessment (CCOHTA); February 2003. Available at: <http://www.ccohta.ca> Accessed March 23, 2004.
45. Ratko T. Electron beam computed tomography. Technology Report. UHC Clinical Practice Advancement Center. Oak Brook, IL: University Hospital Consortium (UHC); October 1999.
46. Redberg RF, Shaw LJ. A review of electron beam computed tomography: Implications for coronary artery disease screening. *Prev Cardiol*. 2002;5(2):71-78.
47. Rumberger JA. Tomographic (plaque) imaging: State of the art. *Am J Cardiol*. 2001;88(2-A):66E-69E.
48. Rumberger JA, Sheedy PF, Breen JF, et al. Electron beam computed tomographic coronary calcium score cut points and severity of associated angiographic lumen stenosis. *J Am Coll Cardiol*. 1997;29:1542-1548.
49. Rumberger JA, Sheedy PF, Breen JF, et al. Electron beam computed tomography and coronary artery disease: Scanning for coronary artery calcification. *Mayo Clin Proc*. 1996;71:369-377.
50. Schoepf UJ, Becker CR, Ohnesorge BM, Yucel EK. CT of coronary artery disease. *Radiology*. 2004;232(1):18-

- 37.
51. Schuijff JD, Bax JJ, Shaw LJ, et al. Meta-analysis of comparative diagnostic performance of magnetic resonance imaging and multislice computed tomography for noninvasive coronary angiography. *Am Heart J.* 2006;151(2):404-411.
 52. Secci A, Wong N, Tang W, et al. Electron beam computed tomography coronary calcium as a predictor of coronary events. *Circulation.* 1997;96:1122-1129.
 53. Snow V, Barry P, Fihn SD, et al. Primary care management of chronic stable angina and asymptomatic suspected or known coronary artery disease: A clinical practice guideline from the American College of Physicians. *Ann Intern Med.* 2004;141(7):562-567.
 54. Thomson LE, Hachamovitch R. Coronary artery calcium scoring using electron-beam computed tomography: Where does this test fit into a clinical practice? *Rev Cardiovasc Med.* 2002;3(3):121-128.
 55. Traversi E, Bertoli G, Barazzoni G, et al. Non-invasive coronary angiography with multislice computed tomography. Technology, methods, preliminary experience and prospects. *Ital Heart J.* 2004;5(2):89-98.
 56. U.S. Preventive Services Task Force. Screening for coronary heart disease. Report of the U.S. Preventive Services Task Force. Rockville, MD: Agency for Healthcare Research and Quality (AHRQ); February 2004. Available at: <http://www.ahrq.gov/clinic/uspstf/uspsacad.htm> Accessed March 23, 2004.
 57. Walsh J. Computed tomographic angiography in the diagnosis of coronary artery stenosis and for the evaluation of acute chest pain. A Technology Assessment. San Francisco, CA: California Technology Assessment Forum; 2007.
 58. Wang S, Detrano RC, Secci A, et al. Detection of coronary calcification with electron beam computed tomography: Evaluation of interexamination reproducibility and comparison of 3 image acquisition protocols. *Am Heart J.* 1996;132:550-558.
 59. Waugh N, Black C, Walker S, et al. The effectiveness and cost-effectiveness of computed tomography screening for coronary artery disease: Systematic review. *Health Technol Assess.* 2006;10(39):1-60. Wexler L, Brundage B, Crouse J, et al. Coronary artery calcification: Pathophysiology, epidemiology, imaging methods, and clinical implications. A statement for health professionals from the American Heart Association Writing Group. *Circulation.* 1996;94:1175-1192.
 60. Wong ND, Detrano RC, Diamond G, et al. Does coronary artery screening by electron beam computed tomography motivate potentially beneficial lifestyle behaviors? *Am J Cardiol.* 1996;78:1220-1223.

Government Agencies, Professional and Medical Organizations

1. Adelaide Health Technology Assessment (AHTA). Computed tomography coronary angiography. Horizon Scanning Prioritising Summary - Volume 12. Adelaide, Australia: AHTA on behalf of National Horizon Scanning Unit (HealthPACT and MSAC); 2006.
2. American College of Cardiology Foundation, American Heart Association. ACC/AHA guidelines for the management of patients with unstable angina and non-ST-segment elevation myocardial infarction. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Bethesda, MD: American College of Cardiology Foundation (ACCF); March 2002.
3. American College of Cardiology Foundation, American Heart Association. ACC/AHA guideline update for exercise testing. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing). Bethesda, MD: American College of Cardiology Foundation; 2002.
4. American College of Cardiology Foundation, American Heart Association. ACC/AHA 2002 guideline update for the management of patients with chronic stable angina: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to update the 1999 guidelines). Bethesda, MD: American College of Cardiology Foundation; 2002.
5. BlueCross BlueShield Association (BCBSA), Technology Evaluation Center (TEC). Contrast-enhanced cardiac computed tomographic angiography in the diagnosis of coronary artery stenosis or for evaluation of acute chest pain. TEC Assessment Program. Chicago, IL: BCBSA; August 2006; 21(5). Available at: http://www.bcbs.com/betterknowledge/tec/vols/21/21_05.html Accessed April 11, 2007.

6. BlueCross BlueShield Association (BCBSA), Technology Evaluation Center (TEC). Contrast-enhanced cardiac computed tomographic angiography for coronary artery evaluation. TEC Assessment Program. Chicago, IL: BCBSA; May 2005;20(4). Available at: http://www.bcbs.com/betterknowledge/tec/vols/20/20_04.html Accessed April 11, 2007.
7. German Agency of Health Technology Assessment (DAHTA) at German Institute for Medical Documentation and Information (DIMDI). Computed tomography for the measurement of coronary calcification in asymptomatic risk patients [summary]. Technology Assessment. Cologne, Germany; DIMDI; 2006.
8. Institute for Clinical Systems Improvement (ICSI). Electron-beam and helical computed tomography for coronary artery disease. Technology Assessment No. 34. Bloomington, MN: ICSI; 2004.
9. Medical Services Advisory Committee (MSAC). Diagnostic and therapeutic modalities for coronary artery disease. Horizon Scanning 003. Canberra, Australia: MSAC; 2003.
10. National Health Service Quality Improvement Scotland (NHS QIS). The use of multislice computed tomography angiography (CTA) for the diagnosis of coronary artery disease. Evidence Note 9. Glasgow, Scotland: NHS QIS; June 2005.
11. National Horizon Scanning Centre (NHSC). Computed tomography angiography for the diagnosis and management of coronary artery disease. Horizon Scanning Technology Briefing. Birmingham, UK: NHSC; December 2006.
12. New Zealand Health Technology Assessment (NZHTA). What is the prognostic value of calcium scoring in screening asymptomatic populations for cardiovascular disease? Evidence Tables. Christchurch, NZ: NZHTA; 2003. Available at: <http://nzhta.chmeds.ac.nz> Accessed April 16, 2004.
13. Ontario Ministry of Health and Long-Term Care, Medical Advisory Secretariat (MAS). Multi-detector computed tomography angiography for coronary artery disease. Health Technology Literature Review. Toronto, ON: MAS; April 2005.

HISTORY AND REVISIONS

Date	Action
12/1/2011	<ul style="list-style-type: none">• New template design approved by MPC.
2/28/2011	<ul style="list-style-type: none">• Approved by MPC.