

Molina Clinical Policy

Measurement of Carotid Intima-Media Thickness for Prediction of Clinical Vascular Events: Policy No. 235

Last Approval: 10/12/2022

Next Review Due By: October 2023



OHIO MEDICAID: Molina Ohio Medicaid will not exclude code 93895 and request will be reviewed for medical necessity on an individual basis.

DISCLAIMER

This Molina Clinical Policy (MCP) is intended to facilitate the Utilization Management process. Policies are not a supplementation or recommendation for treatment; Providers are solely responsible for the diagnosis, treatment and clinical recommendations for the Member. It expresses Molina's determination as to whether certain services or supplies are medically necessary, experimental, investigational, or cosmetic for purposes of determining appropriateness of payment. The conclusion that a particular service or supply is medically necessary does not constitute a representation or warranty that this service or supply is covered (e.g., will be paid for by Molina) for a particular Member. The Member's benefit plan determines coverage – each benefit plan defines which services are covered, which are excluded, and which are subject to dollar caps or other limits. Members and their Providers will need to consult the Member's benefit plan to determine if there are any exclusion(s) or other benefit limitations applicable to this service or supply. If there is a discrepancy between this policy and a Member's plan of benefits, the benefits plan will govern. In addition, coverage may be mandated by applicable legal requirements of a State, the Federal government or CMS for Medicare and Medicaid Members. CMS's Coverage Database can be found on the CMS website. The coverage directive(s) and criteria from an existing National Coverage Determination (NCD) or Local Coverage Determination (LCD) will supersede the contents of this MCP and provide the directive for all Medicare members. References included were accurate at the time of policy approval and publication.

OVERVIEW

Carotid intima-media thickness (CIMT) measurement is a noninvasive test that uses B-mode ultrasound to measure the lining of the carotid arteries. CIMT is utilized as a marker of subclinical atherosclerosis, and its measurement has been suggested as a cardiovascular risk screening approach. The intima is the innermost layer of an artery, while the media is its middle layer. Routinely, carotid ultrasonography has been utilized for the examination of ischemic cerebrovascular symptoms. In the context of risk stratification including carotid ultrasonography, the intima-media thickness is assessed in order to detect preclinical or subclinical cardiovascular disease. The results are evaluated for any thickening or indications of anatomical alterations resulting from early atherosclerosis. Detection and monitoring of intima-medial thickening may allow for earlier intervention and/or monitoring of disease progression.

The CIMT is thought to be a surrogate marker for atherosclerosis, as it correlates with the presence of coronary atherosclerosis. This has led to the theory that it may be a separate marker from the traditional risk factors for cardiovascular disease and stroke. Cigarette smoking, high blood pressure, elevated serum total and LDL cholesterol, low serum HDL cholesterol, diabetes mellitus, and advancing age are the major independent risk factors. Obesity, a family history of premature coronary heart disease (CHD), and physical inactivity are additional risk factors. It is unclear whether measuring CIMT provides an advantage over traditional risk factors or whether treatment guided by this test has an effect on clinical outcomes.

The evidence includes large cohort studies and systematic reviews for individuals undergoing cardiac risk assessment who receive ultrasonic measurement of CIMT. Accuracy and morbidity are relevant outcomes. Numerous commonly used markers for coronary heart disease and the risk of future cardiovascular events have been linked by some studies to elevated CIMT.

Lorenz et al. (2010) in a meta-analysis of individual participant data that CIMT was related with an increased risk of cardiovascular events, but that CIMT progression through time was not associated with an increased risk of cardiovascular events. The added predictive value of CIMT was modest in a 2012 systematic review by Peters et al., and the ability to reclassify patients into clinically relevant categories was not demonstrated (Peters et al. 2012). The findings of these reviews and other studies show that the predictive value of CIMT is uncertain, and that the predictive ability for any level of population risk cannot be determined with precision. Furthermore, no studies have been conducted to determine how the use of CIMT in clinical practice improves outcomes. No scientific literature directly evaluates the premise that CIMT measurement improves patient outcomes, nor is there guidance on how to incorporate CIMT data into risk assessment and risk management. The evidence is insufficient to assess the technology's impact on health outcomes.

Regulatory

Measurement of CIMT is a procedure, and not subject to FDA regulation. The FDA regulates B-mode ultrasound

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devices used to assess CIMT, however there are numerous products. Refer to the [FDA](#) website for further information.

COVERAGE POLICY

Ultrasonographic measurement of CIMT for prediction of clinical vascular events **is considered experimental, investigational, and unproven** due to insufficient evidence in the peer reviewed medical literature that that have not established safety, efficacy and effect on net health outcomes.

DOCUMENTATION REQUIREMENTS. Molina Healthcare reserves the right to require that additional documentation be made available as part of its coverage determination; quality improvement; and fraud; waste and abuse prevention processes. Documentation required may include, but is not limited to, patient records, test results and credentials of the provider ordering or performing a drug or service. Molina Healthcare may deny reimbursement or take additional appropriate action if the documentation provided does not support the initial determination that the drugs or services were medically necessary, not investigational or experimental, and otherwise within the scope of benefits afforded to the member, and/or the documentation demonstrates a pattern of billing or other practice that is inappropriate or excessive.

SUMMARY OF MEDICAL EVIDENCE

There is insufficient published evidence to assess the role of CIMT measurement for the prediction of clinical vascular events and/or the impact on health outcomes or patient management. The clinical evidence to establish that CIMT testing has a benefit beyond traditional risk assessment is lacking. Prospective studies provide inadequate clinical evidence that the use of this technology alters patient management and improves clinical outcomes. There are no RCTs assessing the clinical utility of measuring CIMT for cardiac risk stratification, and no specific guidance on how measurements of CIMT should be incorporated into risk assessment and risk management. There is also a lack of standardization of measurement and imaging protocols and a lack of consensus regarding what constitutes expected normal limits. The literature does not show that CIMT can improve risk prediction beyond what traditional risk factors can provide, nor does it show the effect of these measurements on patient outcomes. The current published literature consists of several systematic reviews, meta-analyses, case series, and large longitudinal cohort studies. Additional studies involving larger, well-designed studies is required to establish the role of arterial compliance in the early detection, prevention, and management of CVD.

Lorenz et al. (2010) published the results of the Carotid Atherosclerosis Progression Study, a ten-year follow-up of 4,904 patients without pre-existing vascular disease. The utility of CIMT in predicting individual risk beyond the Framingham and SCORE models was investigated. While CIMT was predictive for cardiovascular endpoints, the authors concluded that it did not consistently improve individual risk classification.

Several observational longitudinal studies have demonstrated a correlation between CIMT measurement and established CVD risk factors (Villines, et al., 2017; Geisel, et al., 2017; Nambi, et al., 2010; Kathiresan et al., 2007; Amato, et al., 2007; O'Leary, et al., 1999; Hodis, et al., 1998; Bots, et al., 1997; Chambless, et al., 1997).

Villines et al., (2017) reported on the Jackson Heart Study (JHS), a community-based cohort study evaluating the etiology of cardiovascular, renal, and respiratory diseases among African Americans (AA) residing in the three counties (Hinds, Madison, and Rankin) that make up the Jackson, Mississippi metropolitan area. At the time it was conducted, JHS is the largest single-site, community-based epidemiologic study of environmental and genetic factors associated with cardiovascular disease in AA. The study enrolled 5301 adults ages 21 to 94 [681 (12.8%) of the 5,301 participants were excluded from the current analyses due to preexisting CVD (410 with CAD, 161 with stroke, and 110 with both), 226 (4.3%) missing CIMT measures, 428 (8.1%) missing other risk factor data, and 165 (3.1%) younger than 30 or older than 80 years]. The study included 2,463 women and 1,338 men who had no clinical CVD at the start. At the baseline assessment of the study, participants were measured bilaterally for far-wall CIMT. The incidence of CVD events was then evaluated over a 7 to 11-year period of follow-up. Incident CVD events were evaluated from samples of 2,463 women (107 CVD events) and 1,334 men (64 CVD events) who were free of clinical CVD at baseline. Each 0.2 mm increase in CIMT was linked with age-adjusted incident CVD hazard ratios of 1.4 for women and 1.3 for men. Similarly, the addition of CIMT had a little effect on risk-reclassification: Net Reclassification Index (NRI) 0.13 and 0.05 for women and men, respectively; Integrated Discrimination Improvement (IDI) 0.02 and 0.01 for women and men, respectively. The study concluded that CIMT was related with incident CVD but provided modest incremental improvement in risk reclassification beyond standard risk factors in an AA population group. There were several

limitations to the study: 1) The study was limited to a single geographical region, which may limit generalizability; 2) While the follow-up period was relatively long in comparison to many prognostic studies, 9.0 years is shorter than the 10-year period used to calculate the Framingham risk score, which may reduce the overall power of the observations; 3) Carotid plaque was not evaluated on a systemic level. Previous research has shown that including carotid plaque in CVD risk prediction models improves accuracy significantly more than measuring CIMT alone; and 4) It is unknown what effect statins, antihypertensive, and antiplatelet medications had during the study period. [Funded by the National Heart, Lung and Blood Institute and the National Institute on Minority Health and Health Disparities.0]

Cohort and case control studies have not demonstrated that the use of this test results in a substantial increase in predictive value when utilized as a screening tool in addition to established risk factors, nor have they demonstrated that patient treatment guided by CIMT improves cardiovascular outcomes. Despite the fact that there appears to be an association with established risk factors for heart disease, these studies have not shown that there is an association between the two (Bot, et al., 2014; Jain, et al., 2011; Folsom et al., 2008; Baldassare, et al., 2007; Kitagawa, et al., 2007; Kanawar et al., 2007; Gepner, et al., 2006; Iglesias del Sol, et al., 2001).

Systematic Reviews

Azcui Aparicio et al. (2021) conducted a systematic review to examine the predictive usefulness of CIMT, carotid plaque identification, and CAC score in diagnosing sub-clinical atherosclerosis and estimating future risk of CVD in asymptomatic, low-to-moderate risk patients. The review includes 30 studies with 92,498 participants (23 prospective cohort studies, 1 retrospective cohort study, 1 case-control study, and 5 cross-sectional studies). In 11 studies, the average duration of follow-up was 10.34.8 years and the median duration was 6.0 years. Inclusion of CAC scores resulted in the greatest HR, ranging from 1.45 (95% CI, 1.11–1.88, $p = 0.006$) to 3.95 (95% CI, 2.97–5.27, $p 0.001$), followed by maximal CIMT (HR 1.08; 95% CI, 1.06–1.11, $p 0.001$ to 2.58; 95% CI, 1.83–3.62, $p 0.001$) and carotid plaque presence CAC had the highest net reclassification index (11.2%), followed by carotid plaque (2%) and CIMT (3%). The authors concluded that CAC scoring is superior to carotid plaque and CIMT assessments in asymptomatic, low-to-moderate risk people. This systematic review noted the variety of ultrasound indicators employed in different articles, particularly those for CIMT, as a drawback. Furthermore, this study did not address how CIMT affects patient management and improves clinical outcomes.

Willeit et al. (2020) conducted a meta-analysis of randomized clinical trials to evaluate CIMT progression as a surrogate marker for multiple types of CVD endpoints, including myocardial infarction, stroke, revascularization procedures, and fatal CVD. The analysis included 119 RCTs involving 100,667 patients who were followed for an average of 3.7 years. A total of 12,038 patients developed the combined CVD end point. Each 10 $\mu\text{m}/\text{y}$ reduction in CIMT progression across all interventions led to a relative risk for CVD of 0.91 (0.87-0.94), and an additional relative risk for CVD of 0.92 (0.87-0.97) was reached independently of CIMT progression. The total estimated relative risks for interventions slowing CIMT progression by 10, 20, 30, or 40 $\mu\text{m}/\text{y}$ are 0.84 (0.75-0.93), 0.76 (0.67-0.85), 0.69 (0.59-0.79), or 0.63 (0.52-0.74), respectively. Results were comparable when trials were categorized by intervention type, conduct date, time to ultrasonography follow-up, availability of participant-specific data, primary versus secondary preventive trials, type of CIMT measurement, and percentage of female patients. The analysis demonstrated a statistically significant association between treatment effects on progression of CIMT and treatment effects on CVD. Results were comparable when trials were grouped by intervention type, time of conduct, time to ultrasonography follow-up, availability of participant-specific data, primary vs. secondary preventive trials, type of CIMT measurement, and proportion of female patients. The authors found that the effects of therapies on CIMT progression and on CVD risk are related, hence validating the utility of CIMT progression as a surrogate marker in clinical trials. The study had limitations, which should be noted. The type of therapeutic intervention varied across the trials included, which may have an effect on the CIMT surrogate value, and the individuals had varying comorbidities. Further, the study did not investigate how incorporating CIMT measurement into clinical care affects patient management and clinical outcomes.

Kumar et al. (2020) performed a meta-analysis to determine the relationship between CCA-IMT and stroke risk. The study included 19 studies; 16 studies involving 3475 ischemic stroke (IS) cases and 11,826 controls; 6 studies with 902 large vessel disease (LVD) and 548 small vessel diseases (SVD) of IS subtypes; 5 studies with 228 intracerebral hemorrhage (ICH) and 1032 IS cases. The authors reported that increased CCA-IMT was associated with a higher risk of IS when compared to control subjects. There was a higher risk of LVD compared to the SVD subtype of IS and a higher likelihood of IS occurrence rather than ICH. The authors found that CIMT are related to the risk of stroke and may be utilized as a diagnostic marker to predict the probability of stroke occurrences; however, to validate the findings,

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prospective research with larger sample sizes is required.

National and Specialty Organizations

The **American College of Cardiology (ACC)** and **American Heart Association (AHA)** (2019) issued an update to the 2017 guideline on the primary prevention of CVD. This guideline does not include or indicate the use of CIMT as a routine measurement in clinical practice for the prevention of CVD.

The ACC / AHA (2013) guideline on the assessment of cardiovascular risk indicates that CIMT is not recommended for routine measurement in clinical practice for risk assessment for first atherosclerotic cardiovascular disease (ASCVD) event. [Grade N: No Recommendation for or against; Level of Evidence B: Limited populations evaluated; data derived from a single randomized trial or nonrandomized studies; ACC/AHA Class III (No benefit – procedure/test not helpful)] (Goff, et al., 2014).

*The 2013 guideline contrasts with the 2010 joint guidelines for the assessment of cardiovascular risk, which suggested that CIMT could be appropriate for assessing cardiovascular risk in asymptomatic persons at moderate risk.

The **American Society of Echocardiography (ASE)** 2020 guideline *Recommendations for the Assessment of Carotid Arterial Plaque by Ultrasound for the Characterization of Atherosclerosis and Evaluation of Cardiovascular Risk* endorsed the recommendations stated in the 2008 consensus statement. Authors of the 2020 guidelines informed that "Since the largest portion of CIMT (approximately 99% in healthy individuals and approximately 80% when diseased) consists of the medial layer, CIMT has not been shown to consistently add to CVD risk prediction."

The Society for Vascular Medicine endorsed the ASE consensus statement (2008) that stated CIMT is a feature of arterial wall aging "that is not synonymous with atherosclerosis, particularly in the absence of plaque."

The statement recommended measuring both CIMT and carotid plaque via ultrasound "for refining CVD [cardiovascular disease] risk assessment in patients at intermediate cardiovascular disease risk (Framingham Risk Score 6%-20%) without established CHD [coronary heart disease], peripheral arterial disease, cerebrovascular disease, diabetes mellitus, or abdominal aortic aneurysm." However, the Society noted that "more study is required to evaluate if the enhanced risk prediction found with CIMT or carotid plaque imaging translates into improved patient outcomes."

The **United States Preventive Services Task Force (USPSTF)** (2018) issued a recommendation statement on CVD risk assessment with nontraditional risk factors; CIMT was not mentioned in this recommendation. The USPSTF Summary of Recommendation "concludes that the current evidence is insufficient to assess the balance of benefits and harms of adding the ankle-brachial index (ABI), high-sensitivity C-reactive protein (hsCRP) level, or coronary artery calcium (CAC) score to traditional risk assessment for CVD in asymptomatic adults to prevent CVD events."

The **European Society of Cardiology (ESC)** guidelines for the prevention of CVD stated the following regarding CIMT: "The lack of standardization surrounding the definition and measurement of IMT, as well as its high variability and low intra-individual repeatability, have raised concerns. A recent meta-analysis failed to establish that IMT is superior to the Framingham Risk Score in predicting future CVD, even in the intermediate risk category. The systematic use of carotid ultrasonography IMT to enhance risk assessment is therefore not advised." (Piepoli et al., 2016).

SUPPLEMENTAL INFORMATION

None.

CODING & BILLING INFORMATION

CPT Codes

CPT	Description
93895	Quantitative carotid intima media thickness and carotid atheroma evaluation, bilateral

HCPCS Codes – N/A

CODING DISCLAIMER. Codes listed in this policy are for reference purposes only and may not be all-inclusive. Deleted codes and codes which

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are not effective at the time the service is rendered may not be eligible for reimbursement. Listing of a service or device code in this policy does not guarantee coverage. Coverage is determined by the benefit document. Molina adheres to Current Procedural Terminology (CPT®), a registered trademark of the American Medical Association (AMA). All CPT codes and descriptions are copyrighted by the AMA; this information is included for informational purposes only. Providers and facilities are expected to utilize industry standard coding practices for all submissions. When improper billing and coding is not followed, Molina has the right to reject/deny the claim and recover claim payment(s). Due to changing industry practices, Molina reserves the right to revise this policy as needed.

APPROVAL HISTORY

10/12/2022	Policy revised. Updated Overview, Summary of Evidence, and References section; inclusion and summary of relevant clinical studies and professional society guidelines. IRO Peer Review. Sept 2022. Practicing, board-certified physician in the areas of Cardiovascular Disease, Interventional Cardiology.
10/13/2021	Policy reviewed, no changes to criteria, updated references.
9/18/2019, 9/16/2020	Policy reviewed, no changes.
7/10/2018	Policy reviewed, no changes to criteria, updated Summary of Medical Evidence section and references. IRO Peer Review. March 27, 2018. Practicing, board-certified physician in the areas of Cardiovascular Disease, Interventional Cardiology.
12/16/2015, 9/15/2016	Policy reviewed, no changes.
6/22/2017	Policy reviewed, no changes.
2/2/2015	New policy.

REFERENCES

Government Agencies

- Centers for Medicare and Medicaid Services (CMS). Medicare coverage database (search: <http://www.cms.gov/mcd/search.asp>. Accessed September 2022.
- United States Preventive Services Task Force (USPSTF). Cardiovascular disease: Risk assessment with nontraditional risk factors. Final Recommendation Statement. [Final Recommendation Statement](#). Updated July 10, 2018. Accessed September 2022.
- United States Preventive Services Task Force (USPSTF). Emerging risk factors for coronary heart disease: A summary of systematic reviews conducted for the U.S. Preventive Services Task Force. *Ann Intern Med*. 2009 Oct 6;151(7):496-507. doi: 10.7326/0003-4819-151-7-200910060-00010. Accessed September 2022.

Peer Reviewed Publications

- Azcui Aparicio RE, Ball J, Yiallourou S, et al. Imaging-guided evaluation of subclinical atherosclerosis to enhance cardiovascular risk prediction in asymptomatic low-to-intermediate risk individuals: A systematic review. *Prev Med*. 2021 Dec;153:106819.
- Lorenz MW, Polak JF, Kavousi M, et al. Carotid intima-media thickness progression to predict cardiovascular events in the general population (the PROG-IMT collaborative project): A meta-analysis of individual participant data. *Lancet*. 2012 Jun 2;379(9831):2053-62. doi: 10.1016/S0140-6736(12)60441-3.
- Villines T, Hsu L, Blackshear C, et al. Relation of carotid intima-media thickness to cardiovascular events in Black Americans (From the Jackson Heart Study). *Am J Cardiol*. 2017 Nov 1;120(9):1528-1532. doi: 10.1016/j.amjcard.2017.07.046. Epub 2017 Jul 31. PMID: 28844515; PMCID: PMC5640488.
- Willeit P, Tschiderer L, Allara E. Carotid intima-media thickness progression as surrogate marker for cardiovascular risk: Metaanalysis of 119 clinical trials involving 100,667 patients. *Circulation*. 2020 Aug 18;142(7):621-642. PMID: 32546049.

National and Specialty Organizations

- American College of Cardiology/American Heart Association
 - Goff DC, Lloyd-Jones DM, Bennett G, Coady S, et al. 2013 ACC/AHA guideline on the assessment of cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2014;129:S49-S73. published online November 12, 2013. PMID 24222018.
 - 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*. Dec 14 2010; 56(25): e50-103. PMID 21144964.
- American Society of Echocardiography
 - Johri AM, Nambi V, Naqvi TZ, et al. Recommendations for the assessment of carotid arterial plaque by ultrasound for the characterization of atherosclerosis and evaluation of cardiovascular risk: From the American Society of Echocardiography. *J Am Soc Echocardiogr*. Aug 2020; 33(8): 917-933. PMID 32600741.
 - Stein JH, Korcarz CE, Hurst RT, et al. Use of carotid ultrasound to identify subclinical vascular disease and evaluate cardiovascular disease risk: a consensus statement from the American Society of Echocardiography Carotid Intima-Media Thickness Task Force. Endorsed by the Society for Vascular Medicine. *J Am Soc Echocardiogr*. Feb 2008; 21(2): 93-111; quiz 189-90. PMID 18261694.
- American Heart Association (AHA).
 - Position statement on state efforts to mandate coronary arterial calcification and carotid intima media thickness screenings among asymptomatic adults. Published March 7, 2012.
 - Polak JF, Person SD, Wei GS, et al. Segment-specific associations of carotid intima-media thickness with cardiovascular risk factors: The Coronary Artery Risk Development in Young Adults (CARDIA) Study. *American Heart and Stroke Association*. *Stroke*. 2010 Jan;41(1):9-15. doi: 10.1161/STROKEAHA.109.566596.
- European Society of Cardiology (ESC). Piepoli MF, Hoes AW, Agewall S, Albus C, et al; ESC Scientific Document Group. 2016 European

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Guidelines on cardiovascular disease prevention in clinical practice: The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of 10 societies and by invited experts). Developed with the special contribution of the European Association for Cardiovascular Prevention & Rehabilitation (EACPR). Eur Heart J. 2016 Aug 1;37(29):2315-2381. doi: 10.1093/eurheartj/ehw106. Epub 2016 May 23. PMID: 27222591; PMCID: PMC4986030.

Other Peer Reviewed and Professional Organization Publications (used in the development of this policy)

1. Amato M, Montorsi P, Ravani A, Oldani E, Galli S, Ravagnani PM, et al. Carotid intima-media thickness by B-mode ultrasound as surrogate of coronary atherosclerosis: Correlation with quantitative coronary angiography and coronary intravascular ultrasound findings. Eur Heart J. 2007 Sep;28(17):2094-101.
2. Baldassarre D, Hamsten A, Veglia F, et al. Measurements of carotid intima-media thickness and of interadventitia common carotid diameter improve prediction of cardiovascular events: Results of the IMPROVE (Carotid Intima Media Thickness [IMT] and IMT-Progression as Predictors of Vascular Events in a High-Risk European Population) study. J Am Coll Cardiol. 2012 Oct 16;60(16):1489-99. doi: 10.1016/j.jacc.2012.06.034.
3. Baldassarre D, De Jong A, Amato M, Werba JP, Castelnovo S, Frigerio B, et al. Carotid intima-media thickness and markers of inflammation, endothelial damage and hemostasis. Ann Med. 2008;40(1):21-44.
4. Baldassarre D, Amato M, Pustina L, Castelnovo S, Sanvito S, Gerosa L, et al. Measurement of carotid artery intima-media thickness in dyslipidemic patients increases the power of traditional risk factors to predict cardiovascular events. Atherosclerosis. 2007 Apr;191(2):403-8. Epub 2006 May 8.
5. Bots ML, Hoes AW, Koudstaal PJ, Hofman A, Grobbee DE. Common carotid intima-media thickness and risk of stroke and myocardial infarction: The Rotterdam Study. Circulation. 1997 Sep 2;96(5):1432-7.
6. Bots ML, Groenewegen KA, Anderson TJ, Britton AR, Dekker JM, Engström G. Common carotid intima-media thickness measurements do not improve cardiovascular risk prediction in individuals with elevated blood pressure: The USE-IMT collaboration. Hypertension. 2014 Jun;63(6):1173-81.
7. Chambless LE, Heiss G, Folsom AR, et al. Association of coronary heart disease incidence with carotid arterial wall thickness and major risk factors: The Atherosclerosis Risk in Communities (ARIC) Study, 1987-1993. Am J Epidemiol. 1997 Sep 15;146(6):483-94.
8. Folsom AR, Kronmal RA, Detrano RC, O'Leary DH, Bild DE, Bluemke DA, et al. Coronary artery calcification compared with carotid intima-media thickness in the prediction of cardiovascular disease incidence: The Multi-Ethnic Study of Atherosclerosis (MESA). Arch Intern Med. 2008 Jun 23;168(12):1333-9.
9. Geisel MH, Bauer M, Hennig F, Hoffmann B, Lehmann N, Möhlenkamp S, et al.; Heinz Nixdorf Recall study. Comparison of coronary artery calcification, carotid intima-media thickness and ankle-brachial index for predicting 10-year incident cardiovascular events in the general population. Eur Heart J. 2017. Jun 14;38(23):1815-1822.
10. Gepner AD, Keevil JG, Wyman RA, Korcarz CE, Aeschlimann SE, Busse KL, Stein JH. Use of carotid intima-media thickness and vascular age to modify cardiovascular risk prediction. J Am Soc Echocardiogr. 2006 Sep;19(9):1170-4.
11. Groot E, Duivenvoorden R. Carotid intima-media thickness. Available from [UpToDate](#). Updated May 2019. Accessed August 2022. Registration and login required.
12. Hodis HN, Mack WJ, LaBree L, Selzer RH, Liu CR, Liu CH, Azen SP. The role of carotid arterial intima-media thickness in predicting clinical coronary events. Ann Intern Med. 1998 Feb 15;128(4):262-9.
13. Iglesias del Sol A, Bots ML, Grobbee DE, Hofman A, Witteman JC. Carotid intima-media thickness at different sites: relation to incident myocardial infarction: The Rotterdam Study. Eur Heart J. 2002 Jun;23(12):934-40.
14. Jain A, McClelland RL, Polak JF, Shea S, Burke GL, Bild DE, et al. Cardiovascular imaging for assessing cardiovascular risk in asymptomatic men versus women: The Multi-Ethnic Study of Atherosclerosis (MESA). Circ Cardiovasc Imaging. 2011 Jan 1;4(1):8-15.
15. Kitagawa K, Hougaku H, Yamagami H, Hashimoto H, Itoh T, Shimizu Y, OSACA2 Study Group, et al. Carotid intima-media thickness and risk of cardiovascular events in high-risk patients: Results of the Osaka Follow-Up Study for Carotid Atherosclerosis 2 (OSACA2 Study). Cerebrovasc Dis. 2007;24(1):35-42.
16. Kathiresan S, Larson MG, Keyes MJ, Polak JF, Wolf PA, D'Agostino RB, et al. Assessment by cardiovascular magnetic resonance, electron beam computed tomography, and carotid ultrasonography of the distribution of subclinical atherosclerosis across Framingham risk strata. Am J Cardiol. 2007 Feb 1;99(3):310-4.
17. Nambi V, Chambless L, Folsom AR, He M, Hu Y, Mosley T, et al. Carotid intima-media thickness and presence or absence of plaque improves prediction of coronary heart disease risk: The ARIC (Atherosclerosis Risk In Communities) study. J Am Coll Cardiol. 2010 Apr 13;55(15):1600-7.
18. Lorenz MW, Schaefer C, Steinmetz H, Sitzer M. Is carotid intima media thickness useful for individual prediction of cardiovascular risk? Ten-year results from the Carotid Atherosclerosis Progression Study (CAPS). Eur Heart J. 2010 Aug;31(16):2041-8.
19. O'Leary DH, Polak JF, Kronmal RA, Manolio TA, Burke GL, Wolfson SK Jr. Carotid-artery intima and media thickness as a risk factor for myocardial infarction and stroke in older adults. Cardiovascular Health Study Collaborative Research Group. N Engl J Med. 1999 Jan 7;340(1):14-22.
20. Polak JF, O'Leary DH. Carotid intima-media thickness as surrogate for and predictor of CVD. Glob Heart. 2016 Sep;11(3):295-312.e3. doi: 10.1016/j.gheart.2016.08.006.
21. van den Oord, SC, Sijbrands, EJ, ten Kate, GL, et al. Carotid intima-media thickness for cardiovascular risk assessment: Systematic review and meta-analysis. Atherosclerosis. 2013 May;228(1):1-11. doi: 10.1016/j.atherosclerosis.2013.01.025.

APPENDIX

Reserved for State specific information. Information includes, but is not limited to, State contract language, Medicaid criteria and other mandated criteria.

OHIO MEDICAID: Molina Ohio Medicaid will not exclude code 93895 and request will be reviewed for medical necessity on an individual basis.

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