Clinical Policy Title: Ambulatory blood pressure monitoring

Clinical Policy Number: 04.01.03

Effective Date: October 1, 2014
Initial Review Date: May 21, 2014
Most Recent Review Date: April 10, 2018
Next Review Date: April 2019

Related policies:

CP# 04.01.05 Implantable cardiac loop recorder
CP# 04.01.01 Real-time outpatient cardiac monitoring

ABOUT THIS POLICY: AmeriHealth Caritas has developed clinical policies to assist with making coverage determinations. AmeriHealth Caritas’ clinical policies are based on guidelines from established industry sources, such as the Centers for Medicare & Medicaid Services (CMS), state regulatory agencies, the American Medical Association (AMA), medical specialty professional societies, and peer-reviewed professional literature. These clinical policies along with other sources, such as plan benefits and state and federal laws and regulatory requirements, including any state- or plan-specific definition of “medically necessary,” and the specific facts of the particular situation are considered by AmeriHealth Caritas when making coverage determinations. In the event of conflict between this clinical policy and plan benefits and/or state or federal laws and/or regulatory requirements, the plan benefits and/or state and federal laws and/or regulatory requirements shall control. AmeriHealth Caritas’ clinical policies are for informational purposes only and not intended as medical advice or to direct treatment. Physicians and other health care providers are solely responsible for the treatment decisions for their patients. AmeriHealth Caritas’ clinical policies are reflective of evidence-based medicine at the time of review. As medical science evolves, AmeriHealth Caritas will update its clinical policies as necessary. AmeriHealth Caritas’ clinical policies are not guarantees of payment.

Coverage policy

AmeriHealth Caritas considers the use of 24-hour ambulatory blood pressure monitoring to be clinically proven and, therefore, medically necessary to assist in the diagnosis of hypertension in adult members for the following indications (Whelton, 2017):

- Suspected white coat hypertension with a systolic blood pressure >130 mm Hg but <160 mm Hg or diastolic blood pressure >80 mm Hg but <100 mm Hg.
- Treated hypertension with office readings not at goal and home blood pressure monitoring suggests significant white coat effect.
- Treated hypertension with multiple drug therapies and office blood pressure within 10 mm Hg above goal.
- Known white coat hypertension:
  - Periodic monitoring to detect conversion to sustained hypertension.
- Suspected masked hypertension:
- Office blood pressure consistently between 120-129 mm Hg/75-79 mm Hg in untreated members.

- Suspected masked uncontrolled (treated) hypertension and either:
  - Elevated home blood pressure readings prior to intensification of antihypertensive drug treatment.
  - Presence of target organ damage or increased overall cardiovascular disease risk and office readings at goal.

AmeriHealth Caritas considers the use of 24-hour ambulatory blood pressure monitoring to be clinically proven and, therefore, medically necessary to assist in the diagnosis of hypertension in pediatric members, using monitors that have been validated in a pediatric population and apply pediatric normative data, for any of the following clinical indications (Flynn, 2017):

- To confirm hypertension when office blood pressure measurements are at:
  - Elevated blood pressure category for 1 year or more, defined as: in children ages 1 to 13 years, in ≥90th percentile to <95th percentile or 120/80 mm Hg to <95th percentile (whichever is lower); in children ages 13 years or older, 120/<80 mm Hg to 129/<80 mm Hg.
  - Stage 1 hypertension defined as: in children ages 1 to 13 years, ≥95th percentile to <95th percentile + 12 mmHg, or 130/80 mm Hg to 139/89 mm Hg (whichever is lower); in children ages 13 years or older, 130/80 mm Hg to 139/89 mm Hg.
  - Stage 2 hypertension after one week, defined as: in children ages 1 to 13 years, ≥95th percentile + 12 mm Hg, or ≥140/90 mm Hg (whichever is lower); in children ages 13 years or older, ≥140/90 mm Hg.

- To confirm treatment effectiveness.

- To diagnose suspected white coat hypertension.

- To routinely assess hypertension severity and determine the presence of abnormal circadian blood pressure patterns in the presence of high-risk conditions, including, but not limited to:
  - Secondary hypertension.
  - Chronic kidney disease or renal abnormalities.
  - Type 1 and type 2 diabetes mellitus.
  - Solid organ transplantation.
  - Obesity.
  - Known or suspected obstructive sleep apnea syndrome.
  - Repaired aortic coarctation.
  - Genetic syndromes associated with hypertension (e.g., neurofibromatosis, Turner syndrome, Williams syndrome, or aortic coarctation).
  - Prematurity.

For Medicare members only:
AmeriHealth Caritas considers the use of ambulatory blood pressure monitoring to be medically necessary for patients with suspected white coat hypertension who meet all of the following criteria (Medicare National Coverage Determination 20.19):

- Office blood pressure >140/90 mm Hg on at least three separate clinic or office visits with two separate measurements made at each visit.
- At least two documented blood pressure measurements taken outside the office that are <140/90 mm Hg.
- No evidence of end-organ damage.

**Limitations:**

All other uses of ambulatory blood pressure monitoring are not medically necessary.

The following quality criteria for ambulatory blood pressure monitoring must be met:

- Monitoring is performed for at least 24 hours.
- Automatic readings are set at ≤30-minute intervals.
- Monitoring is performed using a U.S. Food and Drug Administration-approved device that has been validated according to international, standardized protocols prior to use.

Repeat ambulatory blood pressure monitoring may be obtained if the first examination has less than 70 percent of the expected values due to a high number of artifacts.

Routine repeat ambulatory blood pressure monitoring is not clinically proven and, therefore, not medically necessary.

In a circumstance when ambulatory blood pressure monitoring needs to be performed more than once on a patient, the medical necessity and quality criteria described above must be met for each subsequent test.

**Alternative covered services:**

- Office or clinic blood pressure measurement.
- Home blood pressure measurement.

**Background**

According to the Centers for Disease Control and Prevention (2016), approximately one of every three adults in the United States has hypertension, and only half of them have their blood pressure under control. Among U.S. children, the prevalence of hypertension is 1.1 percent (Ma, 2016). Primary (essential) hypertension is now identifiable in children and adolescents and is often associated with a positive family history of hypertension or cardiovascular disease, obesity, and lifestyle factors (Flynn, 2017).

Hypertension is classified as follows (systolic/diastolic blood pressure) (Whelton, 2017):

- Normal: <120 mm Hg/<80 mm Hg.
• Elevated hypertension: 120 – 139 mm Hg/<80 mm Hg.
• Stage 1 hypertension: 130 – 139 mm Hg/80 – 89 mm Hg.
• Stage 2 hypertension: ≥140 mm Hg/≥90 mm Hg.

Accurate blood pressure measurement is essential to correctly classify individuals, ascertain blood pressure-related risk, and guide management. To date, office blood pressure measurements define the relationship between blood pressure and risk, but are subject to fluctuations and phenomena such as white coat hypertension or masked hypertension (Pickering, 2005). Therefore, a diagnosis of white coat hypertension or masked hypertension requires repeated measurements to minimize misclassification of individuals as hypertensive or normotensive (Pickering, 2005).

**Ambulatory blood pressure monitoring:**

Ambulatory blood pressure monitoring is a noninvasive method of obtaining multiple blood pressure readings at regular intervals over a 24-hour (or sometimes 48-hour) period in the person’s own living environment. The rationale for its use within carefully selected populations is to provide more precise and accurate blood pressure data that will lead to improved care management and patient outcomes. The purported clinical advantages are to (Pickering, 2005):

• Detect lower blood pressure (white coat hypertension) or higher blood pressure (masked hypertension) out-of-office compared to in-office measurement.
• Determine the presence or absence of normal nocturnal dipping status (i.e., decreases in an individual’s blood pressure during nighttime hours or when sleeping).
• Assess the adequacy of blood pressure control in persons taking complex antihypertensive medication regimens.
• Provide detailed information on blood pressure patterns in persons with episodic hypertension, chronic kidney disease, diabetes, and autonomic dysfunction.
• Identify persons with apparently refractory hypertension but relatively little to no target organ damage.
• Confirm hypertension in patients in whom there is a large discrepancy between clinic and home blood pressure measurements.

Table 1 illustrates the lack of consensus among guidelines regarding the definition of hypertension in adult populations according to ambulatory blood pressure monitoring. Instead, guidelines use thresholds based on a definition of hypertension (blood pressure >140/90 mm Hg) obtained in an office setting from clinical trials that examined the benefits of treating hypertension. Less robust data exist to support treatment guidelines using ambulatory blood pressure monitoring (Meyers, 2011).

**Table 1. Diagnostic thresholds for hypertension using ambulatory blood pressure monitoring in adults**
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<tbody>
<tr>
<td>24-hour</td>
<td>≥135/80</td>
<td>&gt;130/80</td>
<td>≥130/80</td>
<td>≥130/80</td>
<td>≥130/80</td>
</tr>
<tr>
<td>Daytime</td>
<td>≥140/85</td>
<td>&gt;135/85</td>
<td>≥135/85</td>
<td>≥135/85</td>
<td>≥135/85</td>
</tr>
<tr>
<td>Nighttime</td>
<td>≥130/75</td>
<td>&gt;120/70</td>
<td></td>
<td></td>
<td>≥120/70</td>
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</table>

In the United States, several ambulatory blood pressure monitoring monitors have been cleared for marketing via the 510(k) process (U.S. Food and Drug Administration, 2018). However, monitors that have not undergone validation testing or U.S. Food and Drug Administration clearance can also be sold in the United States, and few have been formally validated in children (Flynn, 2017).

**Searches**

AmeriHealth Caritas searched PubMed and the databases of:
- UK National Health Services Centre for Reviews and Dissemination.
- Agency for Healthcare Research and Quality’s Guideline Clearinghouse and other evidence-based practice centers.
- The Centers for Medicare & Medicaid Services (CMS).

We conducted searches on February 26, 2018. Search terms were: “blood pressure monitoring, ambulatory” (MeSH) and “hypertension/diagnosis” (MeSH).

We included:
- **Systematic reviews**, which pool results from multiple studies to achieve larger sample sizes and greater precision of effect estimation than in smaller primary studies. Systematic reviews use predetermined transparent methods to minimize bias, effectively treating the review as a scientific endeavor, and are thus rated highest in evidence-grading hierarchies.
- **Guidelines based on systematic reviews**.
- **Economic analyses**, such as cost-effectiveness, and benefit or utility studies (but not simple cost studies), reporting both costs and outcomes — sometimes referred to as efficiency studies — which also rank near the top of evidence hierarchies.

**Findings**

For this policy, we included only studies published since 2000 to reflect the most current research in the U.S. context. AmeriHealth Caritas identified six systematic reviews and one health technology assessment that addressed the diagnostic accuracy, prognostic value, and cost-effectiveness of ambulatory blood
pressure monitoring in managing adults with hypertension. No systematic reviews addressed ambulatory blood pressure monitoring in pediatric populations. The overall quality of the evidence comparing ambulatory blood pressure monitoring to clinic blood pressure measurement or home blood pressure measurement consisted of three randomized controlled trials, multiple cross-sectional studies, and multiple prospective observational studies of generally poor to moderate quality. Heterogeneity in study designs limited comparison of results across studies.

There is sufficient evidence to support the safety, efficacy, and cost-effectiveness of ambulatory blood pressure monitoring to confirm the presence or absence of white coat hypertension in persons with elevated blood pressure measured by office-based screening. More recent evidence-based guidelines are notably consistent in defining suspected white coat hypertension as >140/90 mm Hg in the clinic and <135/85 mm Hg outside the clinic (Canadian Hypertension Education Program, 2014; Mancia, 2013; National Institute for Health and Care Excellence, 2011).

Evidence suggests an association between white coat hypertension and intermediate harmful health outcomes (left ventricular hypertrophy, nephropathy, and retinopathy) in persons with normal blood pressure and persons with sustained hypertension. Therefore, white coat hypertension may not necessarily be a benign condition. Patients with white coat hypertension should be identified for close monitoring and instituting lifestyle improvements early, where necessary. Additional research is needed to better define white coat hypertension and low-risk patients. Insufficient evidence exists to support other routine uses of ambulatory blood pressure monitoring in persons with hypertension.

Policy updates:

AmeriHealth Caritas identified one additional systematic review for the United States Preventive Services Task Force that updated a 2007 systematic review on the benefits and harms of screening for hypertension in adults and summarized evidence on rescreening intervals and diagnostic and predictive accuracy for cardiovascular events of different blood pressure methods (Piper, 2015). The United States Preventive Services Task Force and the Canadian Hypertension Education Program now recommend using ambulatory blood pressure monitoring to confirm initially elevated blood pressure measured by office-based screening methods to avoid potential over-diagnosis of isolated clinic hypertension and harms of unnecessary treatment (Siu, 2015; Cloutier, 2015). These results do not change earlier findings; therefore, no changes to the current policy are warranted.

Current guidelines acknowledge the diagnostic superiority of 24-hour ambulatory blood pressure monitoring for its ability to identify sustained hypertension by excluding white coat hypertension, identifying the presence of episodic or masked hypertension, and providing additional prognostic information from nocturnal patterns of blood pressure (O’Brien, 2016; Flynn, 2014, updated 2017). Given the known risks associated with inadequately controlled hypertension, ambulatory blood pressure monitoring may be beneficial when longer measurement periods are needed to diagnose hypertension phenotypes to determine an appropriate diagnosis, and the information would alter care management. There remains a lack of consensus on the best method for identifying individuals who would most likely
benefit from ambulatory blood pressure monitoring screening for conditions other than white coat hypertension.

The use of ambulatory blood pressure monitoring for diagnosing masked hypertension warrants further consideration, as a significant portion of untreated and treated persons with non-elevated clinic blood pressure have masked hypertension and abnormal nocturnal blood pressure profiles (Thomas, 2017; Wang, 2017). Masked hypertension and nocturnal blood pressure fall patterns are associated with significantly higher risk of cardiovascular events (Salles, 2016; Ohkubo, 2005). Nocturnal hypertension and non-dipping may be early markers of masked hypertension (Franklin, 2016; O’Brien, 2016).

Several indices have been developed to identify candidates for ambulatory blood pressure monitoring who have normal office blood pressure, but they require further validation before routine clinical use (Booth, 2016; Schwartz, 2016; Sheppard, 2016). Current evidence suggests that masked hypertension and masked uncontrolled hypertension are more likely in individuals of African descent, with increased cardiovascular risk and disease states (e.g., diabetes, chronic renal failure, and metabolic syndrome), older persons, males, shortened sleep time, and obstructive sleep apnea (Colantonio, 2017; Thomas, 2017; Wang, 2017; Franklin, 2016). Persons with prehypertension are more likely to have masked hypertension than those with optimal blood pressure and frequently develop target organ damage prior to transitioning to sustained hypertension (Colantonio, 2017; Franklin, 2016).

It is reasonable to apply ambulatory blood pressure monitoring to individuals with normal or elevated (prehypertensive) casual measurements when there is a clinical suspicion of hypertension (e.g., presence of left ventricular hypertrophy) to minimize misclassification of such individuals as normotensive or with controlled hypertension.

In 2018, we added longitudinal data from the Jackson Heart Study (Ravenell, 2017) and updated guidelines from the American Academy of Pediatrics (Flynn, 2017), the American College of Cardiology/American Heart Association (Whelton, 2017), and Canadian Hypertension Education Program (Leung, 2017). Few data have established thresholds for ambulatory hypertension based on U.S. populations. Ravenell et al provides new information derived from an African American population, and both guidelines incorporate updated definitions of ambulatory hypertension while pointing out the need for practitioners to interpret these values in the context of their own patient populations (Ravenell [2017], Whelton [2017], and Leung [2017] added to Table 1; Flynn [2017] in Table 2). The guidelines expand the roles for ambulatory blood pressure monitoring, and the policy was modified to reflect these new changes.

Table 2. American Academy of Pediatrics updated definitions of pediatric blood pressure categories and stages

<table>
<thead>
<tr>
<th>Blood pressure</th>
<th>For children ages 1 – 13 years</th>
<th>For children ages ≥13 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;90th percentile</td>
<td>&lt;120/&lt;80 mm Hg</td>
</tr>
<tr>
<td>Elevated (formerly “prehypertensive”)</td>
<td>≥90th percentile to &lt;95th percentile or 120/80 mm Hg to &lt;95th percentile (whichever is lower)</td>
<td>120 to 129 mm Hg/&lt;80 mm Hg</td>
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Blood pressure

<table>
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<th>Blood pressure</th>
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<th>For children ages ≥13 years</th>
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</thead>
<tbody>
<tr>
<td>Stage 1 hypertension</td>
<td>≥95th percentile to &lt;95th percentile + 12 mmHg or 130/80 to 139/89 mm Hg (whichever is lower)</td>
<td>130/80 to 139/89 mm Hg</td>
</tr>
<tr>
<td>Stage 2 hypertension</td>
<td>≥95th percentile + 12 mm Hg or ≥140/90 mm Hg (whichever is lower)</td>
<td>≥140/90 mm Hg</td>
</tr>
</tbody>
</table>


Summary of clinical evidence:

<table>
<thead>
<tr>
<th>Citation</th>
<th>Content, Methods, Recommendations</th>
<th>Key points:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colantonio (2017), Ravenell (2017), Thomas (2017), and Bromfield (2016) for the Jackson Heart Study</td>
<td>Longitudinal study of exclusively African American cohort (5,306 total men and women) 20 years and older recruited between 2000 and 2004 from the Jackson, Mississippi, metropolitan area.</td>
<td>● Prevalence of daytime hypertension &gt; clinic hypertension for those not taking antihypertensives (31.8% versus 14.3%) and taking antihypertensives (43.0% versus 23.1%). ● Percentage of participants not taking and taking antihypertensives with nocturnal hypertension (49.4% and 61.7%, respectively), white coat hypertension (30.2% and 29.3%, respectively), masked hypertension (25.4% and 34.6%, respectively), and non-dipping pattern (62.4% and 69.6%, respectively) (Thomas, 2017). ● Clinic blood pressure 130-139/85-89 mm Hg was associated with masked hypertension (prevalence ratio, 1.90; 95% confidence interval [CI], 1.56 to 2.32), but not other metabolic syndrome components (abdominal obesity, impaired glucose, low high-density lipoprotein cholesterol, high triglycerides) (Colantionio, 2017). ● Better cardiovascular health is associated with a lower prevalence of masked hypertension (Bromfield, 2016). ● The following definitions that correspond to clinic blood pressure ≥ 140/90 mm Hg are proposed for African American adults: daytime ≥ 140/85 mm Hg; 24-hour ≥ 135/80 mm Hg, and nighttime ≥ 130/75 mm Hg (Ravenell, 2018).</td>
</tr>
<tr>
<td>Flynn (2017) for the American Academy of Pediatrics Clinical practice guideline for screening and management of high blood pressure in children and adolescents</td>
<td>Ambulatory blood pressure monitoring is more accurate for diagnosing hypertension than clinic-measured blood pressure, is more predictive of future blood pressure, and can assist in the detection of secondary hypertension.</td>
<td>● Ambulatory blood pressure monitoring to confirm hypertension with elevated office readings, to detect suspected white coat hypertension, and to assess hypertension severity in the presence of high-risk conditions. ● Recommend using a standardized approach with monitors that have been validated in a pediatric population, and use pediatric normative data to interpret studies.</td>
</tr>
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<td>Leung (2017) for the Canadian Hypertension Education Program Hypertension Canada’s 2017 guidelines for</td>
<td>Ambulatory blood pressure monitoring should be considered when an office-induced increase in blood pressure is suspected in treated patients with:</td>
<td>● Blood pressure not below target despite receiving appropriate chronic antihypertensive therapy (Grade C);</td>
</tr>
<tr>
<td>Citation</td>
<td>Content, Methods, Recommendations</td>
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<tr>
<td>diagnosis, risk assessment, prevention, and treatment of hypertension in adults</td>
<td>• Symptoms suggestive of hypotension (Grade C); • Fluctuating office blood pressure readings (Grade D).</td>
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</tr>
<tr>
<td>Whelton (2017) for the American College of Cardiology/American Heart Association Guideline for the prevention, detection, evaluation, and management of high blood pressure in adults</td>
<td><strong>Key points:</strong> • Ambulatory blood pressure monitoring complements office and home measurement to correctly identify masked hypertension, white coat hypertension, and sustained hypertension, and base treatment accordingly.</td>
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<tr>
<td>O’Brien (2016) Ambulatory blood pressure monitoring for drug treatment management</td>
<td><strong>Key points:</strong> • Evidence review and summary of three international guidelines: United States Preventive Services Task Force (Sui, 2015); National Institute for Health and Care Excellence (2011); European Society of Hypertension (O’Brien, 2013). • Current guidelines emphasize diagnostic superiority of ambulatory blood pressure monitoring to identify white coat hypertension and masked hypertension. • Ambulatory blood pressure monitoring offers diagnostic insights into nocturnal blood pressure patterns and presence of nocturnal hypertension. • Less emphasis on nocturnal blood pressure patterns in guidelines, but they are relevant in assessing treatment response. • Scant recommendations from any guideline on the benefits and use of ambulatory blood pressure monitoring for initiating antihypertensives or assessing treatment efficacy.</td>
<td></td>
</tr>
<tr>
<td>Siu (2015) for the United States Preventive Services Task Force Screening for hypertension in adults</td>
<td><strong>Key points:</strong> • Recommends screening for hypertension in adults ages 18 years and older without known hypertension. • Recommends obtaining measurements outside of the clinical setting for diagnostic confirmation before starting treatment. • Recommends ambulatory blood pressure monitoring as the reference standard for confirming the diagnosis of hypertension; home blood pressure monitoring is an alternative if ambulatory blood pressure monitoring is not available. • Screening intervals: – Annually for adults ages ≥ 40 years and for those who are at increased risk for hypertension. Risk factors for hypertension include high-normal blood pressure (130 to 139/85 to 89 mm Hg), overweight or obesity, and African Americans. – Every three to five years for adults ages 18 to 39 years with normal blood pressure (&lt; 130/85 mm Hg) who do not have other risk factors.</td>
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<tr>
<td>Piper (2015) for Agency for Healthcare Research and Quality Screening for high</td>
<td><strong>Key points:</strong> • Systematic review of multiple studies, including 11 studies (8,458 total participants) of the predictive value of ambulatory blood pressure monitoring methods for long-term cardiovascular events, after adjustment for office-based blood pressure measurement.</td>
<td></td>
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<tr>
<td>Citation</td>
<td>Content, Methods, Recommendations</td>
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| blood pressure in adults, rescreening intervals, and diagnostic/predictive accuracy of blood pressure methods for cardiovascular events |  - Overall quality: fair to good.  
- Ambulatory blood pressure monitoring predicted long-term cardiovascular outcomes independently of office blood pressure (hazard ratio [HR] range, 1.28 to 1.40).  
- Persons with blood pressure in the high-normal range, older persons, those with an above-normal body mass index and African Americans are at higher risk for hypertension on rescreening within six years than are persons without these risk factors.  
- For patients who undergo ambulatory blood pressure monitoring and have an ambulatory blood pressure < 135/85 mm Hg with no evidence of end-organ damage, their cardiovascular risk is likely similar to that of normotensives. |
| Health Quality Ontario (2012) Ambulatory blood pressure monitoring versus clinic blood pressure in persons with uncomplicated hypertension | Key points:  
- Systematic review of three large randomized controlled trial (1,882 total patients) comparing ambulatory blood pressure monitoring to clinic blood pressure in persons with uncomplicated hypertension.  
- Overall quality: very low to moderate and conflicting.  
- Incorporating ambulatory blood pressure monitoring in the diagnostic algorithm for persons with uncomplicated hypertension arterial results in lower and less intensive antihypertensive medication consumption and improved blood pressure control.  
- Over the long term, patients managed with ambulatory blood pressure monitoring had fewer fatal and non-fatal cardiovascular events (relative risk [RR] 1.76, 95% CI 1.03 to 3.02), but conventionally managed patients were more likely to have control of blood pressure (RR 0.90, 95% CI 0.81 to 0.99). No difference between groups in the number of patients who began multi-drug therapy or risk for a drug-related adverse event. |
| Health Quality Ontario (2012) Cost-effectiveness analysis of conventional blood pressure monitoring versus ambulatory blood pressure monitoring | Key points:  
- A systematic review of two economic evaluations and one primary study compared conventional and ambulatory monitoring for uncomplicated hypertension. Overall quality: variable.  
- One U.S. study reported savings for diagnosis and treatment with ambulatory blood pressure monitoring ranging from $85,000 to $153,000 per 1,000 patients based on 20% and 5% of patients with white coat hypertension confirmed to be hypertensive, respectively (Krakoff, 2006).  
- One U.K. study reported incremental cost-effectiveness ratios (ICER) of £3,000 to £26,000 per quality-adjusted life-year (QALY) for ambulatory blood pressure monitoring versus conventional monitoring (Lovibond, 2011).  
- Canadian perspective: ambulatory blood pressure monitoring would save the health system $19 million (Cdn) over five years, with a borderline dominant effect (ICER: $30 per QALY). |

**References**

**Professional society guidelines/other:**


Peer-reviewed references:


**CMS National Coverage Determinations (NCDs):**

20.19 Ambulatory Blood Pressure Monitoring.

**Local Coverage Determinations (LCDs):**

No LCDs identified as of the writing of this policy.

**Commonly submitted codes**

Below are the most commonly submitted codes for the service(s)/item(s) subject to this policy. This is not an exhaustive list of codes. Providers are expected to consult the appropriate coding manuals and bill accordingly.

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>93784</td>
<td>Ambulatory blood pressure monitoring, utilizing a system such as magnetic tape and/or computer disk, for 24 hours or longer; including recording, scanning analysis, interpretation and report.</td>
<td></td>
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<tr>
<td>93786</td>
<td>Ambulatory blood pressure monitoring, utilizing a system such as magnetic tape and/or computer disk, for 24 hours or longer; recording only.</td>
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<tr>
<td>93788</td>
<td>Ambulatory blood pressure monitoring, utilizing a system such as magnetic tape and/or computer disk, for 24 hours or longer; scanning analysis with report.</td>
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<tr>
<td>93790</td>
<td>Ambulatory blood pressure monitoring, utilizing a system such as magnetic tape and/or computer disk, for 24 hours or longer; review with interpretation and report.</td>
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<table>
<thead>
<tr>
<th>ICD-10 Code</th>
<th>Description</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>R03.0</td>
<td>Elevated blood pressure reading without diagnosis of hypertension.</td>
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<table>
<thead>
<tr>
<th>HCPCS Level II Code</th>
<th>Description</th>
<th>Comment</th>
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<tbody>
<tr>
<td>N/A</td>
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