



CIGNA MEDICAL COVERAGE POLICY

The following Coverage Policy applies to all plans administered by CIGNA Companies including plans administered by Great-West Healthcare, which is now a part of CIGNA.

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Subject **Cardiac Event Monitors**

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Hyperlink to Related Coverage Policies

Telemedicine
Tilt Table Testing

INSTRUCTIONS FOR USE

Coverage Policies are intended to provide guidance in interpreting certain **standard** CIGNA HealthCare benefit plans. Please note, the terms of a customer's particular benefit plan document [Group Service Agreement (GSA), Evidence of Coverage, Certificate of Coverage, Summary Plan Description (SPD) or similar plan document] may differ significantly from the standard benefit plans upon which these Coverage Policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a Coverage Policy. In the event of a conflict, a customer's benefit plan document **always supercedes** the information in the Coverage Policies. In the absence of a controlling federal or state coverage mandate, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of 1) the terms of the applicable benefit plan document in effect on the date of service; 2) any applicable laws/regulations; 3) any relevant collateral source materials including Coverage Policies and; 4) the specific facts of the particular situation. Coverage Policies relate exclusively to the administration of health benefit plans. Coverage Policies are not recommendations for treatment and should never be used as treatment guidelines. Proprietary information of CIGNA. Copyright ©2011 CIGNA

Coverage Policy

CIGNA covers the use of a 24- to 48-hour continuous external unattended cardiac monitoring device (e.g., Holter monitor™ [HM]) (Current Procedural Terminology [CPT] code 93224, 93225, 93226, 93227) as medically necessary for ANY of the following indications:

- as a diagnostic tool to evaluate symptoms suggestive of cardiac arrhythmias (e.g., frequent palpitations, unexplained dizziness, or syncope)
- assessment of pacemaker or implantable cardioverter defibrillator (ICD) function for **ANY** of the following:
 - frequent symptoms of palpitation, syncope, or near syncope
 - suspected component failure or malfunction
 - assessment of response to drug therapy in an individual with an ICD
- assessment of potential myocardial ischemia in suspected variant angina or known coronary artery disease when such information will impact management
- assessment of antiarrhythmic drug therapy in an individual with a treated arrhythmia
- child with **ANY** of the following:
 - hypertrophic or dilated cardiomyopathy
 - possible long QT syndrome

- congenital heart disease accompanied by a significant residual hemodynamic abnormality when surgery is being considered
- assessment of the adequacy of antiarrhythmic therapy during rapid growth
- asymptomatic non-paced congenital complete atrioventricular (AV) block

CIGNA covers the use of an external loop recorder (CPT code 93268, 93270, 93271, 93272) as medically necessary for the identification of a suspected cardiac arrhythmia despite normal findings on ambulatory electrocardiography (AECG).

CIGNA covers the use of an implantable loop recorder (CPT code 33282, 33284, 93285, 93291, 93297, 93298, 93299, C1764, E0616) as medically necessary for the evaluation of recurrent unexplained episodes of fainting when ALL of the following criteria are met:

- cardiac arrhythmia is suspected to be the cause of fainting
- noninvasive ambulatory monitoring failed to establish a definitive diagnosis because the symptoms occur so infrequently and unpredictably that the length of the monitoring period may have been inadequate to capture a diagnostic electrocardiogram (ECG) rhythm disorder
- tilt-table testing is negative or nondiagnostic

CIGNA covers an external home-based, real-time continuous attended cardiac monitoring system (CPT code 93228, 93299) as medically necessary when ALL of the following criteria are met:

- clinical suspicion of a significant arrhythmia
- symptoms of syncope, presyncope, or severe palpitations occurring less frequently than once per 24 hours are present
- non-diagnostic 24-hour Holter or non-real-time monitoring (e.g., event monitor, pacemaker telephonic telemetry, post-symptom patient-activated recorder or auto-trigger) within 45 days prior to consideration of the use of a home-based, real-time continuous attended cardiac monitoring system

General Background

Cardiac arrhythmias or abnormal heartbeats represent a major source of morbidity and mortality among patients with cardiovascular disease. While some patients with arrhythmias may experience palpitations, weakness, dizziness, or syncope, other patients may have no symptoms at all. Some arrhythmias pose a significant health threat and require prompt treatment. Treatments for arrhythmias include medical therapy, artificial pacemakers, implanted cardiac defibrillators, and ablation of malfunctioning cardiac tissue. Effective treatment of arrhythmias requires an early diagnosis. This can be difficult, since arrhythmias can occur infrequently and unpredictably and may be asymptomatic. Therefore, devices that monitor a patient's heartbeat for an extended period of time and can automatically detect certain arrhythmias are desirable (ECRI, 2010).

Remote cardiac monitoring technologies allow home ECG monitoring of patients with suspected cardiac arrhythmias or at risk for developing arrhythmias. This is also referred to as ambulatory electrocardiography (AECG). Because certain abnormalities may occur only during sleep or with mental, emotional, or exercise-induced changes in cardiac oxygenation or function, an ECG may need to be recorded over long periods of time. AECG has proven to be useful for the diagnosis and management of patients at high risk for life-threatening cardiac arrhythmias (Agency for Healthcare Research and Quality [AHRQ], 2007; Hammill, 2007; Kadish, et al., 2001).

The categories of remote cardiac monitoring technologies include (AHRQ, 2007):

- continuous external unattended cardiac monitoring device (e.g., Holter monitoring™ [HM])
- patient- or event-activated devices
 - externally-worn presymptom memory loop recorders (attended and unattended)
 - implantable/insertable presymptom memory loop recorders (attended and unattended)
 - post-symptom patient activated recorders

- real-time continuous attended cardiac monitoring systems

Continuous External Unattended Cardiac Monitoring Device (HM): The most common device used is called a Holter monitor™ (HM). The recording device of an HM is worn on a strap at the waist or over the shoulder. The electrical signals of the heart are picked up by two electrodes attached to the chest, and these are connected to the recorder by wires. HM generally provides a continuous 24- to 48-hour record of the electrical signals from the heart. While wearing the HM, the individual keeps a diary of all activities and symptoms. The data is computer analyzed and interpreted by a physician at a later time (Olgin, 2007; Noble, et al., 2004).

The American College of Cardiology/American Heart Association (ACC/AHA) practice guidelines for ambulatory electrocardiography (AECG) state there are two categories of AECG recorders: continuous and intermittent recorders. The authors assigned their highest level (i.e., Class I) of evidence to the following indications for AECG (Crawford, et al., 1999). There have been no updates to these guidelines since 1999:

- to assess symptoms possibly related to rhythm disturbances
 - patients with unexplained syncope, near syncope, or episodic dizziness in whom the cause is not obvious; patients with unexplained recurrent palpitations
- to assess antiarrhythmic therapy:
 - to assess antiarrhythmic drug response in individuals in whom baseline frequency of arrhythmia has been characterized as reproducible and sufficient to permit analysis
- to assess pacemaker and implantable cardioverter defibrillator (ICD) function:
 - evaluation of frequent symptoms of palpitation, syncope, or near syncope to assess device function to exclude myopotential inhibition and pacemaker-mediated tachycardia, and to assist in the programming of enhanced features such as rate responsiveness and automatic switching
 - evaluation of suspected component failure or malfunction when device interrogation is not definitive in establishing a diagnosis
 - to assess the response to adjunctive pharmacological therapy in patients receiving frequent ICD therapy
- for ischemic monitoring:
 - patients with suspected variant angina
- for pediatric patients:
 - syncope, near syncope, or dizziness in patients with recognized cardiac disease, previously documented arrhythmia, or pacemaker dependency
 - syncope or near syncope associated with exertion when the cause is not established by other methods
 - evaluation of patients with hypertrophic or dilated cardiomyopathies
 - evaluation of possible or documented long QT syndromes
 - palpitation in the patient with prior surgery for congenital heart disease and significant residual hemodynamic abnormalities
 - evaluation of antiarrhythmic drug efficacy during rapid somatic growth
 - asymptomatic congenital complete atrioventricular (AV) block, nonpaced

Patient or Event Recorders (Loop Recorders): The patient or event recorders can be used for a longer time (i.e., 30 days) than a HM and is more likely to record infrequent abnormal heart rhythms. The information collected by a patient or event recorder can be sent over the phone to a doctor's office, clinic, or hospital. The advantage of event recorders over the continuous ambulatory systems is that the ECG is more likely to be

obtained while the patient is experiencing clinical symptoms, therefore allowing a direct correlation between the patient's symptoms and the ECG recorded at that instant (Miller, et al., 2011; AHRQ, 2007; Hammill, 2007; Noble, et al., 2004). Examples of patient or event recorders include:

- Externally-worn presymptom memory loop recorders (attended and unattended): This is a small device that attaches to the chest with electrodes. The standard external loop recorder records several minutes of activity at a time and then starts over, a process referred to as memory loop recording. The patient activates this device to record when a symptom occurs and then data from the device is typically transmitted to a monitoring center for immediate review. This process is repeated whenever symptoms occur over a period of 20–30 days (which is the typical amount of time the device is worn by the patient). Since the data that are recorded by the device are typically associated with a symptom, a physician can also determine whether that symptom is a result of a cardiac arrhythmia. However, due to the need for the patient to signal an event, the standard cardiac event monitor typically only captures events associated with a patient's symptoms and not those events that are asymptomatic.

The auto-trigger external loop recorder also memory loop records, capturing several minutes of heart activity at a time before starting over. In addition, the auto-trigger external loop recorder uses systems to automatically detect events that may not be associated with a patient experiencing symptoms. Unlike a standard external loop recorder, an auto-trigger external loop recorder does not rely on the patient's ability to activate it and, as a result, is able to capture asymptomatic events in addition to symptomatic ones. However, the auto-trigger device still relies on the patient to call in and transmit the event by reaching the physician or a technician at a physician's office or a monitoring center and holding the cardiac event monitor up to a telephone to transmit the event data.

- Implantable/insertable presymptom memory loop recorders (attended and unattended). An implantable or insertable memory loop recorder (ILR) is inserted under the patient's skin at about the second rib on the left front of the chest and is activated by passing a special magnet over the device. The main difference between the ILR and the external loop recorders is that the ILR can be used for a much longer time period. Current models are capable of recording from 14–20 months before being surgically removed. It is capable of recording up to 42 minutes of a single ECG channel that can be partitioned for one to seven episodes, with up to 20 minutes of preactivation ECG saved for subsequent downloading to a programming unit for analysis. The device can be configured to store patient-activated, automatically activated recordings (e.g., heart rate outside preset parameters), or a combination of these. The ILR is used when syncope is infrequently detected by either an HM or a 30-day event recorder.
- Post-symptom patient-activated recorders: This handheld device is used only when symptoms occur. It does not have electrodes that are attached to the chest. When symptoms occur, the patient presses a button to start the ECG recording. The back of the device has small metal discs that function as the electrodes. The post-event monitor typically stores the data for up to 30 days which is transmitted telephonically or through a computer to a receiving center or doctor's office after the event.

Home-Based, Real-Time Continuous Attended Cardiac Monitoring Systems:

The home-based, real-time continuous attended cardiac monitoring systems have been promoted for use as alarm systems for long-term monitoring in patients. When using this technology, the patient wears a portable electrocardiogram sensor with leads attached to the patient's skin for continuous monitoring of cardiac rhythms during daily activities. If the algorithm of the monitoring system detects an arrhythmic event, the system will automatically transmit the ECG data wirelessly or through a phone line to a service center. Here, experienced monitoring specialists analyze the data, respond to events, and report results in the manner prescribed by the physician. The patient can also manually send the ECG data by pressing a button when experiencing a symptom. Physicians can monitor a patient's cardiac rhythm for weeks (ECRI, 2010).

U.S. Food and Drug Administration (FDA)

Continuous External Unattended Cardiac Monitoring Devices (HM) and Patient or Event Recorders

(Loop Recorders): There are numerous manufacturers of continuous external unattended cardiac monitoring

devices and patient or event recorders which can be found on the FDA Center for Devices and Radiologic Health 510(k) database (FDA, 2010). Examples of implantable memory loop recorders include the Reveal[®] Insertable Loop Recorder (Medtronic, Inc., Minneapolis, MN) which received 510(k) premarket approval from the FDA in February 2001 as a Class II device (FDA, 2001).

Real-Time Continuous Attended Cardiac Monitoring Systems: CardioNet Mobile Cardiac Outpatient Telemetry™ (MCOT™) Services uses the CardioNet (Philadelphia, PA) home-based, real-time cardiac surveillance system. The CardioNet ambulatory ECG arrhythmia detector and alarm received 510(k) premarket approval from the FDA in February 2002 as a Class II device (FDA, 2006; FDA, 2002). Another real-time system is the HEARTLink™ II, manufactured by Cardiac Telecom Corporation (Greensburg, PA) which uses Telemetry@ Home (FDA, 1998). Other examples of real-time systems include the CG-6108 Arrhythmia ECG Event Recorder (Card Guard Scientific Survival Ltd, Rehovot, Israel) which is also known as the Lifestar Ambulatory Cardiac Telemetry (ACT) by Life Watch Services, Inc. (Rosemont, IL), the Vital Signs Transmitter (VST)™ (Biowatch Medical, Inc., Columbia, SC) and the AVIVO™ (Corventis, Inc., San Jose, CA) (FDA, 2009; FDA, 2006; FDA, 2004).

Literature Review

Continuous External Unattended Cardiac Monitoring Devices (HM)/Patient or Event Recorders (Loop Recorders): The peer-reviewed medical literature supports the clinical utility of standard cardiac event monitors such as the HM and loop recorders. Evidence in the published literature consists of systematic reviews, case studies and few well-designed clinical trials (Hindricks, et al., 2010; Giada, et al., 2007; Brignole, et al., 2006; Reiffel, et al., 2005; Farwell, et al., 2004; Sivakumaran, et al., 2003; Krahn, et al., 2001; Krahn, et al., 1999).

Real-Time Continuous Attended Cardiac Monitoring Systems: There is sufficient evidence in the published peer-reviewed medical literature supporting the clinical utility of home-based, real-time surveillance systems for a specific subset of individuals. Additional studies are required to evaluate how real-time surveillance systems may improve health outcomes.

Kadish et al. (2010) retrospectively analyzed patient characteristics, diagnostic yield, and diagnoses of patients in a large commercial database (LifeWatch Services, Inc., Rosemont, Illinois). All patients (n=26,438) who underwent monitoring from April to December 2008 at a single service provider formed the patient population of this study. Arrhythmic events noted in these patients were defined as those requiring physician notification and those that represented potentially life-threatening arrhythmias. Of the 26,438 patients included in the study, 5459 (21%) had arrhythmic events meeting physician notification criteria during a mean monitoring period of 21 days. Of these, 262 patients (1%) had arrhythmic events that could potentially be classified as emergent. Limitations of the study include lack of a comparison group, no information on patient outcomes and detailed information on the patient population was not reported.

In a case series study, Tayal et al. (2008) analyzed 56 patients with cryptogenic transient ischemic attack (TIA) or stroke after diagnostic evaluation and Mobile MCOT for up to 21 days. Demographic, radiographic, echocardiographic, and MCOT results were reviewed. Predictors of AF detection by MCOT were determined by univariate analysis including Student t test and Fisher exact tests and multivariate analysis. The inclusion criteria were: age greater than 18 years; ischemic stroke or TIA within the last three months; and diagnosis of cryptogenic TIA/stroke. TIA was defined as sudden-onset focal neurologic symptoms or signs that resolved within 24 hours and was not associated with high-intensity abnormality in the diffusion-weighted sequence. TIA symptoms and signs included hemiplegia/hemiparesis, monoplegia/monoparesis, aphasia, transient monocular blindness, vertigo, dysarthria, and isolated sensory symptoms. The exclusionary criteria included: history of AF; admission ECG, inpatient cardiac telemetry monitoring, or 24-hour Holter data that demonstrated AF prior to initiation of MCOT; and prothrombotic state. The median MCOT monitoring duration was 21 (range 5–21) days resulting in an AF detection rate of 23% (13/56). AF was first detected after a median of 7 (range 2–19) days of monitoring. Twenty-seven asymptomatic AF episodes were detected in the 13 patients, of which 85% (23/27) were <30 seconds and the remaining 15% (4/27) were 4–24 hours in duration. Diabetes was predictive of AF detection by both univariate (p=0.024) and multivariate analysis (OR 6.15; 95% CI 1.16–32.73; p=0.033). A reported potential limitation of this study was the absence of an age-matched control group without a history of TIA/stroke. In addition, not all patients underwent a transesophageal echocardiography (TEE) in this cohort.

In a retrospective study, Saarel et al. (2008) reported on the use of the MCOT system for evaluation of children and adolescents with suspected cardiac arrhythmia. Patients older than 21 years and those with previously

documented arrhythmia were excluded. A total of 59 MCOT studies were performed. Five patients met exclusion criteria leaving 54 subjects (mean age 12.4+/-4.5 years; range 3.2–19.7 years; 46% male) for inclusion. Half of the subjects had been previously monitored with a Holter (n=24), transtelephonic electrocardiographic event monitors (n=1), or both (n=2). Among these subjects, the diagnostic yield for MCOT was similar to the overall study population (59%, n=16/27). Twenty-one subjects (39%) did not experience symptoms during MCOT, yielding a diagnostic rate of 61% (N = 33). Of the 33 diagnostic studies, 9% (n= 3; mean age 16.9+/-0.6 years; range 16.2–17.3 years; one male) showed supraventricular tachycardia and 9% (n=3; mean age 11.1+/-2.7 years; range 8.2–13.5 years; one male) showed supraventricular or ventricular ectopy. Minor skin irritation at sites of electrode placement was the only complication of MCOT (n=5). The reported limitations of this study include small sample size, retrospective data analysis, and nonrandomized design.

Rothman et al. (2007) conducted a multicenter, randomized, nonblinded controlled trial evaluating the CardioNet system versus a patient-activated external loop event monitor for symptoms thought to be due to a cardiac arrhythmia. The study included 305 patients at 17 centers. The inclusion criteria were: a high clinical suspicion of a malignant arrhythmia; symptoms of syncope, presyncope, or severe palpitations occurring less frequently than once per 24 hours (presyncope was defined as transient dizziness, lightheadedness, unsteadiness, or weak spells without loss of consciousness; severe palpitations were defined as palpitations that would warrant referral for cardiac monitoring); and a nondiagnostic 24-hour Holter or telemetry monitor within 45 days prior to enrollment. Exclusion criteria were New York Heart Association (NYHA) Class IV heart failure, myocardial infarction within the prior three months, unstable angina, candidate for or recent valvular cardiac surgery, history of sustained ventricular tachycardia or ventricular fibrillation, complex ectopy defined as ventricular premature depolarizations ≥ 10 /hour with a documented ejection fraction $\leq 35\%$, patients < 18 years of age, and a concomitant condition prohibiting completion of or compliance with the protocol. The primary endpoint was the confirmation or exclusion of a probable arrhythmic cause of the patient's symptoms (e.g., syncope, presyncope, or palpitations). Arrhythmias were classified as either clinically significant or clinically insignificant, and then the investigators evaluated the temporal relationship of any symptoms and the likelihood that a clinically significant arrhythmia caused the patient's presenting symptoms.

The patients were randomized to 30 days of monitoring with MCOT (MCOT Group n=134) or with an external loop monitor (Loop Group n=132). Out of the 305 randomized patients, 266 patients completed a minimum of 25 days of monitoring. The most common reason for not completing the protocol was patient noncompliance (13 MCOT patients and seven LOOP patients). Seven patients found the devices too difficult or cumbersome to use; seven patients had an allergic reactions or skin irritation to the electrodes; and six patients stated the monitors interfered with their work or travel. Most of the patients in the Loop Group were required to activate the recorder when they experienced symptoms; however, 49 (18%) patients were at centers that had autotriggered recording of cardiac events. During monitoring, clinically significant arrhythmias were detected in 55 (41%) patients in the MCOT Group versus 19 (14%) patients in the Loop Group, a statistically significant difference ($p < 0.001$). For patients who had syncope or presyncope, clinically significant arrhythmias were detected in 52% of patients with MCOT and in 15% of patients with loop recorders. In most cases, the arrhythmias detected were AF, atrial flutter, or ventricular tachycardia. A subgroup analysis was performed at the institutions that used autotriggered loop monitoring rather than patient-activated monitoring. A definitive diagnosis was obtained in this subgroup for 88% of MCOT Group patients versus 46% of Loop Group patients ($p < 0.0025$). However, this subgroup analysis involved a relatively small number of patients, and the autotriggered devices may have had single ECG leads, whereas the CardioNet system uses double ECG leads. The authors state the proportion of patients reporting symptoms was similar in both groups (79% in MCOT and 76% in LOOP), suggesting equal compliance during the early portion of the monitoring period when most transmissions and reported symptoms occurred.

In a case series study, Olson et al. (2007) evaluated the records of 122 consecutive patients using MCOT for palpitations, presyncope/syncope, or to monitor the efficacy of a specific antiarrhythmic therapy. Ten of 17 patients (59%) studied for resyncope/syncope had a diagnosis made with MCOT. Eight of these 17 patients had a previous negative evaluation for presyncope/syncope (e.g., holter or event monitor) and five had an event correlated with the heart rhythm during the monitoring period. Nineteen patients monitored for palpitations or presyncope/syncope were asymptomatic during monitoring but had a prespecified arrhythmia detected. When MCOT was used as the first ambulatory monitoring system to evaluate palpitations (n = 18), 73% of patients correlated their symptoms with the underlying cardiac rhythm. Seven of 21 patients monitored for medication titration had dosage adjustments during outpatient monitoring. A limitation of this study is the uncontrolled study design. There is no comparison to other ambulatory monitoring systems.

In a small uncontrolled study, Vasamreddy et al. (2006) used the CardioNet monitoring system to assess the efficacy of cardiac tissue ablation procedures for treatment of atrial fibrillation. A total of 19 patients with highly symptomatic drug refractory AF underwent catheter ablation. Each was provided with an MCOT monitor and was asked to wear it five days immediately before the ablation, and five days per month starting with the ablation for six consecutive months. When patients experienced any symptoms, they were asked to activate the system and to record associated symptoms. Out of the total 390 events triggered by patient's symptoms, 40% were confirmed as AF events (156) and 60% were confirmed as non-AF events (234). Only shortness of breath and chest discomfort were highly associated with AF ($p < 0.05$). At the end of six months of follow-up, out of 10 patients who completed the study, seven (70%) patients were free of symptomatic AF recurrences, whereas only five (50%) patients achieved success when asymptomatic AF recurrences were included in the outcome. Poor patient compliance with a very intensive monitoring protocol was reported as an important limitation of using the CardioNet monitoring system.

In a case series study, Joshi et al. (2005) reported data from the first 100 consecutive patients monitored by an MCOT system who were undergoing treatment for known arrhythmias or who were suspected to have arrhythmias based on symptoms such as palpitations, dizziness, or syncope. A clinically significant arrhythmia was detected in 51 patients, but 25 (49%) did not have any symptoms during the arrhythmia. Thirteen of the 17 patients (76%) found to have atrial flutter/fibrillation had no symptoms during the arrhythmia. Thirty patients had been previously monitored by either an HM or an event recorder. MCOT detected an arrhythmia in 16 of the patients that was not found by a previous monitoring system. One patient had sustained ventricular tachycardia who required an implantable cardioverter-defibrillator.

Systematic Review

The Centers for Medicare & Medicaid Services (CMS) requested that the AHRQ commission an evidence report to evaluate remote cardiac monitoring devices. The AHRQ contracted the Evidence-based Practice Center (ECRI) to prepare an evidence report on this topic. The systematic review focused on patient- or event-activated devices, which include externally-worn presymptom memory loop recorders (attended and unattended), implantable/insertable presymptom memory loop recorders (attended and unattended), and post-symptom patient-activated recorders. The second category comprises real-time continuous attended cardiac monitoring systems. Continuous unattended cardiac monitoring (e.g., Holter monitoring), prehospital (in ambulance) monitoring and transmission, as well as monitoring solely for the purpose of detecting device failure, was beyond the scope of this report. The systematic review focused on the downstream utility of a diagnostic technology. The overall summary stated, "While this report did find evidence that certain remote cardiac monitoring technologies lead to changes in patient management, the available evidence was insufficient to allow conclusions about the impact of remote cardiac monitoring technologies on any patient-oriented outcomes. Future studies that focus on downstream patient-oriented outcomes would be useful for determining the true benefit of these technologies" (AHRQ, 2007).

Professional Societies/Organizations

The AHA/ACC scientific statement on the evaluation of syncope states: "In patients with unexplained syncope, use of an ILR for one year yielded diagnostic information in more than 90% of patients. This approach is more likely to identify the mechanism of syncope than is a conventional approach that uses Holter or event monitors and electrophysiological testing" (Strickberger, et al., 2006). There have been no updates to this statement since 2006.

The AHA/ACC/ European Society of Cardiology Committee (ESC) guideline on the management of patients with ventricular arrhythmias recommends AECG when there is a need to clarify the diagnosis by detecting arrhythmias, QT interval changes, T-wave alternans, or ST changes, to evaluate risk, or to judge therapy. Event monitors are indicated when symptoms are sporadic to establish whether or not they are caused by transient arrhythmias. Implantable recorders are useful in patients with sporadic symptoms suspected to be related to arrhythmias such as syncope when a symptom-rhythm correlation cannot be established by conventional diagnostic techniques (Zipes, et al., 2006). There have been no updates to this guideline since 2006.

The ACC/AHA/ESC guidelines for the management of patients with supraventricular arrhythmias states, "Ambulatory 24-hour Holter recording can be used in patients with frequent (i.e., several episodes per week) but transient tachycardias. An event or wearable loop recorder is often more useful than a 24-hour recording in patients with less frequent arrhythmias. Implantable loop recorders may be helpful in selected cases with rare

symptoms (i.e., fewer than two episodes per month) associated with severe symptoms of hemodynamic instability.” There have been no updates to the guidelines since 2003 (Blomstrom-Lundqvist, et al., 2003). There have been no updates to this guideline since 2003.

Summary

The peer-reviewed medical literature and the American College of Cardiology/American Heart Association (ACC/AHA) practice guidelines for ambulatory electrocardiography (AECG) support the clinical utility of standard cardiac event monitors. There is sufficient evidence in the published peer-reviewed medical literature supporting the clinical utility of home-based, real-time surveillance systems for a specific subset of individuals. Additional studies are required to evaluate how real-time surveillance systems may improve health outcomes.

Coding/Billing Information

Note: This list of codes may not be all-inclusive.

Covered when medically necessary to report continuous external unattended cardiac monitoring device (e.g., Holter monitor™ [HM]):

| CPT® Codes | Description |
|------------|---|
| 93224 | External electrocardiographic recording up to 48 hours by continuous rhythm recording and storage; includes recording, scanning analysis with report, physician review and interpretation |
| 93225 | External electrocardiographic recording up to 48 hours by continuous rhythm recording and storage; recording (includes connection, recording, and disconnection) |
| 93226 | External electrocardiographic recording up to 48 hours by continuous rhythm recording and storage; scanning analysis with report |
| 93227 | External electrocardiographic recording up to 48 hours by continuous rhythm recording and storage; physician review and interpretation |

| ICD-9-CM Diagnosis Codes | Description |
|--------------------------|---|
| 410.00-410.92 | Acute myocardial infarction |
| 411.1 | Intermediate coronary syndrome, unstable angina |
| 413.1 | Prinzmetal angina |
| 414.8 | Other specified forms of chronic ischemic heart disease |
| 414.9 | Unspecified chronic ischemic heart disease |
| 425.4 | Other primary cardiomyopathies |
| 426.0-426.9 | Conduction disorders |
| 427.0-427.9 | Cardiac arrhythmias |
| 780.2 | Syncope and collapse |
| 780.4 | Dizziness and giddiness |
| 785.1 | Palpitations |

Covered when medically necessary to report external loop recorder:

| CPT®* Codes | Description |
|-------------|--|
| 93268 | External patient and, when performed, auto-activated electrocardiographic rhythm derived event recording with symptom-related memory loop with remote download capability up to 30 days, 24-hour attended monitoring; includes transmission, physician review and interpretation |

| | |
|-------|---|
| 93270 | External patient and, when performed, auto-activated electrocardiographic rhythm derived event recording with symptom-related memory loop with remote download capability up to 30 days, 24-hour attended monitoring; recording (includes connection, recording, and disconnection) |
| 93271 | External patient and, when performed, auto-activated electrocardiographic rhythm derived event recording with symptom-related memory loop with remote download capability up to 30 days, 24-hour attended monitoring; transmission download and analysis |
| 93272 | External patient and, when performed, auto-activated electrocardiographic rhythm derived event recording with symptom-related memory loop with remote download capability up to 30 days, 24-hour attended monitoring; physician review and interpretation |

| ICD-9-CM Diagnosis Codes | Description |
|--------------------------|---------------------|
| 427.0-427.9 | Cardiac arrhythmias |

Covered when medically necessary to report implantable loop recorder:

| CPT® Codes | Description |
|------------|--|
| 33282 | Implantation of patient-activated cardiac event recorder |
| 33284 | Removal of an implantable, patient-activated cardiac event recorder |
| 93285 | Programming device evaluation (in person) with iterative adjustment of the implantable device to test the function of the device and select optimal permanent programmed values with physician analysis, review and report; implantable loop recorder system |
| 93291 | Interrogation device evaluation (in person) with physician analysis, review and report, includes connection, recording and disconnection per patient encounter; implantable loop recorder system, including heart rhythm derived data analysis |
| 93297 | Interrogation device evaluation(s), (remote) up to 30 days; implantable cardiovascular monitor system, including analysis of 1 or more recorded physiologic cardiovascular data elements from all internal and external sensors, physician analysis, review(s) and report(s) |
| 93298 | Interrogation device evaluation(s), (remote) up to 30 days; implantable loop recorder system, including analysis of recorded heart rhythm data, physician analysis, review(s) and report(s) |
| 93299 | Interrogation device evaluation(s), (remote) up to 30 days; implantable cardiovascular monitor system or implantable loop recorder system, remote data acquisition(s), receipt of transmissions and technician review, technical support and distribution of results |

| HCPCS Codes | Description |
|-------------|--|
| C1764 | Event recorder, cardiac (implantable) |
| E0616 | Implantable cardiac event recorder with memory, activator and programmer |

| ICD-9-CM Diagnosis Codes | Description |
|--------------------------|----------------------|
| 427.0-427.9 | Cardiac arrhythmias |
| 780.2 | Syncope and collapse |

Covered when medically necessary to report external home-based, real-time continuous attended cardiac monitoring system:

| CPT® Codes | Description |
|-----------------------|--|
| 93228 | External mobile cardiovascular telemetry with electrocardiographic recording, concurrent computerized real time data analysis and greater than 24 hours of accessible ECG data storage (retrievable with query) with ECG triggered and patient selected events transmitted to a remote attended surveillance center for up to 30 days; physician review and interpretation with report |
| 93229 | External mobile cardiovascular telemetry with electrocardiographic recording, concurrent computerized real time data analysis and greater than 24 hours of accessible ECG data storage (retrievable with query) with ECG triggered and patient selected events transmitted to a remote attended surveillance center for up to 30 days; technical support for connection and patient instructions for use, attended surveillance, analysis and physician prescribed transmission of daily and emergent data reports |

| ICD-9-CM Diagnosis Codes | Description |
|---|----------------------|
| 427.0-427.9 | Cardiac arrhythmias |
| 780.2 | Syncope and collapse |
| 785.1 | Palpitations |

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References

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Policy History

| Pre-Merger Organizations | Last Review Date | Policy Number | Title |
|---------------------------------|-------------------------|----------------------|------------------------|
| CIGNA HealthCare | 4/15/2008 | 0085 | Cardiac Event Monitors |

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