

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

Actigraphy is a non-invasive method of measuring sleep parameters and average motor activity, typically used for inferring sleep/wake patterns in the evaluation of sleep disorders, using digital devices called actigraphs. Actigraphs (or actometers or actimeters), are small, watch-shaped devices worn on the wrist, ankle, or trunk, and contain motion detectors (accelerometers) to monitor and record movements. The actigraph can be worn 24-hours a day for several days or weeks as it continuously collects data. Actigraphy has been utilized for more than two decades in the study of sleep and circadian rhythms, and while it may provide an estimate of total sleep time, it provides only an indirect estimate of sleep based on movement and may misclassify quiet wakefulness as sleep. Actigraphy can measure sleep metrics including total sleep duration (from sleep onset to final awakening), sleep onset latency (time elapsed between bedtime and the beginning of sleep), total time in bed (from bedtime to final awakening), and sleep efficiency (ratio of total sleep time to total time spent in bed, expressed as a percentage). Movement disorders and other conditions can have an impact on actigraphy-based sleep parameters (Fekedulgen et al. 2020; Thomas & Gamble 2025).

Actigraphy is most commonly used in the evaluation of suspected circadian rhythm sleep-wake disorders, such as delayed sleep-wake phase disorder or shift work disorder but has also been explored for use in the evaluation of other conditions, such as mood disorders (e.g., depression, bipolar disorder), psychiatric disorders (e.g., schizophrenia, post-traumatic stress disorder), and neurological disorders (e.g., Parkinson's disease) (Raschellà et al. 2023; Tazawa et al. 2019). In comparison to the gold standard of polysomnography, actigraphy has limited ability to provide certain information about sleep, such as respiratory function and sleep architecture, as information regarding the stages of non-rapid eye movement sleep and rapid eye movement sleep is typically unavailable and requires electroencephalogram, electrooculography, and electromyography. When compared to polysomnogram, its accuracy for total sleep time is approximately 90%, but only 40% for determining the correct sleep stage. Total sleep time and sleep efficiency are often overestimated with actigraphy due to difficulties identifying sleep onset (Fekedulgen et al. 2020; ¹Smith et al. 2018; Thomas & Gamble 2025).

Several elements effect the reliability and validity of using actigraphy to measure various sleep characteristics, including: technical features of the device (e.g., tri-axial versus dual or single axis accelerometers), software driven data acquisition settings (e.g., sampling rates and sensitivity settings), location of device placement, mathematical algorithms used to estimate sleep/wake, clinical features of the population being studied, utilization of a standardized scoring approach to setting rest activity intervals, and training of patients in data collection procedures. The core technology in "direct to consumer" devices may vary markedly from that accessible for therapeutic use, and their proprietary nature limits transparency. (Fekedulgen et al. 2020; ¹Smith et al. 2018).

Regulatory Status

The 510(k)-clearance process of the U.S. Food and Drug Administration (FDA) has permitted the marketing of numerous actigraphy devices intended for clinical use (FDA product code: OLV). These devices are generally intended and marketed to track sleep-wake cycles or physical activity levels in the evaluation of sleep disorders. Some consumer grade devices such as smartwatches may offer sleep tracking features but are not FDA-cleared for medical use or diagnostic purposes.

COVERAGE POLICY

Actigraphy, when used as a stand-alone test for any indication, including but not limited to the evaluation of sleep disorders, is considered **experimental, investigational, or unproven** due to insufficient evidence in the peer-reviewed medical literature to establish long-term safety, efficacy, and effect on net health outcomes

This policy only addresses actigraphy as a stand-alone test. This does not include the use of actigraphy as a component of portable sleep monitoring. When performed as a component of portable home sleep testing, actigraphy should not be reported separately.

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

Current evidence evaluating actigraphy for the diagnosis of sleep disorders does not establish the effectiveness of actigraphy as a stand-alone diagnostic tool. Despite extensive application of actigraphs in sleep research and clinical settings, published literature specifically detailing the methodology for derivation of sleep parameters from the digital counts stored by actigraphs is lacking or limited, as such information is critical for the appropriate analysis and interpretation of actigraphy data (Scott et al. 2020). There is also a lack of consensus in definition of sleep onset and offset, which results in inconsistent reporting of sleep parameters across studies (²Smith 2018).

Systematic Reviews and Meta-Analyses

¹Yuan et al. (2024) performed a systematic review to assess how effectively wrist-worn actigraphy devices classify sleep stages in adults when compared to polysomnography, the gold standard. Due to substantial heterogeneity in study designs, sleep stage groupings, devices used, and performance metrics, a meta-analysis was not feasible. The studies included in the review involved mostly healthy adult participants with sample sizes typically under 100. Only two studies had over 100 participants, and just one included participants with sleep disorders. The devices that were evaluated included both research-grade and consumer-grade actigraphs, with variation in placement (non-dominant wrist, both wrists, etc.) sampling rates (30-62.5 Hz), and data types (raw accelerometry vs. activity count). Seven studies included details of device sleep staging algorithms, which were predominantly statistical or machine learning-based (e.g., machine learning, logistic regression, Hidden Markov Models, decision tree ensembles). Performance widely varied and depended on how sleep stages were grouped. Only three studies attempted full five-stage American Academy of Sleep Medicine classification (Wake, N1, N2, N3, REM), where the best reported five-stage accuracy was 42.5% (²Yuan et al. 2024) and the best F1 score was 43.2%. Studies that grouped stages into fewer categories (e.g., light vs. deep sleep) showed higher apparent accuracy but lacked standardization and comparability. Vendor-defined groupings such as “light” and “deep” sleep in consumer-grade devices made comparison difficult due to lack of transparency in definitions and algorithms. No adverse reactions were reported, which is consistent with the non-invasive nature of actigraphy. Risk of bias was assessed using a modified QUADAS-2 tool, with the most common sources being participant selection, as many studies did not describe recruitment methods or population characteristics, and the actigraphy algorithm, particularly for proprietary consumer devices that lacked transparency. The authors also cautioned that publication bias is possible, particularly since negative findings or poor performance in clinical populations may remain unpublished. The authors concluded that while actigraphy measurement demonstrates some ability to classify sleep stages, existing performance remains low. Current evidence does not support or refute the validity of sleep staging from actigraphy due to the high heterogeneity in outcome reporting.

An et al. (2020) completed a systematic review and meta-analysis to assess the utility of actigraphy in chronic pain patients. Studies using actigraphy to measure sleep in chronic pain patients were searched in databases and included 34 with 3,590 patients. Sleep parameters measured by actigraphy were compared with those measured by sleep diary and polysomnogram. No differences were noted between actigraphic and polysomnogram in sleep parameters;

however, due to the limited number of studies and large variability, it was not established that the two are equivalent objective measures. Based on thresholds set by the 2018 American Academy of Sleep Medicine on actigraphy, the analysis noted that the 95% confidence interval of the mean differences in the study were large and suggested that the two methods (actigraphy and polysomnogram) cannot be used interchangeably (¹Smith et al. 2018). Therefore, while no significant differences were found, it is not definitive that the two measurement methods are consistent and produce the same measurements. The authors concluded that while actigraphy presents many potential advantages, further research is required to compare the different assessment methods with large RCTs measuring sleep using multiple assessment methods in chronic pain patients.

Scott et al. (2020) completed a systematic review to determine the accuracy of wearable sleep devices, including actigraphy devices, in estimating sleep onset latency. It was noted that sleep wearable devices could increase the availability of applications used to measure sleep parameters. Researchers noted that “actigraphy devices produced average estimations of sleep onset latency that were often not significantly different from polysomnogram.” However, the accuracy of actigraphy was noted to be dependent upon patient characteristics, such as movement disorders. It was also noted that devices measuring behavioral aspects of sleep onset consistently overestimated sleep onset latency when compared to polysomnogram.

Conley et al. (2019) conducted a systematic review and meta-analysis to evaluate the agreement between wrist actigraphy and polysomnography in measuring sleep characteristics among adults with and without chronic conditions. The review aimed to quantify discrepancies between actigraphy and polysomnography, as actigraphy may misclassify sleep and wake states, especially in populations with chronic conditions that influence sleep patterns and motor actigraphy. The review included 96 studies with a total of 4,134 participants, including both observational studies and RCTs. Studies using consumer-grade activity trackers were excluded due to proprietary algorithms and lack of validation data. Of the total review population, 762 participants (18.4%) were healthy adults without chronic conditions or sleep complaints and 724 (17.5%) had various chronic medical or psychiatric conditions. The remaining participants had unspecified conditions or sleep disorders. Across all participants, actigraphy consistently overestimated total sleep time by an average of 17.88 minutes (95% CI: 7.90 to 27.85, $n = 3,437$) and sleep efficiency by 3.77% (95% CI: 1.87% to 5.59%, $n = 2,905$) compared to polysomnography. Actigraphy underestimated sleep onset latency by 6.94 minutes (95% CI: -9.63 to -4.24; $n = 2,534$) wake after sleep onset by 12.87 minutes (95% CI: -19.30 to -6.43, $n = 2,537$). Sensitivity, or correct identification of sleep was high across all studies (mean of 0.83) where specificity, or correct identification of wake was lower (mean of 0.51). The authors concluded that actigraphy tends to overestimate sleep and underestimate wake compared to polysomnography in both healthy and chronic condition populations, with larger discrepancies in those with chronic conditions.

Tazawa et al. (2019) performed a systematic review and meta-analysis to evaluate the use of actigraphy to assess symptoms of individuals with depressive and/or bipolar disorders. The review analyzed 38 studies, for a total of 3,758 participants. These included both comparisons between patients and healthy controls, and pre- and post-treatment data within the same patient populations. The primary actigraphy measurements reviewed were daily physical activity and various sleep-related parameters. The findings revealed that patients with depression exhibited significantly lower activity levels than healthy individuals, with a large standardized mean difference (SMD = 1.27, 95% CI [0.97, 1.57], $p < 0.001$). They also experienced significantly more wakefulness after sleep onset (SMD = -0.729, 95% CI [-1.20, -0.25], $p < 0.003$). For individuals in remission or euthymic states, sleep related disturbances were still evident compared to controls. In within-subject analyses of pre- and post-treatment outcomes, there was significant improvement in sleep latency (SMD -0.85, 95% CI [-1.53, -0.17], $p < 0.015$), wake after sleep onset (SMD = -0.065, 95% CI [-1.20, -0.10], $p = 0.022$), and sleep efficiency (SMD = 0.77, 95% CI [0.29, 1.24], $p = 0.002$). These improvements indicate a positive response to treatment as measured through actigraphy-derived sleep metrics. Study limitations include small sample sizes, and heterogeneity in the types of actigraphy devices and severity of illness. Potential confounding factors, such as hospitalization status and the influence of psychotropic medications, could have impacted the actigraphy readings. The authors concluded that actigraphy can detect measurable differences in sleep and activity between individuals with mood disorders and healthy controls, and that treatment-related improvements can also be captured. The authors suggest that specific actigraphy-derived patterns may characterize different mood disorder states, and that future studies linking actigraphy data to symptom severity and treatment response could enhance the clinical utility of the technology.

Non-Randomized Studies, Retrospective Reviews, and Other Evidence

Rösler et al. (2023) conducted a case-control study to investigate whether actigraphy is effective in differentiating individuals with insomnia from healthy sleepers in a naturalistic setting. The study involved 204 adult participants (167 with insomnia, 37 controls), aged 18-70, who wore wrist actigraphy and kept sleep diaries for up to 9 days at home, followed by one night of simultaneous polysomnogram and actigraphy in a sleep lab. Both mean sleep parameters and within-subject variability were assessed using actigraphy and the sleep diaries. In-lab polysomnogram served as the gold standard against which actigraphy was validated. Agreement between modalities was moderate, with a mean Cohen's kappa of 0.44 for both insomnia and control groups. There were strong correlations between actigraphy and polysomnogram for total sleep time and moderate correlations for sleep efficiency and wake after sleep onset. Sleep onset latency showed only a modest correlation. In the home setting, actigraphy-derived average sleep estimates largely failed to differentiate patients with insomnia from controls. The only significant difference observed was a modest reduction in actigraphically estimated total sleep time in the insomnia group (by about 21 minutes). There were no statistically significant differences in average sleep efficiency, sleep onset latency, or wake after sleep onset between groups based on actigraphy. However, sleep diary reports revealed large and consistent differences, where individuals with insomnia reported shorter total sleep time (by approximately 80 minutes), lower sleep efficiency, and longer sleep onset latency and wake after sleep onset, confirming the subjective nature of insomnia complaints. The study did identify higher night-to-night variability in actigraphy-derived sleep efficiency and wake after sleep onset among patients with insomnia, indicating that variability rather than average values, may better reflect the sleep disturbances in this population. Circadian rhythm variables derived from nonparametric analysis (inter- and intra-daily variability, L5, M10) showed no significant differences between patients and controls, suggesting that circadian disruption is not a core feature of most insomnia cases. The authors concluded that current, state-of-the-art ambulatory actigraphy does not reliably distinguish insomnia from normal sleep when using average sleep metrics. The findings challenge the common assumption of actigraphy's diagnostic utility in insomnia and highlight the complexity of objectively capturing a subjectively defined disorder.

Fedele et al. (2022) completed a prospective, observational study of 24 participants to compare actigraphy to polysomnogram in individuals with posttraumatic amnesia. Testing was completed in a traumatic brain injury rehabilitation unit. Approximately 79.2% of participants had a severe traumatic brain injury while 20.8% had a severe traumatic brain injury. The average time post-injury was 38.2 days. Results showed a poor agreement between actigraphy and polysomnogram in determining sleep and wake parameters. Researchers noted that uncontrollable movements caused by traumatic brain injury may have impacted the data for actigraphy and recommended additional well-controlled studies to assess efficacy.

Chinoy et al. (2021) completed a prospective, observational study of 34 healthy young adults to assess the efficacy of consumer sleep devices (e.g., Fatigue Science Readiband, Fitbit Alta HR, Garmin Fenix 5S, Garmin Vivosmart 3, EarlySense Live, ResMed S+, SleepScore Max) compared to actigraphy and polysomnogram. Testing and reporting of results were completed following the guidelines of the Sleep Research Society. Participants were asked to stop consumption of alcohol and caffeine six days prior to testing and to establish a sleep schedule that would allow them to get a full eight hours of sleep for the four nights prior to the study. The study protocol consisted of testing on three consecutive nights using each individual's pre-study bed and wake times as their times for study. The time in bed was eight hours each study night. The second or third night of the study consisted of an experimental sleep disruption protocol to determine the effects of fragmented sleep patterns on device algorithm performance. Results determined that most consumer sleep tracking devices were equivalent or outperformed actigraphy.

Fekedulegn et al. (2020) noted that more comprehensive understanding of the actigraphy process and the methods used for deriving the sleep parameters from wrist movement data: 1) ensures appropriate use and interpretation of sleep parameters in future studies, 2) enables the recalibration of sleep parameters to address specific goals, and 3) inform the development of new measures and increase the breadth of sleep parameters used. The current lack of evidence-based studies and high-quality literature detailing how sleep parameters are derived results in a number of unclear variables. There is also a need to standardize sleep measures derived from actigraphy in order to facilitate communication among investigators and comparisons across studies.

National and Specialty Organizations

The **European Insomnia Guideline** published updated recommendations for the evaluation of insomnia. Actigraphy is not recommended for the routine evaluation of insomnia and may be considered only when irregular sleep-wake

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schedules or circadian rhythm sleep-wake disorders are suspected. The guidelines include the following recommendations for actigraphy (Riemann et al. 2023):

- In case of clinical suspicion of irregular sleep-wake schedules or circadian rhythm sleep-wake disorders (Grade A recommendation)
- In case of clinical suspicion of periodic leg movements in sleep (Grade A recommendation)
- To assess quantitative rest activity (Grade A recommendation) and sleep parameters (Grade C recommendation)

The guidelines further state that actigraphy cannot differentiate patients with insomnia from good sleepers and does not deliver a valid estimation of sleep stages like the polysomnogram. Overall, the guideline notes limited support for actigraphy in the clinical evaluation of insomnia, and its use is restricted to situations where circadian rhythm disturbance is suspected rather than for diagnosing insomnia itself (Riemann et al. 2023).

The **American Academy of Sleep Medicine (AASM)** clinical practice guidelines for actigraphy established recommendations for the use of actigraphy in adult and pediatric patients with suspected or diagnosed sleep disorders or circadian rhythm sleep-wake disorders. Recommendations were based on systematic review and developed using the GRADE process. A “strong” recommendation is one that clinicians should follow under most circumstances, where a “conditional recommendation reflects a lower degree of certainty regarding the outcome and appropriateness for all patients. Additionally, these guidelines only apply to the use of FDA-approved devices. The AASM recommends the following for the use of actigraphy (2Smith et al. 2018):

- Only one **strong** recommendation was issued which recommends that clinicians not use actigraphy in place of electromyography for the diagnosis of periodic limb movement disorder in adult and pediatric patients.
- To estimate sleep parameters in adult patients with insomnia disorder (Conditional)
- In the assessment of pediatric patients with insomnia disorder (Conditional)
- In the assessment of adult patients with circadian rhythm sleep-wake disorder (Conditional)
- In the assessment of pediatric patients with circadian rhythm sleep-wake disorder (Conditional)
- Integrated with home sleep apnea test devices to estimate total sleep time during recording (in the absence of alternative objective measurements of total sleep time) in adult patients suspected of sleep-disordered breathing (Conditional)
- To monitor total sleep time prior to testing with the Multiple Sleep Latency Test in adult and pediatric patients with suspected central disorders of hypersomnolence (Conditional)
- To estimate total sleep time in adult patients with suspected insufficient sleep syndrome (Conditional)

The AASM guidelines emphasize that actigraphy is not a substitute for in-laboratory polysomnogram when there is an indication for in-laboratory testing but note that it can provide useful objective metrics across a variety of sleep-wake disorders (2Smith et al. 2018).

CODING & BILLING INFORMATION

CPT (Current Procedural Terminology)

Code	Description
95803	Actigraphy testing, recording, analysis, interpretation, and report (minimum of 72 hours to 14 consecutive days of recording)

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

08/12/2026 Policy reviewed. No changes to coverage criteria.

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08/13/2025	Policy reviewed. No change to coverage criteria.
08/14/2024	Policy reviewed. No changes to coverage criteria.
08/09/2023	Policy reviewed. No changes to coverage criteria. IRO Peer Review on June 28, 2023, by a practicing, board-certified physician with a specialty in Sleep Medicine.
08/10/2022	Policy reviewed. No changes in coverage position.
08/11/2021	Policy reviewed. No changes in coverage position.
09/16/2020	New policy. IRO Peer Review. 7/15/2020. Practicing physician board certified in Psychiatry, Psychiatry Child & Adolescent, Sleep Medicine.

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