



CLINICAL GUIDELINES

Sleep Disorders Diagnosis & Treatment Guidelines

Version 1.1

Effective October 15, 2020



eviCore healthcare Clinical Decision Support Tool Diagnostic Strategies: This tool addresses common symptoms and symptom complexes. Imaging requests for individuals with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician, specialist and/or individual's Primary Care Physician (PCP) may provide additional insight.

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Sleep Disorders Diagnosis and Treatment Guidelines

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Abbreviations for Sleep Guidelines

AASM	American Academy of Sleep Medicine
AHI	Apnea-Hypoxia Index: normal AHI < 5 mild OSA: AHI of ≥ 5 to ≤ 14.9 moderate OSA: AHI of ≥ 15 to ≤ 30 severe OSA: AHI of > 30
AOSATF of AASM	Adult Obstructive Sleep Apnea Task Force of the American Academy of Sleep Medicine
APAP	Autotitrating positive airway pressure
BMI	Body mass index (body weight divided by the square of the height)
CPAP	Continuous positive airway pressure
DOT	Department of Transportation
EDS	Excessive daytime sleepiness
HCPCS	Healthcare Common Procedural Coding System (Level II alphanumeric codes used to report services not included in CPT®)
HST	Home sleep testing
IDTF	Independent Diagnostic Testing Facilities
JCAHO	Joint Commission on Accreditation of Healthcare Organizations
MSLT	Multiple Sleep Latency Test
MWT	Maintenance of Wakefulness Test
OSA	Obstructive sleep apnea
PM	Portable monitoring (in home sleep studies)
PSG	Polysomnography
RDI	Respiratory disturbance index: (respiratory effort related arousals + apneas + hypopneas/total sleep time normal RDI < 5 mild OSA: RDI of ≥ 5 to ≤ 14.9 moderate OSA: RDI of ≥ 15 to ≤ 30 severe OSA: RDI of > 30
Screening Tools for Sleep Disorders	Epworth Sleepiness Scale, Berlin Questionnaire (for sleep apnea), STOP-BANG questionnaire, Insomnia Severity Index
OA	Oral appliance

SL-1: Obstructive Sleep Apnea and Other Sleep-related Breathing Disorders

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Preface

Medicare Coverage Policies

- For Medicare and Medicare Advantage enrollees, the coverage policies of CMS (Centers for Medicare and Medicaid Services) take precedence over eviCore's guidelines.

Investigational and Experimental Studies

- Certain studies described in these guidelines are considered investigational by various payers, and their coverage policies may take precedence over eviCore's guidelines. Certain studies, or other procedures, may be considered investigational and experimental if there is a paucity of supporting evidence; if the evidence has not matured to exhibit improved health parameters or the study/procedure lacks a collective opinion of support.

Clinical and Research Trials

- Similar to investigational and experimental studies, clinical trial imaging requests will be considered to determine whether they meet Health Plan coverage and eviCore's evidence-based guidelines.

Legislative Mandate

- State and federal legislations may need to be considered in the review of advanced imaging requests. For example:
 - ◆ Various State and Federal Breast Density Laws
 - ◆ Texas HB 1290 Coronary Calcium CT Law

Reference

1. https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Downloads/FY_14_Definition_of_Medicare_Code_Edits_V_31_Manual.pdf.

SL-1.0: General Guidelines

- A current and comprehensive clinical evaluation (within 60 days) is required before a sleep study can be considered. (Note: The rendering site must be a qualified provider of service per health plan policy). The clinical evaluation may include a relevant history and physical examination, appropriate laboratory studies, and other relevant diagnostic studies (such as a previous sleep study or overnight pulse oximetry). The results of a sleep questionnaire or sleep questionnaire proxy are required. See: **SL-1.2: Sleep Questionnaires**.
 - ◆ Other meaningful contact (telephone call, electronic mail, or messaging) by an established* patient can substitute for a face-to-face clinical evaluation. *An established patient is one who has undergone a current (within 90 days) comprehensive history and physical evaluation by the ordering and treating physician/physician group for their sleep problem.
 - ◆ Documented history may include the following:

- Persistent symptoms present for greater than 4 weeks in duration and not associated with respiratory infections.
- House partners/spouses can describe symptoms, including apneic spells, such as gasping and choking.
- Co-workers, friends, and/or the patient may report that the patient falls asleep during business meetings, conversations, while stopped at traffic lights, or while driving.
- Daytime tiredness and excessive caffeine or stimulant use.
- Excessively loud, erratic and variable snoring. (Note: Snoring alone is not always indicative of OSA).
- Frequent awakening during the night.
- Increased movements; sleep talking; displaying confused or erratic behavior during sleep.
- Morning headaches, limited attention, or memory loss.
- Drowsy driving or history of car crashes or near miss accidents related to sleepiness.
- Prior diagnosis of OSA and response to therapy.
- ◆ Documented physical examination should include:
 - Cardiopulmonary evaluation
 - Level of obesity and/or neck circumference
 - Other findings, such as: macroglossia, tonsillar hypertrophy, nasal polyps, septal deviation, turbinate hypertrophy, elongated/enlarged uvula, narrow/high arched hard palate retrognathia (recessed mandible) or micrognathia (small mandible).

SL-1.1: General Requirements

- Diagnosis of OSA¹, as measured by valid testing is defined as:
 - ◆ The apnea-hypopnea index (AHI), respiratory disturbance index (RDI), respiratory event index (REI) is ≥ 15 events per hour; or
 - ◆ The AHI, RDI, or REI is ≥ 5 and ≤ 14.9 events per hour and documentation of:
 - Symptoms of sleepiness, nonrestorative sleep, fatigue, or insomnia
 - Report of awakening with breath holding, gasping, or choking
 - Bed partner or other observer reports habitual snoring, breathing interruptions, or both during sleep
 - Hypertension, a mood disorder, cognitive dysfunction, coronary artery disease, congestive heart failure, atrial fibrillation, type 2 diabetes mellitus, or stroke.
 - See **SL-7: Practice Notes** for additional information

SL-1.2: Sleep Questionnaires

- Four sleep questionnaires (all self-answered by the patient) are commonly used to quantify the level of sleepiness, quality of sleep or probability of having OSA. These validated questionnaires include (but are not be limited to):
 - ◆ Epworth Sleepiness Scale
 - ◆ Berlin Questionnaire
 - ◆ STOP Bang Questionnaire
 - ◆ Insomnia Severity Index
- eviCore uses the results of these questionnaires to help formulate a patient's likelihood of having sleep-related disease, so the questionnaires must be appropriate for the specific sleep issue in question (e.g. STOP-BANG and Berlin are most appropriate for OSA evaluation).
 - ◆ To view these questionnaires and their interpretation in their entirety, see **SL-8: Questionnaires**.
- Results of one of these four questionnaires are required, **or** the following condition can serve as a proxy for the sleep questionnaire requirement:
 - ◆ Witnessed apnea by a bed partner
 - ◆ Previous diagnosis of OSA, confirmed in record

SL-1.3: Classifications of Sleep related breathing disorders

- Sleep apnea is defined as repetitive partial or complete cessations of breathing that occur during sleep. These breathing events can be caused by a physical obstruction of the upper airway, a lack of effort to breathe, or a combination of these two factors. The source of the sleep disordered breathing determines the type or classification of sleep apnea.
 - ◆ Obstructive sleep apnea (OSA):
 - OSA is caused by a physical obstruction in the upper airway.
 - Sleep study recording characterized by:
 - Loud snoring
 - Obstructive apnea events – scored as apneas with apnea index or AI
 - Hypopnea events – scored with hypopnea index or HI
 - Significant oxyhemoglobin desaturations
 - Arousals from sleep
 - ◆ Central sleep apnea (CSA) defined as Central hypopnea/apneas are > 50% of total, and Central apnea and/or central hypopnea index ≥ 5 per hour:
 - CSA is caused by a reduction or absence of effort to breathe by the diaphragm or respiratory muscles.
 - Sleep study recording characterized by:
 - Central apnea events, or hypopnea events
 - Occasional snoring
 - Oxyhemoglobin desaturation
 - Occasional arousals from sleep

- ◆ Central sleep apnea (CSA) with Cheyne-Stokes Respiration defined as Central hypopnea/apneas are > 50% of total, and Central apnea and/or central hypopnea index ≥ 5 per hour and the pattern of breathing meets criteria for Cheyne-Stokes breathing:
 - CSR is a form of periodic breathing characterized by the waxing and waning of respiratory effort and airflow
 - CSR generally starts with a gradual waning of breathing effort and airflow which results in a central apnea, or hypopnea, followed by a gradual increase in breathing effort and flow
- ◆ Sleep-related hypoventilation as defined when either of the below occur during sleep:
 - Increase in arterial PCO₂, transcutaneous PCO₂, or end-tidal PCO₂ to a value >55 mmHg for ≥ 10 minutes
 - There is a >10 mmHg increase in arterial PCO₂, transcutaneous PCO₂, or end-tidal PCO₂ during sleep (compared to awake supine value) to a value > 50 mmHg for > 10 minutes
- ◆ Treatment emergent central sleep apnea (complex sleep apnea) as measured by valid testing is defined as:
 - Diagnostic PSG demonstrates 5 or more obstructive respiratory events per hour of sleep
 - PSG during use of positive airway pressure shows improvement of obstructive events and emergence or persistence of central apneas/hypopneas with:
 - Central apnea and/or hypopnea index ≥ 5 per hour and Central hypopnea/apneas are $\geq 50\%$ of total

SL-1.4: Coding

SL-1.4.1: Home Portable Monitoring (PM) (Home Sleep Testing) - Coding

There are currently 3 levels (G0398, G0399 and G0400) of home PM's, with varying number of monitored parameters. Each can be used with or without an attendant but are generally performed unattended in the patient's home.

Home Sleep Studies	HCPCS	Channels
Home sleep study test (HST) with type II portable monitor, unattended; minimum of 7 channels: EEG, EOG, EMG, ECG/heart rate, airflow, respiratory effort and oxygen saturation	G0398	At least 7 monitored channels. Can calculate AHI.
Home sleep test (HST) with type III portable monitor, unattended; minimum of 4 channels: 2 respiratory movement/airflow, 1 ECG/heart rate and 1 oxygen saturation	G0399	At least 4 monitored channels (airflow/ventilation, heart rate, oxygen saturation, respiratory movement)
Home sleep test (HST) with type IV portable monitor, unattended; minimum of 3 channels	G0400	Measures 1 to 3 parameters

PSG PROCEDURE CODES	
Unattended Sleep Studies	CPT®
➤ Sleep study, unattended, measures a minimum of heart rate, oxygen saturation, and respiratory analysis (e.g., by airflow or peripheral arterial tone), and sleep time. ◆ Simultaneous recording; simultaneous recording; heart rate, oxygen saturation, and respiratory analysis (e.g., by airflow or peripheral arterial tone), and sleep time. ◆ For unattended sleep study that measures a minimum of heart rate, oxygen saturation, and respiratory analysis, report 95801 ◆ Do not report CPT® 95800 in conjunction with any of the following CPT® codes: 93041-93227, 93228, 93229, 93268-93272, 95801, 95803, 95806.	95800
➤ Sleep study, unattended, measures a minimum of heart rate, oxygen saturation, and respiratory analysis (e.g., by airflow or peripheral arterial tone) ◆ Simultaneous recording; minimum of heart rate, oxygen saturation, and respiratory analysis (e.g., by airflow or peripheral arterial tone). ◆ For unattended sleep study that measures a minimum of heart rate, oxygen saturation, and sleep time, report 95800 ◆ Do not report CPT® 95801 in conjunction with any of the following CPT® codes: 93041-93227, 93228, 93229, 93268-93272, 95800, 95806.	95801
➤ Sleep study, unattended, simultaneous recording of heart rate, oxygen saturation, respiratory airflow and respiratory effort (e.g. thoracoabdominal movement) ◆ Simultaneous recording; minimum of ventilation, respiratory effort, ECG or heart rate, and oxygen saturation. ◆ For unattended sleep study that measures heart rate, oxygen saturation, respiratory analysis, and sleep time, report 0203T ◆ For unattended sleep study that measures heart rate, oxygen saturation, respiratory analysis, report 0204T. ◆ Do not report CPT® 95806 in conjunction with any of the following codes: CPT® 93012, 93014, 93041-93227, 93228, 93229, 93230-93272, 0203T, 0204T	95806

SL-1.4.2: Polysomnography (Facility-based-PSG) - Coding

PSG PROCEDURE CODES	
Attended Polysomnography and Sleep Studies	CPT®
➤ Multiple sleep latency or maintenance of wakefulness testing, recording, analysis and interpretation of physiological measurements of sleep during multiple trials to assess sleepiness or ability to remain awake.	95805
◆ Multiple sleep latency testing (MSLT) is performed prior to treatment when the requesting physician suspects narcolepsy. ◆ MSLT must be requested with a facility sleep study performed the night before the 95805 (CPT® 95810 or CPT® 95811). ◆ See SL-2.3: Maintenance of Wakefulness Testing (MWT) - See SL-2.4: Maintenance of Wakefulness Testing (MWT)-Indications and Criteria	
➤ Polysomnography; (any age), sleep staging with 1-3 additional parameters of sleep, attended by a technologist	95808
◆ Requests will be forwarded for Medical Director review	
➤ Sleep study, simultaneous recording of ventilation, respiratory effort, ECG or heart rate, and oxygen saturation, attended by a technologist with PAP titration,	95807
◆ May be considered experimental and investigational when 95807 or 95807-52 is utilized to request a PAP-NAP. <i>Requests will be forwarded for Medical Director Review.</i>	
Attended Polysomnography and Sleep Studies	CPT®
➤ Polysomnography; (age 6 years or older), sleep staging with 4 or more additional parameters of sleep, attended by a technologist.	95810
◆ CPT® 95810 is used to report full-night studies. ◆ One of the more common studies.	
➤ Polysomnography; (age 6 years or older), sleep staging with 4 or more additional parameters of sleep, with initiation of continuous positive airway pressure therapy or Bi-level ventilation, attended by a technologist	95811
◆ One of the more common studies. ◆ CPT® 95811 is used either as either a split-night study with both the diagnostic study and the subsequent positive airway pressure or bi-level ventilation are initiated during the same visit, or as PAP titration alone after CPT® 95810 or inability to complete split night sequence or as a retitration of PAP therapy.	
Attended Polysomnography and Sleep Studies (PEDIATRIC CODES)	CPT®
Polysomnography, (younger than 6 years), sleep staging with 4 or more additional parameters of sleep, attended by a technologist.	95782
Polysomnography, (younger than 6 years), sleep staging with 4 or more additional parameters of sleep, with initiation of continuous positive airway pressure therapy or bi-level ventilation, attended by a technologist.	95783

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SL-2.1: Home Sleep Testing (HST) Indications

- HST can be performed when **all of the following** three criteria are met:
 - ◆ High pre-test probability of moderate-to-severe OSA as defined by validated questionnaire **or** reported symptoms of excessive daytime sleepiness and **at least two** of the following three criteria (habitual loud snoring, witnessed apnea or gasping or choking, or diagnosed hypertension)
 - ◆ HST can physically be performed **and** patient has the mobility, dexterity and cognitive ability to use the available equipment safely at home and the ability to follow instructions; **and**
 - ◆ Does not exhibit one of the co-morbid indications for attended sleep studies found in **SL-2.2: In-Laboratory Polysomnography - OSA Indications**.
- HST can also be used in follow-up treatment results after:
 - ◆ Surgical treatment for moderate to severe OSA, or
 - ◆ OSA Oral appliance trial, or
 - ◆ Other non-PAP supportive interventions (e.g. positional therapy).

SL-2.2: In-Laboratory Polysomnography - OSA Indications

- PSG CPT® 95811 (See also **SL-2.4: Split Night Study or Two Night Study**) can be considered for the following: Sleep survey or proxy symptom(s) lead to **any** pretest probability of OSA and **one** of the following:
 - ◆ HST cannot be done due to one of the following reasons:
 - OSA symptoms with low pretest probability of OSA.
 - Patient does not have the mobility, dexterity or cognitive ability to use the available equipment safely at home and the ability to follow instructions.
 - HST has been attempted and is negative, inconclusive, or technically inadequate (report submitted for review).³⁸
 - ◆ Documentation of at least one of the following suspected or known co-morbid diagnoses:
 - Morbid obesity (BMI > 45, Obesity Hypoventilation Syndrome defined as BMI > 30 plus arterial blood gas with PCO₂ > 45).
 - Moderate to severe pulmonary disease (for example: COPD, asthma) as demonstrated by one or more of the following:
 - nocturnal oxygen use
 - documented arterial blood gases showing PO₂ < 60 or PCO₂ > 45
 - documented pulmonary function tests demonstrating moderate to severe obstruction with forced expiratory volume in one second (FEV₁) ≤ 69% of predicted
 - Documented neuromuscular disease (e.g., Parkinson's, documented stroke or undocumented stroke with residua, active epilepsy, myotonic dystrophy, ALS)
 - Moderate to severe congestive heart failure with documented pulmonary congestion or known left ventricular ejection fraction < 45%, or
 - Other critical illness that would prevent them from using the HST equipment.
 - Chronic severe insomnia (by objective measure e.g. sleep diary, validated insomnia questionnaire. such as Insomnia Severity Index ≥ 22³⁸)

- Chronic daily opioid use³⁸ (typically daily high-potency opioids e.g. Methadone®, Suboxone®, Dilaudid®) with stated concern for presence of central sleep apnea.
- Less than 18 years of age.
- Bi-level PAP or Adaptive Servo Ventilation PAP are specifically requested (Titration study, CPT® 95811, only).
- Documented unsuccessful AutoPAP attempt (Titration study, CPT® 95811 only)
 - Initiation of therapy started > 30 days ago and either:
 - ♦ Auto-PAP machine download with AHI > 5/hr with symptoms (of OSA) or > 15/hr with or without return of symptoms
 - ♦ Auto-PAP use > 70% of nights, 4+hrs/night with continued symptoms noted
- Central sleep apnea
- Treatment – Emergent Central Sleep apnea
- ♦ Diagnostic Testing pre- and post- hypoglossal nerve stimulator implantation³⁷⁻⁴⁰
 - A hypoglossal nerve stimulator is a surgically implanted device that delivers stimulating electrical pulses to the hypoglossal nerve, which controls upper airway musculature. With a sensing lead, the device permits synchronization with ventilatory effort. The Stimulation Treatment for Apnea Reduction (STAR) trial was a prospective, multicenter trial of 126 participants with a body mass index less than 32, moderate to severe obstructive sleep apnea (AHI 20-50), and difficulty tolerating/adhering to CPAP. Participants, who served as their own control, experienced a significant reduction in Apnea Hypopnea Index with hypoglossal nerve stimulation (68% decrease) and oxygen desaturation index (70% decrease) at 12 months, as well as a reduction in self-reported outcomes at 12 and 24 months. ⁱⁱⁱ These improvements were maintained at 3 years.ⁱ During the trial, a response to hypoglossal nerve stimulation was defined as a reduction of AHI by at least 50% from baseline and an AHI of less than 20 events per hour at one year¹.
 - Pre-implantation:
 - **No prior sleep testing:** Patients with a high pre-test likelihood for moderate to severe obstructive sleep apnea who have not undergone prior sleep testing should undergo home sleep apnea testing, if appropriate per guidelines, and a PAP trial before consideration of facility testing for possible hypoglossal nerve stimulator implantation. Please see sections **SL-2.1: Home Sleep Testing (HST) Indication**, prior sections in **SL-2.2: In-Laboratory Polysomnography - OSA Indications**, and **SL-2.2.1: In-Laboratory Polysomnography - Other Indications** for guidelines for patients who have not undergone prior testing.
 - **Prior diagnosis of OSA based on polysomnography:** Patients who have recently undergone polysomnography, (within 12 months), do not need a repeat study unless there have been changes in weight or symptoms to suggest a clinically significant change in sleep study results. In the setting of recent significant changes in weight or symptoms, repeat

polysomnography could be considered if the following criteria are met (BOTH):

- BMI $\leq$ 32
- Previous intolerance to CPAP and/or bi-level PAP during a minimum of one month trial
- **Prior diagnosis of OSA based on home sleep apnea testing:** In the setting of a known diagnosis of obstructive sleep apnea based on home sleep apnea testing, the following criteria must be met prior to performance of polysomnography (CPT® 98510) for pre-implantation evaluation (ALL):
 - BMI $\leq$ 32
 - AHI or REI less than 65 on home sleep testing
 - Intolerance to CPAP and/or bi-level PAP during a minimum of one month trial
- Post-implantation:
 - As per the clinical trial, polysomnography can be performed at approximately one month post-implantation for the purpose of titrating device parameters and determining therapeutic stimulation settings.
 - Following the titration study at one month, retesting (either HST or PSG CPT® 95810) can be performed if any of the following occurs:
 - ◆ Clinical response is insufficient despite regular treatment with hypoglossal nerve stimulator.
 - ◆ Substantial weight gain with return of symptoms.
 - ◆ Results of previously medically necessary sleep test were inadequate due to limited sleep time or other variables.
 - Note: Following the titration study at one month, the choice of home sleep apnea testing or facility polysomnography for repeat testing will be based on indications and co-morbidities outlined in **SL-2.1: Home Sleep Testing (HST) Indication**, prior sections in **SL-2.2: In-Laboratory Polysomnography- OSA Indications**, and **SL-2.2.1: In-Laboratory Polysomnography- Other Indications**.

SL-2.2.1: In-Laboratory Polysomnography- Other Indications

- Suspected narcolepsy or idiopathic hypersomnia (with CPT® 95805), as evidenced by.^{18,19}
 - ◆ Excessive sleepiness (shown not due to other more common sleep disorders such as obstructive sleep apnea or insufficient sleep syndrome), AND
 - ◆ Recurrent daytime naps or lapses into sleep daily for at least 3 months.
 - ◆ Additional symptoms may include:
 - Cataplexy- sudden loss of muscle tone occurring in association with intense emotion (laughing or crying), OR
 - Sleep paralysis, hypnagogic hallucinations, hypnopompic hallucinations, automatic behaviors, or disrupted major sleep episode
 - ◆ See **SL-2.3: In-Laboratory Multiple Sleep Latency Testing (excessive sleepiness) Indications and Criteria**

- Previous sleep study results (and history) consistent with possible idiopathic hypersomnia.
- Persistent symptomatic congestive heart failure (CHF), despite adequate medical treatment, and regardless of pre-test probability of OSA.
- More complicated parasomnias, **NOT including** more common conditions such as:
 - ◆ Typical disorders of arousal.
 - ◆ Nightmares.
 - ◆ Enuresis.
 - ◆ Somniloquy.
 - ◆ Bruxism.
- Rapid Eye Movement (REM) Behavior Disorder: Characterized by the acting out of dreams that are vivid, intense, and violent. Sleep-related vocalization and complex motor behaviors, which correlate with sleep-related mentation, i.e. dream-enacting behaviors. Dream enacting behaviors may include talking, yelling, punching, kicking, sitting, jumping from bed, arm flailing, and grabbing.
- Periodic limb movement disorder (PLMD), but NOT Restless Leg Syndrome (RLS). Suspected PLMD is defined by periodic episodes of repetitive limb movements during sleep associated with insomnia or hypersomnia not caused by another sleep disorder (such as OSA), while RLS is a subjective uncomfortable sensation experienced while awake. Patients who are undergoing initial diagnostic testing and have a high pre-test probability of moderate to severe obstructive sleep apnea (as defined in **SL-2.1: Home Sleep Testing (HST) Indications**) should be evaluated for obstructive sleep apnea before a diagnosis of PLMD is considered.* See practice note below.

Practice note

Occupational requirements (e.g., Department of Transportation [DOT], Federal Aviation Administration [FAA]) to date do not specify home vs. facility testing for initial evaluation. Indications for sleep studies should also be based on these guideline criteria.

Preoperative bariatric surgery testing should also be based on these guidelines criteria.

* Per the International Classification of Sleep Disorders, PLMD cannot be diagnosed in the context of RLS, narcolepsy, untreated obstructive sleep apnea or REM sleep behavior disorder. The presence of periodic limb movements of sleep (PLMS) on sleep testing does not equate to PLMD. PLMS is common, but PLMD is rare in adults.

Restless Legs Syndrome (Willis-Ekbom Disease) is a clinical diagnosis characterized by uncomfortable sensations in the legs that begin or worsen during rest, occur predominantly in the evening, and are partially or totally relieved by movement.

SL-2.3: Multiple Sleep Latency Testing (excessive sleepiness) Indications and Criteria

Multiple Sleep Latency Testing (MSLT, CPT® 95805) can be considered for the following:

- Suspected narcolepsy or idiopathic hypersomnia, see **SL-2.2.1: In-Laboratory Polysomnography- Other Indications**
 - ◆ Immediately follows PSG (CPT® 95810) (cannot follow split-night study)¹⁸, AND
 - ◆ Comprehensive Sleep Evaluation including ESS or Berlin performed, AND
 - ◆ If OSA is suspected, diagnostic study has been performed, and if OSA is present, therapy is initiated, and has resolved symptoms of increased airway resistance (e.g. eliminated snoring).
- Is not requested to assess efficacy of PAP therapy for OSA.

SL-2.4: Maintenance of Wakefulness Testing (MWT) - Indications and Criteria

- Maintenance of Wakefulness Testing (MWT)-General information
 - ◆ Maintenance of Wakefulness Testing (MWT) measures the ability to stay awake for a defined period of time.¹ Practice parameters on the clinical use of MWT were published by the American Academy of Sleep Medicine (AASM) in 2005.⁸⁵ Unlike MSLT, the performance of overnight polysomnography the night prior to MWT is considered optional. Per the AASM, the MWT 40 minute protocol is recommended. Clinical guidelines specify that MWT may be indicated to assess response to treatment in patients with sleep disorders associated with excessive daytime sleepiness.¹ MWT may also be useful to assess ability to maintain wakefulness when hypersomnia constitutes a public or personal safety concern.⁸⁵ However, the utility of MWT is limited by the lack of large scale studies providing normative data for mean sleep latency on MWT.¹ In addition, assessment of the daily ability to maintain wakefulness is complex and influenced by several variables not assessed during MWT such as long term treatment compliance, sleep duration and quality, circadian factors and shift work schedules. An updated position paper on the use of multiple sleep latency test (MSLT) and the MWT is expected to be published in Fall/Winter 2019.⁸⁶
- Maintenance of Wakefulness Testing-Indications
 - ◆ Maintenance of Wakefulness Testing (40 minute protocol) can be considered when ALL of the following criteria are met:
 - The patient has a diagnosed sleep disorder associated with excessive daytime sleepiness (e.g.: Obstructive sleep apnea, narcolepsy), AND
 - The patient is actively undergoing treatment for their sleep disorder and is compliant with treatment. If the patient is being treated with positive airway pressure (PAP) for obstructive sleep apnea, objective compliance is provided meeting compliance criteria (Using PAP > 70% of the nights for an average of 4 hours or more per 24 hour period) and therapy has resolved symptoms of increased upper airway resistance (i.e. eliminated snoring)

- Stated need to objectively document ability to maintain wakefulness as a measure of treatment response due to one of the following
 - Lack of reliable history
 - Personal or public safety concern

➤ AASM LEVELS OF RECOMMENDATIONS

Adapted from Standards of Practice Committee of the American Academy of Sleep Medicine. Practice parameters for clinical use of the multiple sleep latency test and the maintenance of wakefulness test. SLEEP 2005;28(1):113-121.

◆ TERM DEFINITION

- STANDARD- This is a generally accepted patient-care strategy, which reflects a high degree of clinical certainty. The term standard generally implies the use of Level I Evidence, which directly addresses the clinical issue, or overwhelming Level II Evidence.
- GUIDELINE- This is a patient-care strategy which reflects a moderate degree of clinical certainty. The term guideline implies the use of Level II Evidence or a consensus of Level III Evidence.
- OPTION- This is a patient-care strategy, which reflects uncertain clinical use. The term option implies either inconclusive or conflicting evidence or conflicting expert opinion.

General Recommendations	Level of Evidence
➤ The MSLT is a validated objective measure of the ability or tendency to fall asleep	STANDARD
➤ The MWT is a validated objective measure of the ability to stay awake for a defined time	STANDARD
➤ The MWT is used in association with the clinical history to assess the ability to maintain wakefulness	STANDARD
➤ The MWT 40-minute protocol is recommended when the sleep clinician requires objective data to assess an individual's ability to remain awake	OPTION
➤ To provide a valid assessment of sleepiness or wakefulness the MSLT and MWT must be performed under appropriate conditions using proper recording techniques and accepted protocols, with interpretation by a qualified and experienced clinician	STANDARD
Specific indications for the use of multiple sleep latency test (MSLT)	Level of Evidence
➤ The MSLT is indicated as part of the evaluation of patients with suspected narcolepsy to confirm the diagnosis	STANDARD
➤ The MSLT may be indicated as part of the evaluation of patients with suspected idiopathic hypersomnia to help differentiate idiopathic hypersomnia from narcolepsy	OPTION
➤ The MSLT is not routinely indicated in the initial evaluation and diagnosis of obstructive sleep apnea syndrome or in assessment of change following treatment with nasal CPAP	
➤ The MSLT is not routinely indicated for evaluation of sleepiness in medical and neurological disorders (other than narcolepsy), insomnia, or circadian rhythm disorders	OPTION
➤ Repeat MSLT testing may be indicated in the following situations: ◆ when the initial test is affected by extraneous circumstances or when appropriate study conditions were not present during initial testing ◆ when ambiguous or uninterpretable findings are present ◆ when the patient is suspected to have narcolepsy but earlier MSLT evaluation(s) did not provide polygraphic confirmation	STANDARD
Specific indications for the use of maintenance of wakefulness test (MWT)	Level of Evidence
➤ The MWT 40-minute protocol may be used to assess an individual's ability to remain awake when his or her inability to remain awake constitutes a public or personal safety issue	OPTION
➤ The MWT may be indicated in patients with excessive sleepiness to assess response to treatment.	

Adapted from Standards of Practice Committee of the American Academy of Sleep Medicine. Practice parameters for clinical use of the multiple sleep latency test and the maintenance of wakefulness test. SLEEP 2005;28(1):113-121.

SL-2.5: Split Night Study or Two Night Study

Split Night Study

- Split night study (CPT® 95811) is a single-night PSG + PAP trial, and typically can be completed if both:
 - ◆ Apnea Hypopnea Index (AHI) is greater than or equal to 15/hr for ≥ 2 hours of testing
 - ◆ ≥ 3 hours of sleep time remain for PAP titration
- Split night study (CPT® 95811) can be achieved in the majority of cases in one night. This is the current recommended approach per the American Academy of Sleep Medicine (AASM) if the above criteria are met.³⁸.

Two Night Study

- In some cases a split night study cannot be completed because the above criteria is not met and sleep testing must be done in two nights.
 - ◆ The first night's study is performed as (CPT® 95810)
 - ◆ Followed by second night PAP (CPT® 95811)
- When PAP titration (CPT® 95811) is subsequently requested after a completed PSG CPT® 95810 (full-night diagnostic of failed split-study) or HST, the following information should be used to consider unattended APAP or attended CPAP titration:
 - ◆ The same indications that were used to consider PSG or HST see **SL-2.2: In-Laboratory Polysomnography - OSA Indications**
 - ◆ All new information from the PSG or HST
- For more information on the technical and policy requirements of PSG, as well as on PSG scoring, see Practice Notes **SL-7: Practice Notes**

SL-2.6: Repeat Sleep Testing - (Home or Attended Sleep Studies)

SL-2.6.1: Repeat Diagnostic Study

- Either home sleep apnea testing or split night testing (CPT® 95811) based on indications and comorbidities found in **SL-2.1: Home Sleep Testing (HST) Indications** and **SL-2.2: In-Laboratory Polysomnography - OSA Indications** can be performed if any of the following criteria is met:
 - ◆ BMI falls below 30 and there is a desire to discontinue PAP therapy and/or intolerance to PAP therapy
 - ◆ To reassess for the continued presence of OSA after:
 - Surgical treatment for moderate to severe OSA, or
 - OSA Oral appliance trial, or
 - Other non-PAP supportive interventions (e.g. positional therapy).
 - ◆ Results of previous medically necessary sleep test were inadequate and not diagnostic due to limited sleep time or other specified variables (report of prior sleep testing required).

- ◆ **NOT** to assess for the continued presence of OSA in the absence of weight loss or one of the clinical interventions listed above
- ◆ **NOT** to supply new PAP equipment.
- If any of the above criteria is met, please see **SL-2.1: Home Sleep Testing (HST) Indications** and **SL-2.2: In-Laboratory Polysomnography - OSA Indications** for determination of appropriateness of home sleep apnea testing versus facility testing.

SL-2.6.2: Repeat Titration

- Repeat Titration study can be performed if any of the following criteria is met:
 - ◆ Reassessment of treatment results (with either CPT® 95811 or unattended APAP based on indications and comorbidities found in **SL-2.2: In-Laboratory Polysomnography - OSA Indications**) for a patient with known OSA currently on CPAP therapy can be performed when any of the following has occurred:
 - Substantial weight gain (10% of body weight) with return of symptoms.
 - BMI falls below 30 and there is intolerance of PAP pressure
 - Clinical response is insufficient despite treatment
 - Symptoms return despite a good initial response to CPAP.
 - PAP machine download with AHI > 5/hr with return of symptoms or > 15/hr with or without return of symptoms.
 - Must demonstrate that recurrent or continued symptoms are not due to insufficient compliance (must be using PAP > 70% of nights, 4+hrs/night with continued symptoms).
 - Results of previous medically necessary sleep test were inadequate and not diagnostic due to limited sleep time or other specified variables.
 - **NOT** to assess for the efficacy of PAP therapy in the absence of recurrent or changed symptoms. .
 - **NOT** to supply new PAP equipment.
 - If any of the above criteria is met for a patient on CPAP, please see **SL-2.2** for determination of appropriateness of automatic PAP trial versus facility titration study. Comorbidities in **SL-2.2** are required to perform repeat facility titration study without first undergoing an automatic PAP trial.
 - ◆ Re-assessment of treatment results (with CPT® 95811) for a patient with known OSA currently treated with bilevel PAP, APAP, ASV can be performed when any of the following has occurred:
 - Substantial weight gain (10% of body weight) with return of symptoms.
 - BMI falls below 30 and there is intolerance of PAP pressure
 - Clinical response is insufficient despite treatment.
 - Symptoms return despite a good initial response to CPAP.
 - PAP machine download with AHI > 5/hr with return of symptoms or > 15/hr with or without return of symptoms.
 - Must demonstrate that recurrent or continued symptoms are not due to insufficient compliance (must be using PAP > 70% of nights, 4+hrs/night with continued symptoms).
 - Results of previous medically necessary sleep test were inadequate and not diagnostic due to limited sleep time or other specified variables.

- **NOT** to assess for the efficacy of PAP therapy in the absence of recurrent or changed symptoms
- **NOT** to supply new PAP equipment.

SL-2.6.3: Re-assessment of suspected narcolepsy or idiopathic hypersomnia

- Reassessment of suspected narcolepsy or idiopathic hypersomnia with a repeat CPT® 95810/CPT® 95805 can be considered if previous testing did not confirm the diagnosis but clinical suspicion is still present despite treatment, or due to a change in symptoms (e.g. development of sleep paralysis, cataplexy, hypnagogic hallucinations or worsening hypersomnolence).
 - ◆ If the patient also has OSA, CPT® 95811 is supported instead of CPT® 95810 as the patient must be on PAP therapy prior to MSLT.

SL-2.7: PAP-NAP (CPT® 95807-52)

- PAP-NAP, a daytime abbreviated cardiorespiratory sleep study, was developed as a means of improving adherence to positive airway pressure in patients with sleep disordered breathing and co-morbid insomnia and psychiatric disorders.²¹ A pilot study performed in 2008 demonstrated improvement in PAP adherence compared to historical controls in patients with insomnia and diagnosed and/or symptoms of psychiatric disorders.²¹ However, no subsequent controlled studies have been published. Therefore, CPT® **95807 or 95807-52** for the purposes of performing PAP-NAP is not covered procedure.

Practice Note

- Result of previous studies should be submitted for review prior to authorization of additional studies.

SL-3: Pediatric Sleep Guidelines

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SL-3.1: Proper Uses of Polysomnography in Pediatric Patients

Use of home/portable sleep studies for the diagnosis of OSA in children (17 years and younger) is considered investigational at this time. Limited portable studies, or studies in the home, are not sufficient to exclude OSA in a child with suggestive symptoms, nor can they reliably assess the severity of the disorder which is important in planning treatment. Overnight polysomnography remains the diagnostic "gold-standard" in children with OSA.

- Overnight polysomnography (PSG) in a sleep lab setting is appropriate for children (17 years of age and younger) for the diagnosis of **any** of the following conditions:
 - ◆ Sleep related breathing disorders, such as obstructive sleep apnea, upper airway resistance syndrome
 - ◆ Narcolepsy or idiopathic hypersomnia (generally would be performed in conjunction with a multiple sleep latency test)
 - ◆ Congenital central alveolar hypoventilation syndrome or sleep related hypoventilation due to neuromuscular disorders or chest wall deformities
 - ◆ Nocturnal seizure activity
 - ◆ REM behavior disorder (rare in childhood)
 - ◆ Repeat PSG following adenotonsillectomy if there are residual symptoms of OSA or to assess for residual OSA
 - ◆ Polysomnography of primary sleep apnea of infancy (when other medical disorders have been ruled out)
 - ◆ Suspected periodic limb movement disorder
- Overnight PSG in a sleep lab is appropriate for children with habitual snoring associated with **any** of the following:
 - ◆ Restless or disturbed sleep
 - ◆ Behavioral disturbance, or learning disorders including deterioration in academic performance, hyperactivity, or attention deficit disorder
 - ◆ Unexplained enuresis
 - ◆ Frequent awakenings
 - ◆ Failure to thrive or growth impairment
 - ◆ Witnessed apnea
 - ◆ Excessive daytime somnolence, or altered mental status unexplained by other conditions or etiologies
 - ◆ Polycythemia unexplained by other conditions or etiologies
 - ◆ Cor pulmonale unexplained by other conditions or etiologies
 - ◆ Hypertrophy of tonsils and adenoids associated with noisy daytime respirations where surgical removal poses a significant risk and would be avoided in the absence of sleep disordered breathing.
- Polysomnography when there is clinical evidence of a sleep related breathing disorder in infants who have experienced an apparent life-threatening event (ALTE).
- Repeat overnight polysomnography in a sleep lab setting for children is considered medically necessary in **any** of the following circumstances:

- ◆ Initial polysomnography is inadequate or non-diagnostic and the accompanying caregiver reports that the child's sleep and breathing patterns during the testing were not representative of the child's sleep at home;
 - ◆ For positive airway pressure (PAP) titration in children with obstructive sleep apnea syndrome.
 - ◆ A child with previously diagnosed and treated obstructive sleep apnea who continues to exhibit persistent snoring or other symptoms of sleep disordered breathing.
 - ◆ To periodically re-evaluate the appropriateness of continuous positive airway pressure (CPAP) setting based on the child's growth pattern or the presence of recurrent symptoms while on CPAP.
 - ◆ If obesity was a major contributing factor and significant weight loss has been achieved, repeat testing may be indicated to determine the need for continued therapy.
- Repeat polysomnography to assess for residual OSA following adenotonsillectomy is warranted when one of the following is present:
- ◆ Residual symptoms of OSA are present in children with mild OSA preoperatively OR
 - ◆ One of the following is present:
 - moderate to severe OSA
 - obesity
 - craniofacial abnormalities that obstruct the upper airway
 - neurological disorders such as Down Syndrome, Prader-Willi, and meningocele
- Polysomnographic normal standards differ between children and adults.
- ◆ Diagnosis of pediatric obstructive sleep apnea is demonstrated by both of the following:
 - The presence of one or more of the following:
 - Snoring
 - Labored, paradoxical or obstructed breathing during the child's sleep
 - Sleepiness, hyperactivity, behavioral problems, or learning problems
 - PSG demonstrates one or more of the following:
 - one or more obstructive apneas, mixed apneas, or hypopneas per hour of sleep **or**
 - A pattern of obstructive hypoventilation defined as at least 25% of total sleep time with hypercapnia ($\text{PaCO}_2 > 50$ mm Hg) in association with one or more of the following: snoring, flattening of the inspiratory nasal pressure waveform, paradoxical thoracoabdominal motion.

Practice Note

- Pediatric definitions for apneas and hypopneas differ compared with adults:
- ◆ Pediatric apnea: Drop in peak signal excursion by $\geq 90\%$ of pre-event baseline with an oronasal thermal sensor or alternative apnea sensor (diagnostic) or PAP device flow (titration study) for at least the duration of 2 breaths during the

baseline portion of the study (obstructive or mixed events). Note: Duration criteria differ for central events.

- ◆ Pediatric hypopnea:
 - The peak signal excursion drops by > 30% of the pre-event baseline using nasal pressure or alternative hypopnea sensor (diagnostic study) or PAP device flow (titration study) for ≥ 2 breaths
 - There is a > 3% oxygen desaturation from pre-event baseline or the event is associated with an arousal

SL-3.2: CPAP in Pediatric Patients

- CPAP is indicated when **all** of the following criteria are met:
 - ◆ OSA diagnosis has been established by PSG; and
 - ◆ Adenotonsillectomy has been unsuccessful or is determined to be clinically inappropriate, or when definitive surgery is indicated but must await complete dental and facial development

SL-3.3: Improper Uses of Polysomnography in Pediatric Patients

- The peer-reviewed medical literature **does not** support the following:
 - ◆ Repeat polysomnography in the follow-up of patients with obstructive sleep apnea treated with CPAP when symptoms attributable to sleep apnea have resolved
 - ◆ Polysomnography in children for **any** of the following:
 - Sleep walking or night terrors
 - Routine evaluation of adenotonsillar hypertrophy alone without other clinical signs or symptoms suggestive of obstructive sleep disordered breathing
 - Routine follow-up for children with mild OSA whose symptoms have resolved post-adenotonsillectomy

SL-4: Treatment of Obstructive Sleep Apnea (OSA) and Other Sleep-related Breathing Disorders

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SL-4.1: General Requirements

- Positive diagnosis of a sleep-related breathing disorder, as measured by valid testing demonstrating one or more of the following:
 - ◆ OSA defined as (one of the following):
 - The apnea-hypopnea index (AHI), respiratory disturbance index (RDI), respiratory event index (REI) is ≥ 15 events per hour
 - The AHI, RDI, or REI is ≥ 5 and ≤ 14.9 events per hour and documentation of:
 - Symptoms of sleepiness, nonrestorative sleep, fatigue, or insomnia
 - Report of awakening with breath holding, gasping, or choking
 - Bed partner or other observer reports habitual snoring, breathing interruptions, or both during sleep
 - Hypertension, a mood disorder, cognitive dysfunction, coronary artery disease, congestive heart failure, atrial fibrillation, type 2 diabetes mellitus, or stroke.
 - ◆ CSA defined as (both):
 - Central hypopnea/apneas are $\geq 50\%$ of total
 - Central apnea and/or central hypopnea index ≥ 5 per hour
 - ◆ Central sleep apnea (CSA) with Cheyne-Stokes Respiration defined as (all):
 - Central hypopnea/apneas are $> 50\%$ of total
 - Central apnea and/or central hypopnea index ≥ 5 per hour
 - Pattern of breathing meets criteria for Cheyne-Stokes breathing i.e. periodic breathing characterized by the waxing and waning of respiratory effort and airflow (crescendo and decrescendo change in breathing amplitude)
 - ◆ Treatment Emergent Central Sleep Apnea defined as (both):
 - Diagnostic PSG demonstrates 5 or more obstructive respiratory events per hour of sleep
 - PSG during use of positive airway pressure shows improvement of obstructive events and emergence or persistence of central apneas/hypopneas with (both):
 - Central apnea and/or hypopnea index ≥ 5 per hour
 - Central hypopnea/apneas are $\geq 50\%$ of total
 - ◆ Sleep-related hypoventilation defined as (one):
 - Either of the below occur during sleep:
 - Increase in arterial PCO₂, transcutaneous PCO₂, or end-tidal PCO₂ to a value >55 mmHg for ≥ 10 minutes
 - There is a >10 mmHg increase in arterial PCO₂, transcutaneous PCO₂, or end-tidal PCO₂ during sleep (compared to awake supine value) to a value > 50 mmHg for > 10 minutes
- Results from the sleep study are used to determine the type of sleep apnea, the severity of the breathing disorder, and the most appropriate form of treatment. Depending on these factors, a variety of PAP devices, and location of titration of therapy, can be considered.
- Positive airway pressure is the treatment of choice for the various forms of sleep apnea. Positive airway pressure (PAP) is produced by a flow generator and applied to the airway through nasal, oral, or oronasal mask interfaces

Practice Note:

Requests for E0470 or E0471 for a pulmonary or neurological disorder in the absence of a comorbid sleep-related breathing disorder will be returned to the health plan for medical necessity review.

SL-4.1.1: Treatment - Coding

Treatment Codes (HCPCS and CPT®)	CODE
Continuous airway pressure (CPAP/APAP) device	E0601
Respiratory assist device, bilevel pressure (BPAP) capability, WITHOUT backup rate feature, used with noninvasive interface, e.g. nasal or facial mask (intermittent assist device with continuous positive airway pressure device)	E0470
Respiratory assist device, bilevel pressure (BPAP) capability (including ASV), WITH backup rate feature, used with noninvasive interface, e.g. nasal or facial mask (intermittent assist device with continuous positive airway pressure device)	E0471
Respiratory assist device, bilevel pressure (BPAP) capability, WITH backup rate feature, used with invasive interface, e.g. tracheostomy tube (intermittent assist device with continuous positive airway pressure device)	E0472
Humidifier, non-heated, used with positive airway pressure (CPAP/BiPAP/APAP) device	E0561
Humidifier, heated, used with positive airway pressure (CPAP/BiPAP/APAP) device	E0562
Tubing with heating element	A4604
Combination oral/nasal mask	A7027
Replacement oral cushion combo mask	A7028
Replacement nasal pillow comb mask	A7029
CPAP full face mask	A7030
Replacement facemask interface	A7031
Replacement nasal cushion	A7032
Replacement nasal pillows	A7033
Nasal interface (mask or cannula type) used with PAP device	A7034
Positive airway pressure headgear	A7035
Positive airway pressure chinstrap	A7036
Positive airway pressure tubing	A7037
Positive airway pressure filter	A7038
Filter, non-disposable w/ PAP	A7039
PAP oral interface	A7044
Replace exhalation port	A7045
Replacement, water chamber, PAP device	A7046
Monitoring feature/device, stand-alone or integrated, any type, includes all accessories, components and electronics, not otherwise classified (this code relates to Compliance and the data download of a patient's PAP therapy).	A9279
CPAP initiation and management (code is used to report the initiation and instruction when a patient begins therapy)	CPT® 94660

SL-4.1.2: Current Practice Recommendations for CSA with CHF

- CPAP: Standard
- BiPAP (including ST): Option if CPAP ineffective
- ASV:
 - ◆ OPTION if EF > 45% **or** mild central sleep apnea syndrome
 - ◆ **STANDARD AGAINST** if EF ≤ 45% with moderate/severe central sleep apnea syndrome³⁵

SL-4.1.3: Treatment of Opioid-Induced Sleep Disordered Breathing

- CSAS associated with drug or substance use: There is currently no evidence to support routine use of facility-based diagnostic sleep testing due to concurrent opioid or other substance use in the absence of clinical history or previous diagnostic testing suggesting or confirming the presence of sleep disordered breathing. Recent studies suggest “medium increased risk” for central apnea in long-term opioid users, but further investigation is recommended. If diagnostic testing is indicated, home sleep testing is not supported for evaluation of chronic opioid users³⁸ (see **SL-2.2.1: In-Laboratory Polysomnography - Other Indications**). With respect to treatment, current literature is “markedly limited” and further studies are clearly needed to conclusively determine if CPAP is less effective than BiPAP or ASV, although recent studies suggest ASV may be effective in treatment-resistant patients.^{36, 37}

SL-4.2: Positive Airway Pressure Devices

SL-4.2.1: Auto-titration of positive airway pressure in unattended setting

- Initial E0601 APAP Titration can be considered for positive diagnosis of OSA, as defined in **SL-1.1: General Requirements**
- Repeat E0601 APAP Titration (includes re-titration following initial CPT® 95811 when uncomplicated) can be considered for the following (ALL):
 - ◆ A positive diagnosis of OSA, as measured by HST or PSG as defined in **SL-1.1: General Requirements**
 - ◆ Attempted compliance with preexisting or existing therapy (70% of nights, 4+ hours/night) has not adequately treated signs and symptoms.
 - ◆ Persistent symptoms or unimproved AHI/RDI in individual currently on APAP/CPAP therapy, when the patient and/or their caregiver has received the following from the treating physician or supplier of the PAP device:
 - Instruction in the proper use and care of the equipment
 - Mask re-fitting or adjustment if necessary
 - Education for proper use of PAP accessories

SL-4.2.2: Continuous Positive Airway Pressure therapy

- Initiation of E0601 PAP Therapy and establishing compliance (All of the following):
 - ◆ A positive diagnosis of OSA or central sleep apnea, as measured by HST or PSG as defined in **SL-1.1** and **SL-4.1: General Requirements**
 - ◆ The patient and/or their caregiver have received instruction from the treating physician and supplier of the CPAP device and accessories in the proper use and care of the equipment²²
 - ◆ A compliance support plan between the treating physician and DME supplier has been established
- Authorization for equipment purchase:
 - ◆ Device must be consistently used (70% of nights) for an average of four hours or more per 24 hour period, during a consecutive 30 day period during the first 3 months of usage
 - ◆ Patient has regular follow-up to evaluate symptoms
- Extension of establishing compliance with E0601 (All of the following):
 - ◆ Patient history includes **one** of the following:
 - Failure to resolve symptoms or unimproved AHI during initial compliance period²², OR
 - Inconsistent usage of device related to improper fit, lack of education, intolerance of PAP therapy, or device malfunction
 - ◆ Patient has received from the ordering physician or supplier of the PAP device in the past 30 days (**all** of the following):
 - Instruction in the proper use and care of the equipment
 - Mask refitting or adjustment if necessary
 - Education for proper use of PAP accessories

- Replacement APAP/CPAP E0601 device (**All** of the following):
 - ◆ Continued resolution of symptoms and improved AHI on therapy
 - ◆ Device consistently used for an average of four hours or more per 24 hr period, 70% of nights
 - ◆ Device is not operating
 - ◆ DME supplier has physically evaluated the device and determined that it is unable to be repaired
 - ◆ Device to be replaced is no longer covered under a warranty

SL-4.2.3: Bilevel Positive Airway Pressure – spontaneous mode

- Initiation of E0470 PAP Therapy and establishing compliance (ALL):
 - ◆ Diagnosis of sleep disordered breathing as defined in **SL-4.1: General Requirements**
 - ◆ One of the following medical conditions must be documented in the patient's record:
 - Neuromuscular disease or restrictive thoracic disorder:
 - Neuromuscular disease (e.g. amyotrophic lateral sclerosis) or a severe thoracic cage abnormality (e.g. severe kyphoscoliosis, post-thoracoplasty), AND
 - One of the following:
 - An arterial blood gas PaCO₂, done while awake and breathing the patient's prescribed FiO₂, is ≥ 45 mm Hg, or
 - Sleep oximetry demonstrates oxygen saturation ≤ 88% for ≥ 5 minutes of nocturnal recording time (minimum recording time of 2 hours), done while breathing the patient's prescribed FiO₂, or
 - Neuromuscular disease only:
 - ◆ Maximal inspiratory pressure is < 60cm H₂O, or
 - ◆ Forced vital capacity is < 50% predicted, or
 - ◆ Symptomatic respiratory disease impairing activities of daily living
 - Severe COPD:
 - An arterial blood gas PaCO₂ is ≥ 52 mm Hg done while awake and breathing the patient's prescribed FiO₂, or
 - Sleep oximetry demonstrates oxygen saturation ≤ 88% for ≥ 5 minutes of nocturnal recording time (minimum recording time of 2 hours), done while breathing 2 LPM or the patient's prescribed FiO₂ (whichever is higher), and
 - OSA and treatment with CPAP has been considered and ruled out
 - Central sleep apnea diagnosis
 - Valid testing meeting criteria for central sleep apnea as defined in **SL-4.1: General Requirements**
 - Significant improvement of the central events with the use of E0470 device on the settings that will be prescribed for initial use at home.
 - Treatment-Emergent Central Sleep Apnea when:
 - Valid testing meeting criteria for treatment emergent central sleep apnea as defined in **SL-4.1: General Requirements**

- Significant improvement of the central events with the use of E0470 device on the settings that will be prescribed for initial use at home.
 - Obstructive sleep apnea when:
 - Diagnosis of OSA as defined in **SL-1.1: General requirements**, and
 - CPAP (E0601) has been tried and proven either ineffective or not tolerated, based on a therapeutic trial conducted in either a facility or a home setting²²
 - Obesity-hypoventilation syndrome during sleep:
 - $\leq 88\%$ for ≥ 5 minutes of nocturnal recording time (minimum recording time of 2 hours), and
 - Occurs in the absence of obstructive events, and
 - Patient has BMI > 30 kg/m² plus arterial blood gas with PCO₂ > 45
 - Other sleep-related hypoventilation syndrome:
 - As defined in **SL-4.1: General Requirements**
- Continued E0470 therapy after initial 3 months:
- ◆ Device must be consistently used (70% of nights) for an average of four hours or more per 24 hour period, during a consecutive 30 day period during the first 3 months of usage
 - ◆ Patient has regular follow-up to evaluate symptoms
- Replacement Bilevel PAP E0470 device (All of the following):
- ◆ Continued resolution of symptoms and improved AHI/RDI on therapy
 - ◆ Device consistently used for an average of four hours or more per 24 hour period, 70% of nights
 - ◆ Device is not operating
 - ◆ DME supplier has physically evaluated the device and determined that it is unable to be repaired
 - ◆ Device to be replaced is no longer covered under a warranty

SL-4.2.4: Bilevel Positive Airway Pressure – spontaneous/timed mode

- Diagnosis of sleep disordered breathing as defined in **SL-4.1: General Requirements**
- Initiation of E0471 PAP Therapy and establishing compliance (ALL):
 - ◆ One of the following medical conditions must be documented in the patient's record:
 - Neuromuscular disease or restrictive thoracic disorder:
 - Neuromuscular disease (e.g. amyotrophic lateral sclerosis) or a severe thoracic cage abnormality (e.g. severe kyphoscoliosis, post-thoracoplasty), AND
 - One of the following:
 - An arterial blood gas PaCO₂, done while awake and breathing the patient's prescribed FiO₂, is ≥ 45 mm Hg, or
 - Sleep oximetry demonstrates oxygen saturation ≤ 88% for ≥ 5 minutes of nocturnal recording time (minimum recording time of 2 hours), done while breathing the patient's prescribed FiO₂, or
 - Neuromuscular disease only:
 - ◆ Maximal inspiratory pressure is < 60cm H₂O, or
 - ◆ Forced vital capacity is < 50% predicted, OR
 - Severe COPD:
 - PaCO₂ is ≥ 7mm Hg during sleep compared to the initial blood gas taken while awake and breathing prescribed FiO₂, and
 - A facility-based PSG demonstrates oxygen saturation of < 88% for ≥ 5 minutes of nocturnal recording time (minimum recording time of 2 hours) that is not caused by obstructive upper airway events (AHI < 5)
 - ◆ (See above for coverage of E0470 for OSA), OR
 - An arterial blood gas PaCO₂ done while awake and breathing the patient's prescribed FiO₂ is ≥ 52 mm Hg, and
 - Sleep oximetry while breathing with the E0470 device, demonstrates oxygen saturation ≤ 88% for ≥ 5 minutes of nocturnal recording time (minimum recording time of 2 hours), done while breathing oxygen at 2 LPM or the patient's prescribed FiO₂ (whichever is higher), OR
 - Central sleep apnea diagnosis (either primary central sleep apnea or central sleep apnea with Cheyne-Stokes Breathing) when:
 - Valid testing meeting criteria for central sleep apnea as defined in **SL-4.1: General Requirements**
 - Significant improvement of the central events with the use of E0471 device on the settings that will be prescribed for initial use at home.
 - See **SL-4.2.6** for guidelines specific to adaptive servo ventilation (ASV)
 - Treatment-Emergent Central Sleep Apnea when:
 - Valid testing meeting criteria for treatment-emergent central sleep apnea as defined in **SL-4.1: General Requirements**
 - Significant improvement of the central events with the use of E0471 device on the settings that will be prescribed for initial use at home.

- Other hypoventilation syndrome when:
 - A covered E0470 device is being used, and
 - Continued sleep-related hypoventilation is present as defined in **SL-4.1: General Requirements**
- Continued E0471 therapy after initial 3 months:
 - ◆ Device must be consistently used (70% of nights) for an average of four hours or more per 24 hour period, during a consecutive 30 day period during the first 3 months of usage
 - ◆ Patient has regular follow-up to evaluate symptoms
- Replacement Bilevel PAP E0471 device (All of the following):
 - ◆ Continued resolution of symptoms and improved AHI/RDI on therapy; AND
 - ◆ Device consistently used for an average of four hours or more per 24 hr period, 70% of nights; AND
 - ◆ Device is not operating; AND
 - ◆ DME supplier has physically evaluated the device and determined that it is unable to be repaired; AND
 - ◆ Device to be replaced is no longer covered under a warranty

SL-4.2.5: Heated (E0562) and non-heated (E0561) humidifier

- Initial set-up (All of the following):
 - ◆ When requested by treating physician and PAP device (E0470/471 or E0601) has been approved
 - ◆ No previous humidifier has been provided
- Replacement heated or non-heated humidifier (E0562 or E0561) device (All of the following):
 - ◆ Continued resolution of symptoms and improved AHI on PAP therapy
 - ◆ Device consistently used for an average of four hours or more per 24 hr period, 70% of nights
 - ◆ Humidifier device is not operating
 - ◆ DME supplier has physically evaluated the device and determined that it is unable to be repaired
 - ◆ Device to be replaced is no longer covered under a warranty

SL-4.2.6: Adaptive Servo Ventilation (ASV) therapy (E0471)

- Initiation of E0471 ASV Therapy and establishing compliance (ALL):
 - ◆ One of the following medical conditions must be documented in the patient's record:
 - Central sleep apnea (including Cheyne-Stokes breathing):
 - Diagnosis of central sleep apnea as defined in **SL-4.1: General Requirements**
 - Mild CSA, or Moderate to Severe CSA with EF > 45%.
 - OR
 - Treatment Emergent Central Sleep Apnea Documented persistent, treatment-emergent central or mixed apnea with application of CPAP

- Central hypopnea/apneas are $\geq 50\%$ of total, and
- Central apnea index ≥ 5 per hour, **and**
- Failure of prior Bilevel trial (spontaneous or spontaneous/timed)

OR

- Central Sleep Apnea Syndrome due to opioid or substance use:
 - CPAP has been shown to be ineffective following a reasonable treatment attempt/trial, **AND**
 - Opioid therapy cannot be reduced or discontinued, **and**
 - Central hypopnea/apneas are $\geq 50\%$ of total, **and**
 - Central apnea index ≥ 5 per hour.
- Continued E0471 therapy after initial 3 months:
 - ◆ Device must be consistently used (70% of nights) for an average of four hours or more per 24 hr period, during a consecutive 30 day period during the first 3 months of usage
 - ◆ Patient has regular follow-up to evaluate symptoms
- Replacement ASV E0471 device (All of the following):
 - ◆ Continued resolution of symptoms and improved AHI/RDI on therapy; **and**
 - ◆ Device consistently used for an average of four hours or more per 24 hr period, 70% of nights, **and**
 - ◆ Device is not operating, **and**
 - ◆ DME supplier has physically evaluated the device and determined that it is unable to be repaired, **and**
 - ◆ Device to be replaced is no longer covered under a warranty

SL-4.2.7: Continuous positive airway pressure ventilation (CPAP), initiation, and management (94660)

- Physician face-to-face service addressing PAP usage:
 - ◆ Physician application or adjustment of mask or pressure titration or PAP related service; **and**
 - ◆ Service cannot be adequately provided by a certified or registered respiratory therapist, licensed clinician, or sleep technologist when within scope of practice per state regulations; **and**
 - ◆ Another evaluation and management service is not performed.

SL-4.3: Positive Airway Pressure Treatment Supplies

SL-4.3.1: PAP Masks and parts A7027, A7030, A7034, A7044, A7035, A7036

- Combination oral/nasal mask, used with PAP, each (A7027):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 1 per 3 months.
 - ◆ No other PAP mask ordered (i.e., A7030, A7034, or A7044).
- Oral cushion used with combination oral/nasal mask, replacement only (A7028):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Only compatible with A7027 mask.
 - ◆ Frequency: 2 per month.
- Nasal pillows used with combination oral/nasal mask, replacement only, pair (A7029):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Only compatible with A7027 mask.
 - ◆ Frequency: 2 per month.
- Full face mask used with PAP, each (A7030):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 1 per 3 months.
 - ◆ No other PAP mask ordered (i.e., A7027, A7034, or A7044).
- Full face mask interface replacement, each (A7031):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Only compatible with A7030 mask.
 - ◆ Frequency: 2 per month.
- Nasal interface (mask or cannula type) used with PAP, each (A7034):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 1 per 3 months.
 - ◆ No other PAP mask ordered (i.e., A7027, A7030, or A7044).
- Cushion for use on nasal mask interface, replacement only, each (A7032):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Only compatible with A7034 mask.
 - ◆ Frequency: 2 per month.
- Nasal pillow for use on nasal cannula type interface, replacement only, pair (A7033):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Only compatible with A7034 mask.
 - ◆ Frequency: 2 per month.
- Oral interface used with PAP, each (A7044):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 1 per 6 months.
 - ◆ No other PAP mask ordered (i.e., A7027, A7030, or A7034).

- Headgear used with PAP, each (A7035):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 1 per 6 months.
- Chinstrap used with PAP, each (A7036):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 1 per 6 months.

SL-4.3.2: Positive airway pressure tubing (A4604, A7037)

- Tubing with integrated heating element for use with PAP devices, each (A4604):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 1 per 3 months.
 - ◆ No other PAP tubing ordered (i.e., A7037).
- Tubing used with PAP devices, each (A7037):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 1 per 3 months.
 - ◆ No other PAP tubing ordered (i.e., A4604).

SL-4.3.3: Positive airway pressure device filters (A7038, A7039)

- Filter, disposable, used with PAP devices (A7038):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 2 per 1 month.
- Filter, non-disposable, used with PAP devices (A7039):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 1 per 6 months.

SL-4.3.4: Miscellaneous positive airway pressure supplies (A7045, A7046)

- Exhalation port with or without swivel used with accessories for positive airway devices, replacement only (A7045):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 1 per 6 months.
- Water chamber for humidifier, used with positive airway pressure device, replacement, each (A7046):
 - ◆ Coverage criteria for PAP device is met.
 - ◆ Frequency: 1 per 6 months.

SL-5: Sleep Apnea Treatment Program Exclusions

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SL-5.2: Durable Medical Equipment Device and Supply Exclusions	39

SL-5.1: Experimental and Investigational

- The effectiveness of the following therapies has not been established in the treatment of OSA; these therapies may be considered experimental and investigational:
 - ◆ Provent Sleep Apnea Therapy
 - ◆ Winx Therapy System/Oral Pressure Therapy

SL-5.2: Durable Medical Equipment Device and Supply Exclusions

- CPT® 94799 – Unlisted pulmonary service or procedure
 - ◆ Due to the presence of more specific codes, medical necessity for this code cannot be established
- E1399 – Miscellaneous durable medical equipment items, components, and accessories
 - ◆ Due to the presence of more specific codes for PAP equipment, medical necessity for this code cannot be established for PAP equipment

SL-6: Actigraphy (CPT® 95803)

SL-6.1: Actigraphy-Indications

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SL-6.1: Actigraphy-Indications

- Actigraph devices, worn on the wrist, record movement and utilize rest activity patterns to estimate sleep parameters.
- There is insufficient data currently available to generate appropriateness criteria for the use of actigraphy and this procedure should be considered investigational at this time.

SL-7: Practice Notes

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SL-7.1: Occupational Requirements

- The FAA does not give any specific guidance on when testing is required. They recommend Maintenance of Wakefulness Test (evaluates daytime alertness) if there remains any question, as well as, CPT® 95810 or CPT® 95811.
- The US DOT will not qualify a driver with “respiratory dysfunction (including sleep apnea) likely to interfere with ability to control or drive.” Sleep apnea requires a medical examination by (proposed administrative rule) “prefer[ably] Over-night” PSG but “accept[s] Home Sleep Testing as a controversial, new technology.” It is not clear whether sleep apnea will disqualify a driver that already has a license.
 - ◆ Federal Motor Carrier Safety Administration (FMCSA). Regulations: 49 CFR Parts 300-399. Available at: <http://www.fmcsa.dot.gov/regulations/title49/b/5/3>. Accessed October 16, 2017.

SL-7.2: Technical and Policy Requirements of PSG

- The parameters, settings, filters, technical specifications, sleep stage scoring and event scoring should be done in accordance with the AASM Manual for the Scoring of Sleep and Associated Events.
- HST should, at a minimum, record airflow, respiratory effort, and blood oxygenation. The type of biosensors used to monitor these parameters for in-laboratory PSG are recommended for use in HSTs and include the following:
 - ◆ Oronasal thermal sensor and nasal pressure transducer for airflow, apnea and hypopnea; **and**
 - ◆ Oximetry with a high sampling rate and fast averaging time for blood oxygenation; **and**
 - ◆ Ideally, a calibrated or uncalibrated respiratory inductance plethysmography for respiratory effort; **or**
 - ◆ Peripheral Arterial Tonometry (PAT) with oximetry and actigraphy
- Apnea-Hypopnea Index (AHI) by HST is the number of apneas + hypopneas / total recording time rather than total sleep time. As a result, HST's are likely to underestimate the severity of events compared to the Apnea- Hypopnea Index (AHI) by PSG. Due to the known rate of false negative HST, in-laboratory PSG should be performed in cases where HST is technically inadequate or fails to establish the diagnosis of OSA in patients with a high pretest probability.
- The eviCore guidelines recognize that HST can be appropriately performed by Joint Commission (JCAHO) and Medicare IDTF-approved facilities.
- PSG is called Type I monitoring:
 - ◆ Consists of minimum of 6 hours of constant monitoring in a controlled facility environment.
 - ◆ Involves 7 measurement parameters (3 channels of EEG, 2 channel electrooculography, 2 channels of anterior tibialis EMG, ECG or heart rate, oxygen saturation, airflow monitoring, and measures of sub-mental breathing/respiratory effort).

- ◆ Facilities also typically record body position (with video) and snoring (via microphone).
- Results are reported and calculations of the Apnea-Hypoxia Index (AHI) or Respiratory Disturbance Index (RDI) are performed.
- ◆ Scoring PSG:
 - OSA is confirmed if > 15 obstructive events per hour or > 5 obstructive events per hour plus clinical symptoms
 - Obstructive events include apneas, hypopneas, or respiratory-effort related arousals for calculation of RDI.
 - Obstructive events include apneas and hypopneas for calculation of AHI. RDI cannot accurately be calculated by HST.
 - Respiratory Event Index (REI) is appropriate for reporting sleep disordered breathing by HST.

SL-8: Questionnaires

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SL-8.1: Epworth Sleepiness Scale

The **Epworth Sleepiness Scale** is comprised of eight questions, with a maximum score of 24. A score >10 indicates moderate to high probability of excessive daytime sleepiness.

Epworth Sleepiness Scale	
Use the following scale to choose the most appropriate number for each situation: 0 = would never doze or sleep; 1 = slight chance of dozing or sleeping 2 = moderate chance of dozing or sleeping; 3 = high chance of dozing or sleeping	
Situation	Chance of Dozing or Sleeping
1. Sitting and reading	
2. Watching TV	
3. Sitting inactive in a public place	
4. Being a passenger in a motor vehicle for an hour or more	
5. Lying down in the afternoon	
6. Sitting and talking to someone	
7. Sitting quietly after lunch (no alcohol)	
8. Stopped for a few minutes in traffic while driving	
Total Epworth Score (add up the points)	

SL-8.2: The Berlin Questionnaire

The Berlin Questionnaire is comprised of 3 categories and ten questions. Two or more categories with a positive score indicate high probability of OSA.

Patient BMI - _____	
Category 1	Category 2
1. Do you snore? a. Yes b. No c. Don't know <i>If you snore:.....</i>	6. How often do you feel tired or fatigued after your sleep a. Nearly every day b. 3-4 times a week c. 1-2 times a week d. 1-2 times a month e. Never or nearly never
2. Your snoring is: a. Slightly louder than breathing b. As loud as talking c. Louder than talking d. Very loud-can be heard in adjacent rooms	7. During your waking time, do you feel tired, fatigued, or not up to par? a. Nearly every day b. 3-4 times a week c. 1-2 times a week d. 1-2 times a month e. Never or nearly never
3. How often do you snore? a. Almost every day b. 3-4 times a week c. 1-2 times a week d. 1-2 times a month e. Never or almost never	8. Have you ever nodded off or fallen asleep while driving a vehicle a. Yes b. No <i>If yes:</i>
4. Does your snoring bother other people? a. Yes b. No c. Don't know	9. How often does this occur? a. Nearly every day b. 3-4 times a week c. 1-2 times a week d. 1-2 times a month e. Never or nearly never
5. Has anyone noticed that you quit breathing during your sleep? a. Nearly every day b. 3-4 times a week c. 1-2 times a week d. 1-2 times a month e. Never or nearly never	Category 3 a. Do you have high blood pressure? b. Yes c. No Don't know

Berlin Questionnaire Scoring

- **Category 1:** Items 1-5
 - ◆ Item 1: if 'Yes', assign **1 point**
 - ◆ Item 2: if 'c' or 'd' is the response, assign **1 point**
 - ◆ Item 3: if 'a' or 'b' is the response, assign **1 point**
 - ◆ Item 4: if 'a' is the response, assign **1 point**
 - ◆ Item 5: if 'a' or 'b' is the response, assign **2 points**
 - ◆ Add Points. Category 1 is positive if the total score is 2 or more points.
- **Category 2:** Items 6, 7, 8 (item 9 should be noted separately)
 - ◆ Item 6: if 'a' or 'b' is the response, assign **1 point**
 - ◆ Item 7: if 'a' or 'b' is the response, assign **1 point**
 - ◆ Item 8: if 'a' is the response, assign **1 point**
 - ◆ Add Points. Category 2 is positive if the total score is 2 or more points
- **Category 3:** is positive if the answer to Item 10 is 'Yes' **OR** if the BMI of the patient is greater than 30kg/m².
- **High Risk:** if there are 2 or more Categories where the score is positive
- **Low Risk:** if there is only 1 or no Categories where the score is positive

SL-8.3: STOP Bang

STOP Bang questionnaire has eight yes/no questions. A “yes” answer on three or more questions indicates high probability of OSA.

Snoring

1. Do you snore loudly (louder than talking or loud enough to be heard through closed doors?)

Tired

2. Do you often feel tired, fatigued, or sleepy during daytime?

Observed

3. Has anyone observed you stop breathing during your sleep?

Blood Pressure

4. Do you have or are you being treated for high blood pressure?

BMI

5. BMI higher than 35kg/m²

Age

6. Age over 50 years old?

Neck Circumference

7. Neck circumference greater than 40cm?

Gender

8. Gender male?
 - Intermediate to High risk of OSA: answering “yes” to three or more items. Please see note below for score of three or greater.**
 - Low risk of OSA: answering “yes” to less than three items

**** Practice Note:** *High Risk is determined by either one of the following:*

- Answering “yes” to two or more of four STOP questions + any one BANG question except age OR
- Answering “yes” to 5 or more questions

SL-8.4: Insomnia Severity Index

The Insomnia Severity Index has seven questions. The seven answers are added up to get a total score. When you have your total score, look at the 'Guidelines for Scoring/Interpretation' at the bottom of the Insomnia Severity Index page to see where your sleep difficulty fits. Print out a copy of your completed Insomnia Severity Index to take to your health care provider.

For each question, please *CIRCLE* the number that best describes your answer. [Click here to print the Insomnia Severity Index](#).

Please rate the **CURRENT (i.e. LAST 2 WEEKS) SEVERITY** of your insomnia problem(s).

Insomnia problem	None	Mild	Moderate	Severe	Very severe
1. Difficulty falling asleep	0	1	2	3	4
2. Difficulty staying asleep	0	1	2	3	4
3. Problem waking up too early	0	1	2	3	4

4. How SATISFIED/DISSATISFIED are you with your CURRENT sleep pattern?

Very Satisfied	Satisfied	Moderately Satisfied	Dissatisfied	Very Dissatisfied
0	1	2	3	4

5. How NOTICEABLE to others do you think your sleep problem is in terms of impairing the quality of your life?

Not at all Noticeable	A Little	Somewhat	Much	Very Much Noticeable
0	1	2	3	4

6. How WORRIED/DISTRESSED are you about your current sleep problem?

Not at all Worried	A Little	Somewhat	Much	Very Much Worried
0	1	2	3	4

7. To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) CURRENTLY?

Not at all Interfering	A Little	Somewhat	Much	Very Much Interfering
0	1	2	3	4

Guidelines for Scoring/Interpretation:

Add the scores for all seven items (questions 1 + 2 + 3 + 4 + 5 + 6 + 7) = _____ your total score.

Total score categories:

0-7 = No clinically significant insomnia

8-14 = Sub threshold insomnia

15-21 = Clinical insomnia (moderate severity)

22-28 = Clinical insomnia (severe)

SL-9: Oral Appliances for the Treatment of Obstructive Sleep Apnea

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Treatment Codes (HCPCS and CPT®)	CODE
Oral device/appliance used to reduce upper airway collapsibility, adjustable or non-adjustable, prefabricated, includes fitting and adjustment	E0485
Oral device/appliance used to reduce upper airway collapsibility, adjustable or non-adjustable, custom fabricated, includes fitting and adjustment	E0486
Non-covered item or service (Used for oral appliances that do not incorporate all of the criteria as set forth in the Policy Article; tongue-retaining or tongue-positioning devices; and devices that are used only to treat snoring without a diagnosis of obstructive sleep apnea)	A9270

SL-9.1: Custom-fit Oral Appliances

SL-9.1.1: General Information

- Continuous positive airway pressure is the gold standard for treatment of obstructive sleep apnea.⁴³ Oral appliances are an alternative treatment option for patients who are intolerant to PAP therapy or who prefer an alternative to CPAP.⁴³ Subjective adherence and side effect profile are improved with oral appliances compared to CPAP. However, CPAP results in a greater reduction in respiratory events (AHI, RDI or REI) and greater improvement in oxygen saturation. Oral appliances significantly reduce apnea hypopnea index regardless of severity of obstructive sleep apnea, although patients with moderate to severe OSA are more likely to achieve their target AHI with CPAP compared to the oral appliance.⁴³ Both oral appliances and CPAP improve excessive daytime sleepiness, quality of life, and cognitive performance.^{43, 44, 45}
 - ◆ The AASM task force indicates that use of oral appliances in patients with severe obstructive sleep apnea should be reserved for clinical scenarios where CPAP is not tolerated **or** does not provide benefit.⁴³
- The most common oral appliance utilized for the treatment of obstructive sleep apnea is the mandibular advancement device.⁴⁴ There was insufficient evidence for the AASM task force to assess the efficacy of tongue retaining devices, which are also less well tolerated.^{43,44} Custom-made mandibular advancement devices appliance are more effective for symptom improvement, compliance and tolerance compared to ready-made appliances.^{43,46}

SL-9.1.2: Custom-fit Oral Appliances Indications

- Custom-fit oral appliances are indicated when all of the following are met:
 - ◆ A positive diagnosis of obstructive sleep apnea on a covered sleep study as demonstrated by one of the following:
 - AHI, RDI, or REI $\geq 5 \leq 14.9$ events per hour and documentation of:
 - Excessive daytime sleepiness, impaired cognition, mood disorders, or insomnia, or
 - Hypertension, ischemic heart disease, or history of stroke; **OR**
 - AHI, RDI, or REI $\geq 15 \leq 30$ events per hour over the duration of the sleep test;
 - AHI, RDI, or REI AHI > 30 events per hour
 - ◆ Documentation of:
 - Intolerance or lack of benefit after a minimum of a one month trial of PAP, **or**

- PAP is contraindicated for the patient as documented by the treating physician, **or**
 - Patient prefers alternative treatment to CPAP **AND** AHI, RDI, or REI is less than 30.
 - ◆ The device is ordered by the treating physician following a face to face visit and review of sleep study results.
 - ◆ A qualified licensed dentist (DDS and DMD) provides a custom device and follow-up to assess for dental-related side effects.
- Note: Oral devices to prevent temporomandibular joint (TMJ) disorders are considered experimental, investigational, and/or unproven (EIU).

SL-9.1.3: Replacement custom fit oral appliances

- Custom fit oral appliances can be replaced when **all** of the following criteria are met:
- ◆ Device is being used consistently with continued resolution of symptoms
 - ◆ The device is ordered by the treating physician following a face to face visit
 - ◆ A qualified licensed dentist (DDS and DMD) provides a custom device and follow-up to assess for dental-related side effects.
 - ◆ One of the following applies:
 - Device has been lost or irreparably damaged due to a specific accident, natural disaster or breakdown of device from regular use
 - Device is greater than 5 years old

SL-9.2: Pediatric Patients

- Oral appliances may be considered medically necessary in the treatment of children with craniofacial anomalies with signs and symptoms of OSA.
- Oral appliances are considered EIU for the treatment of OSA in children not meeting the above criteria.

Adult References

1. American Academy of Sleep Medicine. International classification of sleep disorders, 3rd ed. Darien, IL: American Academy of Sleep Medicine, 2014.
2. Aurora RN, Kristo DA, Bista SR, et al. The Treatment of Restless Legs Syndrome and Periodic Limb Movement Disorder in Adults—An Update for 2012: Practice Parameters with an Evidence-Based Systematic Review and Meta-Analyses. *Sleep*. 2012;35(8):1039-1062. doi:10.5665/sleep.1988.
3. Kimoff RJ. To Treat or Not to Treat: Can a Portable Monitor Reliably Guide Decision-Making in Sleep Apnea? *American Journal of Respiratory and Critical Care Medicine*. 2011;184(8):871-872. doi:10.1164/rccm.201108-1380.
4. Collop NA. Home Sleep Testing- It Is Not About the Test. *Chest*. 2010;138(2):245-246. doi:10.1378/chest.10-0712.
5. Skomro RP, Gjevre J, Reid J, et al. Outcomes of Home-Based Diagnosis and Treatment of Obstructive Sleep Apnea. *Chest*. 2010;138(2):257-263. doi:10.1378/chest.09-0577.
6. Decision Memo for Sleep Testing for Obstructive Sleep Apnea (OSA) (CAG-00405N). CMS.gov. [https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=227&ver=11&NcaName=Sleep+Testing+for+Obstructive+Sleep+Apnea+\(OSA\)&CoverageSelection=National&Keyword=sleep+testing&KeywordLookUp=Title&KeywordSearchType=And&bc=gAAAAACAAEAAA&](https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=227&ver=11&NcaName=Sleep+Testing+for+Obstructive+Sleep+Apnea+(OSA)&CoverageSelection=National&Keyword=sleep+testing&KeywordLookUp=Title&KeywordSearchType=And&bc=gAAAAACAAEAAA&). Published March 3, 2009.
7. Epstein L, Kristo D, Strollo PJ, et al. Clinical Guideline for the Evaluation, Management and Long-term Care of Obstructive Sleep Apnea in Adults. *J Clin Sleep Med*. 2009;5(3):263-276. Published June 2009. <https://www.ncbi.nlm.nih.gov/pubmed/19960649>.
8. Chung F, Yegneswaran B, Liao P, et al. STOP Questionnaire. *Anesthesiology*. 2008;108(5):812-821. doi:10.1097/aln.0b013e31816d83e4.
9. Tunis S, Shuren J, Spencer F, et al. Decision Memo for Continuous Positive Airway Pressure (CPAP) Therapy for Obstructive Sleep Apnea (OSA) (CAG-00093N). Home - Centers for Medicare & Medicaid Services. <https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=19&NcaName=Continuous%2BPositive%2BAirway%2BPressure%2B%28CPAP%29%2BTherapy%2Bfor%2BObstructive%2BSleep%2BApnea%2B%28OSA%29>. Published October 30, 2001.
10. Kushida CA, Chediak A, Berry RB, et al. Clinical guidelines for the manual titration of positive airway pressure in patients with obstructive sleep apnea. *Journal of Clinical Sleep Medicine*. 2008;4(2):157-171. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2335396/>.
11. Patel NP, Ahmed M, Rosen I. Split-Night Polysomnography. *Chest*. 2007;132(5):1664-1671. doi:10.1378/chest.06-1801.
12. Collop NA, Anderson WM, Boehlecke B, et al. Clinical guidelines for the use of unattended portable monitors in the diagnosis of obstructive sleep apnea in adult patients. Portable Monitoring Task Force of the American Academy of Sleep Medicine. *J Clin Sleep Med*. 2007;3(7):737-47. Published 2007. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2556918/>. Accessed July 15, 2019.
13. Mulgrew AT, Fox N, Ayas NT, Ryan CF. Diagnosis and Initial Management of Obstructive Sleep Apnea without Polysomnography. *Annals of Internal Medicine*. 2007;146(3):157. doi:10.7326/0003-4819-146-3-200702060-00004.
14. Kushida CA, Littner MR, Morgenthaler T, et al. Practice Parameters for the Indications for Polysomnography and Related Procedures: An Update for 2005. *Sleep*. 2005;28(4):499-523. doi:10.1093/sleep/28.4.499.
15. Whitelaw WA, Brant RF, Flemons WW. Clinical Usefulness of Home Oximetry Compared with Polysomnography for Assessment of Sleep Apnea. *American Journal of Respiratory and Critical Care Medicine*. 2005;171(2):188-193. doi:10.1164/rccm.200310-1360oc.
16. Boyer S, Kapur V. Role of portable sleep studies for diagnosis of obstructive sleep apnea. *Current Opinion in Pulmonary Medicine*. 2003;9(6):465-470. doi:10.1097/00063198-200311000-00003.
17. Fletcher EC. Unattended Home Diagnosis and Treatment of Obstructive Sleep Apnea without Polysomnography. *Archives of Family Medicine*. 2000;9(2):168-174. doi:10.1001/archfami.9.2.168.
18. Netzer NC, Stoohs RA, Netzer CM, Clark K, Strohl KP. Using the Berlin Questionnaire to Identify Patients at Risk for the Sleep Apnea Syndrome. *Annals of Internal Medicine*. 1999;131(7):485-491. Doi: 10.7326/0003-4819-131-7-199910050-00002.

19. Benbadis SR. Association between the Epworth Sleepiness Scale and the Multiple Sleep Latency Test in a Clinical Population. *Annals of Internal Medicine*. 1999;130(41):289-292. Doi:10.7326/0003-4819-130-4-199902160-00014.
20. Chesson AL, Ferber RA, Fry JM, et al. American Sleep Disorders Association, Standards of Practice Committee, Polysomnography Task Force. Practice parameters for the indications for polysomnography and related procedures. *The Indications for Polysomnography and Related Procedures*. *Sleep*. 1997;20(6):423-487. doi:10.1093/sleep/20.6.423.
21. Krakow B, Ulibarri V, Melendrez D, Kikta S, Togami L, Haynes P. A Daytime, Abbreviated Cardio-Respiratory Sleep Study (CPT 95807-52) To Acclimate Insomnia Patients with Sleep Disordered Breathing to Positive Airway Pressure (PAP-NAP). *Journal of Clinical Sleep Medicine*. <http://jcsm.aasm.org/ViewAbstract.aspx?pid=27183>. Published June 15, 2008.
22. Javaheri S, Smith J, Chung E. The prevalence and natural history of complex sleep apnea. *Journal of Clinical Sleep Medicine*. 2009;5(3):205. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1024617/>.
23. Rosen CL, Auckley D, Benca R, et al. A Multisite Randomized Trial of Portable Sleep Studies and Positive Airway Pressure Autotitration versus Laboratory-Based Polysomnography for the Diagnosis and Treatment of Obstructive Sleep Apnea: The Home PAP Study. *Sleep*. 2012;35(6):757-767. doi:10.5665/sleep.1870.
24. Kushida CA, Morgenthaler TI, Littner MR, et al. Practice Parameters for the Treatment of Snoring and Obstructive Sleep Apnea with Oral Appliances: An Update for 2005. *Sleep*. 2006;29(2):240-243. doi:10.1093/sleep/29.2.240.
25. Aurora RN, Zak RS, Auerbach SH, et al. Best practice guide for the treatment of nightmare disorder in adults. *Journal of clinical sleep medicine*. 2011;7(5):389-401. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2919672/>.
26. Kushida CA, Littner MR, Morgenthaler T, et al. Practice Parameters for the Indications for Polysomnography and Related Procedures: An Update for 2005. *Sleep*. 2005;28(4):499-523. doi:10.1093/sleep/28.4.499.
27. Berry RB, Hill G, Thompson L, McLaurin V. Portable monitoring and autotitration versus polysomnography for the diagnosis and treatment of sleep apnea. *Sleep*. <https://www.ncbi.nlm.nih.gov/pubmed/18853940>. Published October 2008.
28. Collop NA, Anderson WMD, Boehlecke B, et al. Clinical guidelines for the use of unattended portable monitors in the diagnosis of obstructive sleep apnea in adult patients. Portable Monitoring Task Force of the American Academy of Sleep Medicine. *Journal of clinical sleep medicine: JCSM: official publication of the American Academy of Sleep Medicine*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2556918/>. Published December 15, 2007.
29. Berry RB, Brooks R, Gamaldo CE, et al. The AASM Manual for the Scoring of Sleep and Associated Events. American Academy of Sleep Medicine – Association for Sleep Clinicians and Researchers. <https://aasm.org/clinical-resources/scoring-manual/>. Published April 2, 2018.
30. Epstein LJ, Kristo D, Strollo PJ, et al. Clinical guideline for the evaluation, management and long-term care of obstructive sleep apnea in adults. *Journal of clinical sleep medicine: JCSM: official publication of the American Academy of Sleep Medicine*. <https://www.ncbi.nlm.nih.gov/pubmed/19960649>.
31. Johns MW. A New Method for Measuring Daytime Sleepiness: The Epworth Sleepiness Scale. *Sleep*. 1991;14(6):540-545. doi:10.1093/sleep/14.6.540.
32. Aurora RN, Kristo DA, Bista SR, et al. Update to the AASM Clinical Practice Guideline: “The Treatment of Restless Legs Syndrome and Periodic Limb Movement Disorder in Adults—an Update for 2012: Practice Parameters with an Evidence-Based Systematic Review and Meta-Analyses.” *Sleep*. 2012;35(8):1037-1037. doi:10.5665/sleep.1986.
33. Aurora RN, Chowdhuri S, Ramar K, et al. The Treatment of Central Sleep Apnea Syndromes in Adults: Practice Parameters with an Evidence-Based Literature Review and Meta-Analyses. *Sleep*. 2012;35(1):17-40. doi:10.5665/sleep.1580.
34. Javaheri S, Harris N, Howard J, Chung E. Adaptive Servoventilation for Treatment of Opioid-Associated Central Sleep Apnea. *Journal of Clinical Sleep Medicine*. 2014;10(6):637-643. doi:10.5664/jcsm.3788.
35. Filiatrault M-L, Chauny J-M, Daoust R, Roy M-P, Denis R, Lavigne G. Medium Increased Risk for Central Sleep Apnea but Not Obstructive Sleep Apnea in Long-Term Opioid Users: A Systematic Review and Meta-Analysis. *Journal of Clinical Sleep Medicine*. 2016;12(04):617-625. doi:10.5664/jcsm.5704.

36. Sateia MJ. International Classification of Sleep Disorders-Third Edition. *Chest*. 2014;146(5):1387-1394. doi:10.1378/chest.14-0970.
37. Martin JL, Hakim AD. Wrist Actigraphy. *Chest*. 2011;139(6):1514-1527. doi:10.1378/chest.10-1872.
38. Morgenthaler T, Alessi C, Friedman L, et al. Practice Parameters for the Use of Actigraphy in the Assessment of Sleep and Sleep Disorders: An Update for 2007. *Sleep*. 2007;30(4):519-529. doi:10.1093/sleep/30.4.519.
39. Kapur VK, Auckley DH, Chowdhuri S, et al. Clinical Practice Guideline for Diagnostic Testing for Adult Obstructive Sleep Apnea: An American Academy of Sleep Medicine Clinical Practice Guideline. *Journal of Clinical Sleep Medicine*. 2017;13(03):479-504. doi:10.5664/jcsm.6506.
40. Strollo PJ, Soose RJ, Maurer JT, et al. Upper-Airway Stimulation for Obstructive Sleep Apnea. *New England Journal of Medicine*. 2014;370(2):139-149. doi:10.1056/nejmoa1308659.
41. Soose RJ, Woodson BT, Gillespie MB, et al. Upper Airway Stimulation for Obstructive Sleep Apnea: Self-Reported Outcomes at 24 Months. *Journal of Clinical Sleep Medicine*. 2016;12(01):43-48. doi:10.5664/jcsm.5390.
42. Smith MT, Mccrae CS, Cheung J, et al. Use of Actigraphy for the Evaluation of Sleep Disorders and Circadian Rhythm Sleep-Wake Disorders: An American Academy of Sleep Medicine Clinical Practice Guideline. *Journal of Clinical Sleep Medicine*. 2018;14(07):1231-1237. doi:10.5664/jcsm.7230.
43. Woodson BT, Soose RJ, Gillespie MB, et al. Three-Year Outcomes of Cranial Nerve Stimulation for Obstructive Sleep Apnea. *Otolaryngology-Head and Neck Surgery*. 2015;154(1):181-188. doi:10.1177/0194599815616618.
44. Sheldon SH, Ferber R, Kryger MH. Diagnosis of Obstructive Sleep Apnea. In: *Principles and Practice of Pediatric Sleep Medicine*. 2nd ed. London: Elsevier Saunders; 2014:221-230..
45. Ramar K, Dort LC, Katz SG, et al. Clinical Practice Guideline for the Treatment of Obstructive Sleep Apnea and Snoring with Oral Appliance Therapy: An Update for 2015. *Journal of Clinical Sleep Medicine*. 2015;11(7):773-827. doi:10.5664/jcsm.4858.
46. Sutherland K, Vanderveken OM, Tsuda H, et al. Oral Appliance Treatment for Obstructive Sleep Apnea: An Update. *Journal of Clinical Sleep Medicine*. 2014;10(02):215-227. doi:10.5664/jcsm.3460.
47. Galic T, Bozic J, Pecotic R, Ivkovic N, Valic M, Dogas Z. Improvement of Cognitive and Psychomotor Performance in Patients with Mild to Moderate Obstructive Sleep Apnea Treated with Mandibular Advancement Device: A Prospective 1-Year Study. *Journal of Clinical Sleep Medicine*. 2016;12(02):177-186. doi:10.5664/jcsm.5480.
48. Johal A, Haria P, Manek S, Joury E, Riha R. Ready-Made Versus Custom-Made Mandibular Repositioning Devices in Sleep Apnea: A Randomized Clinical Trial. *Journal of Clinical Sleep Medicine*. 2017;13(02):175-182. doi:10.5664/jcsm.6440.
49. Spencer J, Patel M, Mehta N, et al. Special Consideration Regarding the Assessment and Management of Patients Being Treated with Mandibular Advancement Oral Appliance Therapy for Snoring and Obstructive Sleep Apnea. *Cranio®*. 2013;31(1):10-13. doi:10.1179/crn.2013.002.
50. Caples SM, Rowley JA, Prinsell JR, et al. Surgical Modifications of the Upper Airway for Obstructive Sleep Apnea in Adults: A Systematic Review and Meta-Analysis. *Sleep*. 2010;33(10):1396-1407. doi:10.1093/sleep/33.10.1396.
51. Pavwoski P, Shelgikar AV. Treatment options for obstructive sleep apnea. *Neurology: Clinical Practice*. 2016;7(1):77-85. doi:10.1212/cpj.0000000000000320.
52. Amali A, Motiee-Langroudi M, Saedi B, Rahavi-Ezabadi S, Karimian A, Amirzargar B. A Comparison of Uvulopalatopharyngoplasty and Modified Radiofrequency Tissue Ablation in Mild to Moderate Obstructive Sleep Apnea: A Randomized Clinical Trial. *Journal of Clinical Sleep Medicine*. 2017;13(09):1089-1096. doi:10.5664/jcsm.6730.
53. Browaldh N, Nerfeldt P, Lysdahl M, et al. SKUP3randomised controlled trial: polysomnographic results after uvulopalatopharyngoplasty in selected patients with obstructive sleep apnoea. *Thorax*. 2013;68(9):846-853. doi:10.1136/thoraxjnl-2012-202610.
54. Sommer JU, Heiser C, Gahleitner C, et al. Tonsillectomy with Uvulopalatopharyngoplasty in Obstructive Sleep Apnea. *Deutsches Aertzteblatt Online*. 2016. doi:10.3238/arztebl.2016.0001.
55. Aurora RN, Collop NA, Jacobowitz O, et al. Quality Measures for the Care of Adult Patients with Obstructive Sleep Apnea. *Journal of Clinical Sleep Medicine*. January 2015. doi:10.5664/jcsm.4556.
56. Li H-Y, Wang P-C, Lee L-A, Chen N-H, Fang T-J. Prediction of Uvulopalatopharyngoplasty Outcome: Anatomy-Based Staging System Versus Severity-Based Staging System. *Sleep*. 2006;29(12):1537-1541. doi:10.1093/sleep/29.12.1537.

57. Friedman M, Ibrahim H, Bass L. Clinical Staging for Sleep-Disordered Breathing. *Otolaryngology-Head and Neck Surgery*. 2002;127(1):13-21. doi:10.1067/mhn.2002.126477.
58. Choi JH, Cho SH, Kim S-N, Suh JD, Cho JH. Predicting Outcomes after Uvulopalatopharyngoplasty for Adult Obstructive Sleep Apnea. *Otolaryngology-Head and Neck Surgery*. 2016;155(6):904-913. doi:10.1177/0194599816661481.
59. Aurora RN, Casey KR, Kristo D, et al. Practice Parameters for the Surgical Modifications of the Upper Airway for Obstructive Sleep Apnea in Adults. *Sleep*. 2010;33(10):1408-1413. doi:10.1093/sleep/33.10.1408.
60. Zaghi S, Holtz J-EC, Certal V, et al. Maxillomandibular Advancement for Treatment of Obstructive Sleep Apnea. *JAMA Otolaryngology-Head & Neck Surgery*. 2016;142(1):58. doi:10.1001/jamaoto.2015.2678.
61. Boyd SB, Walters AS, Waite P, Harding SM, Song Y. Long-Term Effectiveness and Safety of Maxillomandibular Advancement for Treatment of Obstructive Sleep Apnea. *Journal of Clinical Sleep Medicine*. 2015. doi:10.5664/jcsm.4838.
62. Prinsell JR. Primary and Secondary Telegnathic Maxillomandibular Advancement, With or Without Adjunctive Procedures, for Obstructive Sleep Apnea in Adults: A Literature Review and Treatment Recommendations. *Journal of Oral and Maxillofacial Surgery*. 2012;70(7):1659-1677. doi:10.1016/j.joms.2011.03.064.
63. Ruiter MD, Apperloo R, Milstein D, Lange JD. Assessment of obstructive sleep apnoea treatment success or failure after maxillomandibular advancement. *International Journal of Oral and Maxillofacial Surgery*. 2017;46(11):1357-1362. doi:10.1016/j.ijom.2017.06.006.
64. Makovey I, Shelgikar AV, Stanley JJ, Robinson A, Aronovich S. Maxillomandibular Advancement Surgery for Patients Who Are Refractory to Continuous Positive Airway Pressure: Are There Predictors of Success? *Journal of Oral and Maxillofacial Surgery*. 2017;75(2):363-370. doi:10.1016/j.joms.2016.10.011.
65. Pavwoski P, Shelgikar AV. Treatment options for obstructive sleep apnea. *Neurology: Clinical Practice*. 2016;7(1):77-85. doi:10.1212/cpj.0000000000000320.
66. Caples SM, Rowley JA, Prinsell JR, et al. Surgical Modifications of the Upper Airway for Obstructive Sleep Apnea in Adults: A Systematic Review and Meta-Analysis. *Sleep*. 2010;33(10):1396-1407. doi:10.1093/sleep/33.10.1396.
67. Aurora RN, Casey KR, Kristo D, et al. Practice Parameters for the Surgical Modifications of the Upper Airway for Obstructive Sleep Apnea in Adults. *Sleep*. 2010;33(10):1408-1413. doi:10.1093/sleep/33.10.1408.
68. Kezirian EJ, Goldberg AN. Hypopharyngeal Surgery in Obstructive Sleep Apnea. *Archives of Otolaryngology-Head & Neck Surgery*. 2006;132(2):206. doi:10.1001/archotol.132.2.206.
69. Kezirian EJ, Malhotra A, Goldberg AN, White DP. Changes in obstructive sleep apnea severity, biomarkers, and quality of life after multilevel surgery. *The Laryngoscope*. 2010;120(7):1481-1488. doi:10.1002/lary.20946.
70. Pavwoski P, Shelgikar AV. Treatment options for obstructive sleep apnea. *Neurology: Clinical Practice*. 2016;7(1):77-85. doi:10.1212/cpj.0000000000000320.
71. Neruntarat C. Genioglossus advancement and hyoid myotomy under local anesthesia. *Otolaryngology - Head and Neck Surgery*. 2003;129(1):85-91. doi:10.1016/s0194-5998(03)00094-9.
72. Brookes CCD, Boyd SB. Controversies in Obstructive Sleep Apnea Surgery. *Oral and Maxillofacial Surgery Clinics of North America*. 2017;29(4):503-513. doi:10.1016/j.coms.2017.07.005.
73. Strollo PJ, Soose RJ, Maurer JT, et al. Upper-Airway Stimulation for Obstructive Sleep Apnea. *New England Journal of Medicine*. 2014;370(2):139-149. doi:10.1056/nejmoa1308659.
74. Soose RJ, Woodson BT, Gillespie MB, et al. Upper Airway Stimulation for Obstructive Sleep Apnea: Self-Reported Outcomes at 24 Months. *Journal of Clinical Sleep Medicine*. 2016;12(01):43-48. doi:10.5664/jcsm.5390.
75. Woodson BT, Soose RJ, Gillespie MB, et al. Three-Year Outcomes of Cranial Nerve Stimulation for Obstructive Sleep Apnea. *Otolaryngology-Head and Neck Surgery*. 2015;154(1):181-188. doi:10.1177/0194599815616618.
76. Aurora RN, Casey KR, Kristo D, et al. Practice Parameters for the Surgical Modifications of the Upper Airway for Obstructive Sleep Apnea in Adults. *Sleep*. 2010;33(10):1408-1413. doi:10.1093/sleep/33.10.1408.

77. Camacho M, Certal V, Brietzke SE, Holty J-EC, Guilleminault C, Capasso R. Tracheostomy as Treatment for Adult Obstructive Sleep Apnea. *The Laryngoscope*. 2013;124(3):803-811. doi:10.1002/lary.24433.
78. Costanzo MR, Augostini R, Goldberg LR, Ponikowski P, Stellbrink C, Javaheri S. Design of the remedē System Pivotal Trial: A Prospective, Randomized Study in the Use of Respiratory Rhythm Management to Treat Central Sleep Apnea. *Journal of Cardiac Failure*. 2015;21(11):892-902. doi:10.1016/j.cardfail.2015.08.344.
79. Costanzo MR, Ponikowski P, Javaheri S, et al. Transvenous neurostimulation for central sleep apnoea: a randomised controlled trial. *The Lancet*. 2016;388(10048):974-982. doi:10.1016/s0140-6736(16)30961-8.
80. Selim BJ, Ramar K. Management of Sleep Apnea Syndromes in Heart Failure. *Sleep Medicine Clinics*. 2017;12(1):107-121. doi:10.1016/j.jsmc.2016.10.004.
81. Aurora RN, Chowdhuri S, Ramar K, et al. The Treatment of Central Sleep Apnea Syndromes in Adults: Practice Parameters with an Evidence-Based Literature Review and Meta-Analyses. *Sleep*. 2012;35(1):17-40. doi:10.5665/sleep.1580.
82. Arzt M, Floras JS, Logan AG, et al. Suppression of Central Sleep Apnea by Continuous Positive Airway Pressure and Transplant-Free Survival in Heart Failure: A Post Hoc Analysis of the Canadian Continuous Positive Airway Pressure for Patients With Central Sleep Apnea and Heart Failure Trial (CANPAP). *Circulation*. 2007;115(25):3173-3180. doi:10.1161/circulationaha.106.683482.
83. Cowie MR, Woehrle H, Wegscheider K, et al. Adaptive Servo-Ventilation for Central Sleep Apnea in Systolic Heart Failure. *New England Journal of Medicine*. 2015;373(12):1095-1105. doi:10.1056/nejmoa1506459.
84. Aurora RN, Bista SR, Casey KR, et al. Updated Adaptive Servo-Ventilation Recommendations for the 2012 AASM Guideline: "The Treatment of Central Sleep Apnea Syndromes in Adults: Practice Parameters with an Evidence-Based Literature Review and Meta-Analyses." *Journal of Clinical Sleep Medicine*. 2016;12(05):757-761. doi:10.5664/jcsm.5812.
85. Standards of Practice Committee of the American Academy of Sleep Medicine. Practice parameters for clinical use of the multiple sleep latency test and the maintenance of wakefulness test. *SLEEP*. 2005;28(1):113-121.
86. American Academy of Sleep Medicine. Guidelines in Development. American Academy of Sleep Medicine – Association for Sleep Clinicians and Researchers. <https://aasm.org/clinical-resources/practice-standards/guidelines-in-development/>.

Pediatric References

1. American Academy of Sleep Medicine. International Classification of Sleep Disorders. 3rd ed. Darien, IL:American Academy of Sleep Medicine; 2014.
2. Tarasiuk A, Simon T, Tal A, Reuveni H. Adenotonsillectomy in Children With Obstructive Sleep Apnea Syndrome Reduces Health Care Utilization. *Pediatrics*. 2004;113(2):351-356. doi:10.1542/peds.113.2.351.
3. Goldstein NA, Pugazhendhi V, Rao SM, et al. Clinical Assessment of Pediatric Obstructive Sleep Apnea. *Pediatrics*. 2004;114(1):33-43. doi:10.1542/peds.114.1.33.
4. Schechter MS. Technical Report: Diagnosis and Management of Childhood Obstructive Sleep Apnea Syndrome. *Pediatrics*. 2002;109(4). doi:10.1542/peds.109.4.e69.
5. American Thoracic Society. Standards and indications for cardiopulmonary sleep studies in children. *American Journal of Respiratory and Critical Care Medicine*. 1996;153(2):866-878. doi:10.1164/ajrccm.153.2.8564147.
6. American Thoracic Society. Cardiorespiratory Sleep Studies in Children. *American Journal of Respiratory and Critical Care Medicine*. 1999;160(4):1381-1387. doi:10.1164/ajrccm.160.4.16041.
7. National Institute of Child Health and Human Development. Obstructive Sleep Apnea in Children. NIH Guide. 1997;26(39). <http://grants.nih.gov/grants/guide/rfa-files/RFA-HL-98-004.html>. Published 1997.
8. U.S. Department of Health and Human Services, National Institutes of Health (NIH), National Heart, Lung and Blood Institute (NHLBI). Sleep apnea: Is your patient at risk? NIH Pub.No.95-3803. NIH. <http://www.nhlbi.nih.gov/health/prof/sleep/slpaprsk.pdf>. Published 1995.
9. Aurora RN, Zak RS, Karippot A, et al. Practice Parameters for the Respiratory Indications for Polysomnography in Children. *Sleep*. 2011;34(3):379-388. doi:10.1093/sleep/34.3.379.
10. Marcus CL, Brooks LJ, Draper KA, et al. Diagnosis and Management of Childhood Obstructive Sleep Apnea Syndrome. *Pediatrics*. 2012;130(3):576-584. doi:10.1542/peds.2012-1671.
11. Roland PS, Rosenfeld RM, Brooks LJ, et al. Clinical Practice Guideline: Polysomnography for Sleep-Disordered Breathing Prior to Tonsillectomy in Children. *Otolaryngology-Head and Neck Surgery*. 2011;145(1_suppl). doi:10.1177/0194599811409837.
12. Carvalho FR, Lentini-Oliveira DA, Prado LB, Prado GF, Carvalho LB. Oral appliances and functional orthopaedic appliances for obstructive sleep apnoea in children. *Cochrane Database of Systematic Reviews*. 2016. doi:10.1002/14651858.cd005520.pub3.
13. Marcus CL, Brooks LJ, Draper KA, et al. Diagnosis and Management of Childhood Obstructive Sleep Apnea Syndrome. *Pediatrics*. 2012;130(3):576-584. doi:10.1542/peds.2012-1671.
14. Aurora RN, Collop NA, Jacobowitz O, et al. Quality Measures for the Care of Adult Patients with Obstructive Sleep Apnea. *Journal of Clinical Sleep Medicine*. January 2015. doi:10.5664/jcsm.4556.
15. Ehsan Z, Ishman SL. Pediatric Obstructive Sleep Apnea. *Otolaryngologic Clinics of North America*. 2016;49(6):1449-1464. doi:10.1016/j.otc.2016.07.001.
16. Marcus CL, Moore RH, Rosen CL, et al. A Randomized Trial of Adenotonsillectomy for Childhood Sleep Apnea. *New England Journal of Medicine*. 2013;368(25):2366-2376. doi:10.1056/nejmoa1215881.
17. El-Kersh K, Cavallazzi R, Senthilvel E. Outcomes of adenotonsillectomy in severe pediatric obstructive sleep apnea. *Ear, nose, & throat journal*. <https://www.ncbi.nlm.nih.gov/pubmed/29236274>. Published December 2017.
18. Huang Y-S, Guilleminault C, Lee L-A, Lin C-H, Hwang F-M. Treatment Outcomes of Adenotonsillectomy for Children with Obstructive Sleep Apnea: A Prospective Longitudinal Study. *Sleep*. 2014;37(1):71-76. doi:10.5665/sleep.3310.
19. Todd CA, Bareiss AK, Mccoul ED, Rodriguez KH. Adenotonsillectomy for Obstructive Sleep Apnea and Quality of Life: Systematic Review and Meta-analysis. *Otolaryngology-Head and Neck Surgery*. 2017;157(5):767-773. doi:10.1177/0194599817717480.
20. Huang Y-S, Guilleminault C. Pediatric Obstructive Sleep Apnea: Where Do We Stand? *Sleep-Related Breathing Disorders Advances in Oto-Rhino-Laryngology*. 2017:136-144. doi:10.1159/000470885.
21. Pavwoski P, Shelgikar AV. Treatment options for obstructive sleep apnea. *Neurology: Clinical Practice*. 2016;7(1):77-85. doi:10.1212/cpj.0000000000000320
22. Aurora RN, Zak RS, Karippot A, et al. Practice Parameters for the Respiratory Indications for Polysomnography in Children. *Sleep*. 2011;34(3):379-388. doi:10.1093/sleep/34.3.379.