Out of Center Sleep Testing (OCST) / Home Sleep Testing (HST)

Audience: All personnel in the Sleep Disorder Center.

Purpose: A protocol for diagnostic OCST/HST assures appropriateness and consistency of testing.

Definitions:
- Obstructive Sleep Apnea (OSA) – A condition in which five or more sleep disordered breathing events occur per hour of sleep and characterized by occlusion of the oropharyngeal airway with continued efforts to breath.
- Parasomnia – A category of sleep disorders in which abnormal events occur during sleep such as sleep walking or talking; due to inappropriately timed activation of physiologic system.
- Polysomnography (PSG) – the measurement and recording of variations in airflow and diaphragmatic activity during sleep; used in the diagnosis of sleep apnea.
- Apnea-Hypopnea Index (AHI) – a calculation of the average number of incidents of hypopnea and apnea per hour of recorded time.
- Sleep Apnea – repeated episodes of complete cessation of airflow for longer than 10 seconds; the events may be obstructive (due to upper airway closure), central (due to lack of ventilatory support), or mixed (having both a central and obstructive component).

Background: Home Sleep Testing
- The portability of data acquisition equipment allows for expanded access to polysomnographic evaluation of sleep apnea in some patients outside the sleep disorders center.
- OCST/HST has been shown to be equivalent to in-lab tests in selected patients.
- OCST/HST studies allow events occurring in a variety of physiological systems to be recorded simultaneously.
- The diagnostic advantage of OCST/HST is the ability to correlate specific changes or abnormalities of one physiological parameter with another.
- Detailed clinical information about the patient’s sleep related problem should be obtained prior to the patient being scheduled for OCST/HST.
- Trained personnel will instruct the patient on required monitoring devices to monitor channels listed above once the patient is scheduled for device pick up.

Orders/ Acceptance Criteria
OCST/HST studies are performed on patients to diagnose sleep apnea when ordered by a physician. OCST/HST studies require that specific criteria be met to insure the test is used for the appropriate persons and to diagnose Obstructive Sleep Apnea (OSA) only. Providers may use the following guidelines
to determine if their patient is a candidate for OCST/HST or would be better suited by a Sleep Medicine consultation or in lab polysomnography (PSG):

**Acceptance Criteria**

OCST/HST is indicated in patients who have observed apneas during sleep or who have any combination of symptoms and conditions below and have no exclusion criteria for OCST/HST.

- Excessive Daytime Sleepiness (EDS) evidenced by Epworth Sleepiness Scale (ESS) score >10, inappropriate daytime napping (during driving, conversation, eating, that interferes with daily activities and is not explained by other conditions
- Habitual snoring or gasping/choking episodes in sleep associated with awakening, disturbed/ restless sleep
- Obesity
- Craniofacial abnormalities, and/or upper airway soft tissue abnormalities, and/or adenotonsilar hypertrophy
- Unexplained treatment resistant hypertension, and/or history of stroke and/or transient ischemic attack, and/or coronary artery disease, and/or supraventricular tachycardia, bradycardia, or other arrhythmia
- Depression, mood disorder, cognitive dysfunction, headaches on awakening

**Exclusion Criteria**

A Sleep Medicine consultation or in lab PSG should be considered for patients meeting the following exclusion criteria:

- Moderate or severe Congestive Heart Failure (CHF)
- History of ventricular fibrillation or sustained ventricular tachycardia
- Moderate or severe lung disease
- Neuromuscular disorders with impairment of pulmonary function
- Inability to follow instructions due to cognitive impairment
- Suspected sleep disorder other than OSA (periodic limb movement disorder, central sleep apnea, insomnia, circadian rhythm disorders, narcolepsy, parasomnias)

**Policy:**

Patients who will be tested in the home or outside the Sleep Disorder Center will be introduced to all of the associated equipment during an appointment with one of the Sleep Disorder Technologists. Patients will receive thorough explanation of purpose and functionality of home sleep testing equipment. The technologist will:

- Perform patient education about purpose and function of OCST/HST
- Demonstrate face-to-face how to set up and use all the sensors associated with the equipment
- Review instruction sheet with patient
- Review emergency contact phone number information
• Explains return process
• Answer any questions the patient may have concerning OCST/HST

**Recording Methods:**

1. Respiration (Airway and Respiratory Effort)
   a. These channels are utilized to monitor respiration specifically for the detection of apneas and Hypopneas.
   b. The sensor for detection of airflow for identification of a hypopnea through a nasal air pressure transducer with or without square root transformation of the signal.
   c. The sensor for detection of respiratory effort.

2. Blood Oxygenation
   • The diagnosis of Obstructive Sleep Apnea during an OCST/HST sleep study requires the continuous monitoring and display of blood oxygen levels to provide crucial information about the severity of the respiratory dysfunction.
   • Pulse oximetry transmits two wavelengths of infrared light through a pulsative vascular bed to measure arterial oxygen saturation.
   • Pulse oximetry is done utilizing a finger probe although other placements may be used depending on the situation.
   • Pulse oximetry does not reflect total gas exchange and therefore cannot detect changes in PaCO2.

**Data Analysis, Interpretation and Reporting**

• Recorded data will be downloaded, scored, and prepared for interpretation within 3 business days following the return of the device to the sleep disorders center.
• Interpretation of OCST/HST Results
  o Individuals interpreting the Unattended studies should be qualified and be able to demonstrate minimal qualifications as outlined by the American Academy of Sleep Medicine (AASM)
  o Interpretation of the procedure will be completed within 2 business days of the completion of scoring
• The results of the OCST/HST sleep study will be presented in the form of a comprehensive but concise report that summarizes all data collected. The following sections delineate the minimal information that will be included in the report:
  o Patient identification – The report should be labeled on each page with the patient’s full name and dates of study. The report should also include the age of the patient and any ID numbers required for file retrieval. Long term storage media should also be labeled accordingly
- Patient history – The report should contain sufficient history information to document the reason why the study was recommended.
- Recording conditions – The report should document the exact periods of time the patient was monitored during the study.
- The physiological parameters actually recorded should be listed as well.
- Respiratory characteristics – The report should summarize the results of the analysis of respiratory characteristics. Information should be provided concerning the number and index of apneas/hypopneas, the longest apneas/hypopneas and the mean and nadir oxygen desaturation.

- The results and recommendations associated with the Home Sleep test will be provided to the ordering physician via Epic for review and follow up.

Sleep Laboratory Equipment and Record Keeping

- Equipment will be cleaned and prepared according to manufacturer’s and Hospital Epidemiology guidelines (Hospital Epidemiology Policy 01.05 Cleaning, Sterilization, High-Level Disinfection and Storage of Patient Care Devices and Other Items) for the next patient immediately following the download of recorded data.
- Technicians and staff of the sleep lab will exercise universal precautions at all times (SDC Policy 08.03.04 Universal Precautions).
- Non-disposable items will be cleaned using facility protocol (Hospital Epidemiology Policy 01.05 Cleaning, Sterilization, High-Level Disinfection and Storage of Patient Care Devices and Other Items). Should any reusable items become contaminated or damaged the item may need to be disposed of and replaced according to manufacturer’s guidelines.
- Disposable items will be discarded after each use and replaced with new items for the next patient.
- Storage of recorded data should be in compliance with the polysomnographic recording equipment. The length of storage should be in compliance with the statutes of the state in which the facility resides.

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Medical Director
References:  Epworth Sleepiness Scale

SCORING: Sum the scores for the below-listed activities, using the following scoring system. A total greater than 10 is considered abnormal.

<table>
<thead>
<tr>
<th>Likelihood of dozing</th>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Low Chance</td>
<td>1</td>
</tr>
<tr>
<td>Moderate Chance</td>
<td>2</td>
</tr>
<tr>
<td>High Chance</td>
<td>3</td>
</tr>
</tbody>
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ACTIVITIES:
1. Sitting and reading
2. Watching TV
3. Sitting, inactive, in a public place, i.e., theater
4. As a passenger in a car for an hour without a break
5. Lying down to rest in the afternoon when circumstances permit
6. Sitting and talking to someone
7. In a car, while stopped for a few minutes in traffic.

