Guideline Summary NGC-10319

Guideline Title

Polysomnography and home sleep testing.

Bibliographic Source(s)

AIM Specialty Health (AIM). Polysomnography and home sleep testing. Chicago (IL): AIM Specialty Health (AIM); 2014 Mar 25. 9 p. [11 references]

Guideline Status

This is the current release of the guideline.

Scope

Disease/Condition(s)

Sleep breathing disorders including:

- Obstructive sleep apnea (OSA)
- Central sleep apnea (CSA)
- Narcolepsy
- Parasomnias and related sleep movement disorders, including:
  - Confusion arousals
  - Somnambulism (sleepwalking)
  - Sleep terrors
  - Rapid eye movement (REM) sleep behavior disorder
  - Sleep-related epilepsy
  - Sleep bruxism
  - Sleep enuresis (bed wetting)
  - Periodic limb movement disorder (PLMD)
- Nocturnal oxygen desaturation

Guideline Category

Diagnosis

Evaluation

Risk Assessment

Clinical Specialty

Dentistry

Family Practice

Geriatrics

Internal Medicine

Nursing

Otolaryngology

Pulmonary Medicine

Sleep Medicine

Intended Users

Advanced Practice Nurses

Dentists

Health Plans

Managed Care Organizations

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

To provide information based on peer-reviewed scientific literature that evaluates and directs the appropriate management of sleep diagnostic testing and treatment scenarios

Target Population

Adults and children with sleep breathing disorders

Interventions and Practices Considered

1. Patient history, including stroke, transient ischemic attack, coronary artery disease, and arrhythmias
2. Home sleep study (unattended)
3. In-lab sleep study
4. Follow-up in-lab sleep study
   - Re-evaluation of obstructive sleep apnea (OSA) diagnosis
   - Assessment of surgery (adenotonsillectomy or upper airway) or oral appliance effectiveness
   - Titration of continuous positive airway pressure (CPAP)

Major Outcomes Considered

- Obstructive sleep apnea (OSA) diagnosis
- Positive airway pressure (PAP) therapy
- Surgery
- Higher mortality

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Research Process

The research and development process is primarily conducted by the lead physician author with staff support, including medical librarians, and is overseen by the AIM members of the Clinical Guidelines Committee (CGC). The resources considered during AIM Guidelines development can include but are not limited to:

- Professional Society Guidelines
- Professional Society Appropriateness Criteria
- Agency for Healthcare Research and Quality (AHRQ) Comparative Effectiveness Guidance
- The Centers for Medicare and Medicaid Services (CMS)
- Initiatives sponsored by Specialty Licensing Boards

Additional web-based searches for evidence-based clinical guidelines and appropriate use criteria may also be performed using the National Guideline Clearinghouse website. Searches of the primary literature for an AIM Guideline under review are also conducted using standard databases and clinical knowledge resources. Relevant evidence-based literature or information may be brought to AIM's attention at any time by providers, AIM's physician reviewers, committee members, or other interested parties. This additional information may warrant off-cycle review and modification to include clinically-important recommendations, in addition to the usual process as determined by the Chair of the CGC.

A database is used to track the various sources of information referenced. A digital copy of each source document, including primary literature, is stored. If the content license prohibits storing a digital copy, a print copy is stored. Quality data on actual case review by AIM's physician reviewers using the guidelines under consideration shall also be made available during the guideline review process.

Number of Source Documents

98 source documents were reviewed.

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus (Committee)

Rating Scheme for the Strength of the Evidence

Not applicable

Methods Used to Analyze the Evidence

Review

Review of Published Meta-Analyses

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Guideline Development and Review Process

Review Process

When a new Guideline(s) is considered, the Chair of the Clinical Guidelines Committee (CGC) may choose to form a Specialty Panel to assist with the drafting and review of the Guideline. Similarly, the assigned AIM Medical Director may use a Specialty Panel to review and comment on proposed revisions to existing Guidelines.

In order for a new or revised Guideline to be approved for use by AIM, it must be reviewed by the Internal Panel of AIM physician reviewers. The Internal Panel considers supporting evidence as well as usability and validity within the education and adjudication process. The Internal Panel votes to forward recommendations to the Independent Physician Panel.

The Independent Physician Panel considers supporting evidence and the potential impact of draft AIM Guidelines on clinical outcomes and practice. The external panel votes to forward recommendations onto the CGC.

An AIM Medical Director is assigned to each program or solution for purposes of the guideline development and review process. These AIM Medical Directors are responsible for drafting new Guidelines as necessary and ensuring that every Guideline and the procedures for applying it, is reviewed and assessed for continued validity at least once annually. The assigned AIM Medical Directors are responsible for monitoring the clinical and regulatory environment with the support of AIM medical librarians to determine when Guideline revisions are necessary, based on new, potentially-relevant evidence and other factors. The assigned AIM Medical Directors are responsible for supporting the Vice President, Clinical Operations in facilitating education and training for the staff regarding the Guidelines.

Committee and Panel Operational Process

Review requires that the Guideline and any supporting materials be provided to members who are given sufficient time for review. The body then meets (either in person or telephonically) to discuss the proposed changes or enhancements. Approval of a Guideline is demonstrated by a vote of at least a majority of the members of that body who are present at the meeting (but in no event fewer than three [3] affirmative votes). If approval is received, then the Guideline can proceed to the next stage of the process. If committee approval is not received at any stage of the process, then the assigned AIM Medical Director shall be responsible for addressing committee member concerns and resubmitting the Guideline for committee review.

Minutes of all meetings are maintained as well as documentation of all proposed, approved and tabled Guidelines and changes to Guidelines. All input received during any level of review is recorded and noted in any subsequent review. Input received after approval of a Guideline is presented at the next regularly scheduled CGC meeting.

The AIM Quality Improvement Committee (QIC) reviews and accepts the Guidelines.

Ultimate responsibility and accountability for the development, review and updating of AIM's Guidelines are delegated to the CGC. No new or revised Guideline can be implemented without CGC approval.

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

The guideline developers reviewed a published cost analysis. However, only clinical outcomes were considered in the development of recommendations.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

The Clinical Guidelines Committee (CGC) considers medical director feedback and Internal and External Panel

The Clinical Guidelines Committee (CGC) considers medical director feedback and Internal and External Panel recommendations. Data from guidelines use in appropriateness reviews, provider comments, and other feedback are also used in developing recommendation revisions. The CGC is the final and ultimate approving body.

The AIM Quality Improvement Committee (QIC) reviews and accepts the Guidelines.

Recommendations

Major Recommendations

Indications for Home (Unattended) Sleep Studies

Sleep testing may be classified as follows:

Type I	An attended sleep study performed in a hospital or freestanding sleep lab with continuous and simultaneous monitoring of electroencephalogram (EEG), electrooculogram (EOG), electrocardiogram (EKG), electromyogram (EMG), oxygen saturation, respiratory effort, and airflow. Type I studies are also known as polysomnography (PSG).
Type II	A sleep study (usually unattended) performed with portable equipment with continuous and simultaneous monitoring of EEG, EOG, EKG, EMG, oxygen saturation, respiratory effort, and airflow. Type II studies are similar to type I (PSG) studies except that the former are usually performed in the home.
Type III	An unattended sleep study performed with portable equipment with monitoring of a minimum of four channels: 2 respiratory movement/airflow, 1 ECG/heart rate and 1 oxygen saturation. The studies are performed in the home and differ from types I and II in that they do not provide data on sleep staging.
Type IV	An unattended sleep study performed with portable equipment with monitoring of three or fewer physiological parameters only one of which is airflow. The studies are performed in the home and differ from types I and II in that they do not provide data on sleep staging.

Note: Home sleep studies performed with Type II and Type III devices (as defined above) are considered medically necessary when the criteria below are met. Type IV devices are considered to be not medically necessary in all clinical scenarios.

Suspected Obstructive Sleep Apnea (OSA)

Home sleep studies are indicated if the patient meets any of the following criteria (1–3) AND has no contraindication to a home sleep study as outlined in Table 1 in the original guideline document:

1. Observed apneas during sleep; OR
2. A combination of at least two (2) of the following (a–e):
   a. Excessive daytime sleepiness evidenced by an Epworth sleepiness scale score greater than 10, inappropriate daytime napping (e.g., during driving, conversation, or eating), or sleepiness that interferes with daily activities and is not explained by other conditions.
   b. Habitual snoring, or gasping/choking episodes associated with awakenings
   c. Treatment-resistant hypertension (persistent hypertension in a patient taking three or more antihypertensive medications)
   d. Obesity, defined as a body mass index greater than 30 kg/m^2 or increased neck circumference defined as greater than 17 inches in men or greater than 16 inches in women
   e. Craniofacial or upper airway soft tissue abnormalities, including adenotonsillar hypertrophy, or neuromuscular disease; OR
3. History of stroke (greater than 30 days previously) transient ischemic attack, coronary artery disease, or sustained supraventricular tachycardic or bradycardic arrhythmias in patients who meet one of the criteria in 2a–e above.

Established OSA - Follow-up Home Sleep Studies

A patient with established diagnosis of OSA should have a follow-up home sleep study if either of the following applies AND there is no contraindication to a home sleep study as outlined in the "Contraindications" field:

1. To assess efficacy of surgery (including adenotonsillectomy or upper airway) or oral appliances/devices; OR
2. To re-evaluate the diagnosis of OSA and need for continued continuous positive airway pressure (CPAP) if there is a significant weight loss (defined as 10% of body weight) since the most recent sleep study.

Indications for In-Lab (Attended) Sleep Studies in Adult Patients (Age 19 Years or Older)

Suspected OSA (in patients with unspecified sleep apnea and nocturnal desaturation, OSA should be suspected and excluded if clinically appropriate):

An in-lab sleep (attended) study is indicated if the patient meets any of the following criteria (1–3) AND has a contraindication to a home sleep study (as listed in the "Contraindications" field):

1. Observed apneas during sleep; OR
2. A combination of at least two (2) of the following (a–e):
   a. Excessive daytime sleepiness evidenced by an Epworth sleepiness scale score greater than ten (10), inappropriate daytime napping (e.g., during driving, conversation, or eating), or sleepiness that interferes with daily activities and is not explained by other conditions
   b. Habitual snoring or gasping/choking episodes associated with awakenings
   c. Treatment-resistant hypertension (persistent hypertension in a patient taking three or more antihypertensive medications)
   d. Obesity, defined as a body mass index greater than 30 kg/m^2 or increased neck circumference defined as greater than 17 inches in men or greater than 16 inches in women
   e. Craniofacial or upper airway soft tissue abnormalities, including adenotonsillar hypertrophy, or neuromuscular disease; OR

3. History of stroke, transient ischemic attack, coronary artery disease, or sustained tachycardic or bradycardic arrhythmias in patients who meet one of the criteria in 2a–e above.

Suspected Sleep Disorder Other Than OSA

An in-lab supervised sleep study is appropriate when there is suspicion of any of the following (1–7):

1. Central sleep apnea
2. Narcolepsy
3. Nocturnal seizures
4. Parasomnia
5. Idiopathic hypersomnia
6. Periodic limb movement disorder
7. Nocturnal desaturation (due to severe chronic obstructive pulmonary disease [COPD] or certain restrictive thoracic disorders) or unexplained right heart failure, polycythemia, cardiac arrhythmias during sleep or pulmonary hypertension

Established Sleep Disorder (OSA or Other): Follow-up Laboratory Studies

A patient with established diagnosis of OSA or other sleeping disorders should have a follow-up in-lab sleep study if either of the following (1 or 2) applies AND the patient has a contraindication to a home sleep study (as listed in the "Contraindications" field):

1. To assess efficacy of surgery (including adenotonsillectomy or upper airway) or oral appliances/devices; OR
2. To re-evaluate the diagnosis of OSA and need for continued CPAP if there is significant weight loss (defined as 10% of body weight) since the most recent sleep study

A patient with established diagnosis of OSA or other sleeping disorders should have a follow-up in-lab study if any of the following (1-3) applies:

1. To titrate CPAP/bi-level positive airway pressure (BPAP) in a patient who has a contraindication to the use of automatically titrating positive airway pressure (APAP) (e.g., congestive heart failure [CHF], COPD) or for whom an attempt at APAP titration has been unsuccessful; OR
2. To titrate CPAP/BPAP in a patient with a contraindication to the use of APAP (e.g., CHF, COPD) whose attempted split-night study did not adequately establish appropriate CPAP/BPAP treatment parameters; OR
3. To re-titrate CPAP/BPAP in a patient who has a contraindication to APAP (e.g., CHF, COPD) and has recurrence of symptoms or worsening of symptoms during treatment with CPAP/BPAP.

Indications for In-Lab (Attended) Sleep Studies in Non-Adult Patients (Age 18 Years or Younger)

Suspected Sleep Disorder (OSA or Other)

An in-lab sleep (attended) study is indicated if the patient meets any of the following criteria 1–11 below:

1. Habitual snoring in association with one or more of criteria a–e below:
   a. Restless or disturbed sleep
   b. Behavioral disturbance or learning disorders including deterioration in academic performance, attention deficit disorder, hyperactivity
   c. Frequent awakenings
   d. Enuresis (bedwetting)
   e. Growth retardation or failure to thrive; OR
2. Excessive daytime somnolence or altered mental status not explained by other conditions; OR
3. Polycythemia not explained by other conditions; OR
4. Cor pulmonale not explained by other conditions; OR
5. Witnessed apnea with duration greater than two (2) respiratory cycles; OR
6. Labored breathing during sleep; OR
7. Hypertrophy of the tonsils or adenoids in patients at significant surgical risk such that the exclusion of OSA would allow avoidance of surgery; OR
8. Suspected congenital central alveolar hypoventilation syndrome or sleep-related hypoventilation due to neuromuscular disease or chest wall deformities; OR
9. Clinical evidence of a sleep-related breathing disorder in infants who have experienced an apparent life-threatening event; OR
10. For exclusion of OSA in a patient who has undergone adenotonsillectomy for suspected OSA more than eight (8) weeks previously; OR
11. The initial study was inadequate, equivocal or non-diagnostic and the child's parents or caregiver report that the breathing patterns observed at home were different from those during testing.

Established Sleep Disorder (OSA or Other) – Follow-up Studies

A follow-up in-lab sleep study is appropriate in any of the following (1–5) situations:

1. A patient with established OSA continues to exhibit persistent snoring or other symptoms of sleep disordered breathing despite treatment with positive airway pressure therapy; OR
2. The patient has undergone adenotonsillectomy more than eight (8) weeks previously for management of established OSA; OR

established OSA); OR

3. To re-evaluate the diagnosis of OSA and need for continued positive airway pressure (PAP) if there is significant weight loss (defined as 10% of body weight) since the most recent sleep study; OR

4. To titrate CPAP or BPAP in a patient whose diagnostic study confirms that the patient is a candidate for positive airway pressure therapy and split-night study has not been performed or was inadequate; OR

5. The initial sleep study has led to a diagnosis other than OSA and the repeat study is requested because of a change in clinical status or to assess efficacy after a change in therapy.

Clinical Algorithm(s)

None provided

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is not specifically stated.

The recommendations were based on a review of published literature. When evidence was unavailable, limited, unclear, or not directly generalizable to the patient populations under consideration, expert consensus was used to develop recommendations.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate polysomnography and home sleep testing

Potential Harms

Not stated

Contraindications

Contraindications

Contraindications to Home Sleep Study

1. Patient is 18 years old or younger
2. Moderate or severe chronic obstructive pulmonary disease (COPD) – forced expiratory volume in 1 second/forced vital capacity (FEV1/FVC) less than or equal to 0.7 and FEV1 less than 80% of predicted
3. Moderate or severe congestive heart failure (CHF) – New York Heart Association (NYHA) class III or IV
4. CHF with a history of ventricular fibrillation or sustained ventricular tachycardia in a patient who does not have an implanted defibrillator
5. Cognitive impairment (inability to follow simple instructions) resulting in inability to apply the home sleep testing equipment when another individual is not available to assist with this task
6. Physical impairment resulting in inability to apply the home sleep testing equipment when another individual is not available to assist with this task
7. The patient has a suspected or established diagnosis of one of the following conditions: (a) central sleep apnea, (b) periodic limb movement disorder, (c) narcolepsy, (d) idiopathic hypersomnia, (e) parasomnia, (f) nocturnal seizures
8. Previous technically suboptimal home sleep study (2 nights of study attempted)
9. Previous 2-night home sleep study which did not diagnose obstructive sleep apnea (OSA) in a patient with ongoing clinical suspicion of OSA
10. Patient is oxygen dependent for any reason
11. History of cerebrovascular accident (CVA) within the preceding 30 days
12. Chronic opiate narcotic use; when discontinuation is not an option. Diagnostic sleep testing for patients using opiate narcotics for acute self-limited conditions, should ideally be deferred until the medications have been stopped
13. Body mass index >33 and elevated serum bicarbonate level (>28 mmol/L)
14. Established diagnosis of obesity hypoventilation syndrome

Qualifying Statements

Qualifying Statements

- AIM Specialty Health (AIM) has developed proprietary diagnostic and treatment management clinical guidelines (together with any updates, referred to collectively as the "Guidelines"). The Guidelines are designed to evaluate and direct the appropriate management of sleep diagnostic testing and treatment scenarios. They are based on data from the peer-reviewed scientific literature, from criteria developed by specialty societies and from guidelines adopted by

the peer-reviewed scientific literature, from criteria developed by specialty societies and from guidelines adopted by other health care organizations. Access to these guidelines is being provided for informational purposes only. AIM is under no obligation to update its Guidelines. Therefore, these Guidelines may be out of date.

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Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

AIM Specialty Health (AIM). Polysomnography and home sleep testing. Chicago (IL): AIM Specialty Health (AIM); 2014 Mar 25. 9 p. [11 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2014 Mar 25

Guideline Developer(s)

AIM Specialty Health - Professional Association

Source(s) of Funding

AIM Specialty Health

Guideline Committee

Clinical Guidelines Committee

Composition of Group That Authored the Guideline

Board certified physicians, including three board-certified sleep medicine specialists

Financial Disclosures/Conflicts of Interest

All members of any body are required to report and discuss any potential conflicts of interest. In the event that a member discloses a conflict of interest that may influence the Guideline development process or specific recommendations, the member must not participate in the vote specific to the relevant recommendation. Ongoing review and management of conflict of interest is the responsibility of the Clinical Guidelines Committee.

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available by request. Please contact AIM Specialty Health at AIM.guidelines@aimspecialtyhealth.com.

Availability of Companion Documents

None available

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on July 1, 2014. The information was verified by the guideline developer on July 28, 2014.

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