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SPECIAL ARTICLES

Evaluation and management of obstructive sleep apnea in adults hospitalized for medical care: an American Academy of Sleep Medicine clinical practice guideline

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Introduction: The purpose of this guideline is to establish clinical practice recommendations for the management of obstructive sleep apnea (OSA) in medically hospitalized adults.

Methods: The American Academy of Sleep Medicine (AASM) commissioned a task force of experts in sleep medicine to develop recommendations and assign strengths based on a systematic review of the literature and an assessment of the evidence using Grading of Recommendations, Assessment, Development and Evaluation methodology. The task force provided a summary of the relevant literature and the certainty of evidence, the balance of benefits and harms, patient values and preferences, and resource use considerations that support the recommendations. The AASM Board of Directors approved the final recommendations.

Good Practice Statement: The following Good Practice Statement is based on expert consensus, and its implementation is necessary for the appropriate and effective management of hospitalized adults with sleep-disordered breathing: For medically hospitalized adults with an established diagnosis of sleep-disordered breathing and on active treatment, existing treatment should be continued rather than withheld, unless contraindicated.

Recommendations: The following recommendations are intended as a guide for clinicians in managing medically hospitalized adults with OSA. Each recommendation statement is assigned a strength ("Strong" or "Conditional"). A "Strong" recommendation (ie, "We recommend … ") is one that clinicians should follow under most circumstances. A "Conditional" recommendation (ie, "We suggest … ") is one that requires that the clinician use clinical knowledge and experience and strongly consider the patient's values and preferences to determine the best course of action.

1. For medically hospitalized adults at increased risk for OSA, the AASM suggests in-hospital screening for OSA as part of an evaluation and management pathway that incorporates diagnosis and treatment with positive airway pressure (PAP) rather than no in-hospital screening. (Conditional recommendation, low certainty of evidence)
   Remarks: Screening may include validated questionnaires and/or screening with overnight high-resolution pulse oximetry. When considering in-hospital screening as part of a management pathway, (1) patients who place a lower value on the potential reduction of clinically meaningful outcomes (eg, cardiovascular events) and place a higher value on the possible downsides associated with the use of PAP (eg, sleep disruption, discomfort), or (2) clinicians who perceive that the diagnosis or management of OSA may interfere with medical care, would reasonably decline OSA screening or PAP during the hospitalization. High risk for OSA is defined by signs and symptoms that suggest moderate-to-severe OSA (eg, excessive daytime somnolence plus 2 of the following: diagnosed hypertension; habitual loud snoring; witnessed apnea, gasping, or choking; and/or association of high-risk comorbidities as outlined in the **Figure 1** *caption). Diagnostic testing for OSA should ideally be conducted after a patient has been medically stabilized during the hospital stay or postdischarge.*
2. For medically hospitalized adults with newly diagnosed OSA, or with a prior established diagnosis of moderate-to-severe OSA but not currently on treatment, the AASM suggests the use of inpatient treatment with PAP rather than no PAP. (Conditional recommendation, low certainty of evidence)
   Remarks: When considering in-hospital OSA treatment, (1) patients who place a lower value on the potential reduction of clinically meaningful outcomes (eg, cardiovascular events) and place a higher value on the possible downsides associated with the use of PAP (eg, sleep disruption, discomfort), or (2) clinicians who perceive that the diagnosis or management of OSA may interfere with medical care, would reasonably decline OSA screening or PAP during the hospitalization.
3. For medically hospitalized adults at increased risk for or with an established diagnosis of OSA, the AASM suggests that sleep medicine consultation be available as part of an evaluation and management pathway, rather than no sleep medicine consultation. (Conditional recommendation, very low certainty of evidence)

Remarks: It is recognized that there will be variability of the availability of hospital-based expertise and resources specific to sleep medicine consultation; therefore, we provide specific guidance as follows. Oversight by a board-certified sleep medicine clinician and/or an AASM-accredited sleep center is preferable. However, elements of this consultation, including education and follow-up plan, can be provided by those with requisite expertise, including advanced practitioners, nurses, sleep technologists, respiratory therapists, care coordinators, case managers, health educators, or other available resource personnel. Given the variability of expertise and resources available, creative consultation models of care such as teleconsult/telehealth, E-consult, and/or nursing or respiratory therapist care can be considered. Availability of inpatient diagnostics and treatment as part of the consultation should be taken into consideration in terms of feasibility of implementation of this recommendation.

4. For medically hospitalized adults at increased risk for or with an established diagnosis of OSA, the AASM suggests a discharge management plan to ensure timely diagnosis and effective management of OSA, rather than no plan. (Conditional recommendation, very low certainty of evidence)
Remarks: Consider ordering postdischarge testing or sleep medicine evaluation prior to discharge. Inpatient sleep testing prior to discharge and/or telehealth medicine may be an option to reduce barriers to care. Consider care coordination to ensure appropriate follow-up and postdischarge care.

Keywords: obstructive sleep apnea, OSA, sleep-disordered breathing, hospital, inpatient, positive airway pressure, PAP
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INTRODUCTION

This clinical practice guideline is the first of the American Academy of Sleep Medicine (AASM) to address the topic of inpatient sleep medicine with a focus on obstructive sleep apnea (OSA) in medically hospitalized adults. The guideline was developed with attention to alignment with previously published AASM guidelines on diagnostic testing for OSA[1] and treatment of adult OSA with positive airway pressure (PAP).[2] Given that these prior guidelines were not created to address or focus attention on the evaluation and management of OSA in the hospitalized patient population, the AASM recognized the need for guidance in this area and convened a task force (TF) to address this existing gap in synthesized knowledge. The guideline is focused on the recognition and management of OSA in adult patients admitted to the hospital for medical inpatient care given that (1) this topic represents an area of growing concern, (2) it involves an inherently diverse and complex patient population, and (3) a systematic synthesis of the existing literature and knowledge to inform and guide clinical practice is lacking. The association of sleep-disordered breathing (SDB) with a 17% increased length of stay per whole day increment and 67% increased costs even after rigorous accounting of potential confounding factors provides further justification for pursuing this guideline.[3] This guideline, in conjunction with the accompanying systematic review, provides a comprehensive update of the available evidence and a synthesis of clinical practice recommendations for the screening, diagnosis, and management of suspected or established inpatient OSA in medically hospitalized adults. SDB includes a range of breathing disorders during sleep encompassing OSA, central sleep apnea (CSA), and sleep-related hypoventilation. Although *a priori* the search was based upon SDB, since most of the evidence focuses on OSA, this term is used in the text and recommendations, and when other breathing disorders are represented in the evidence, this is specified. As other forms of SDB have unique pathologies and treatments, the TF did not feel that evidence could be extrapolated from trials primarily of OSA. The recommendations of this guideline are not intended for hospitalized patients with acute or chronic respiratory failure requiring noninvasive ventilatory support, nor are the recommendations crafted to address OSA considerations in the perioperative surgical or procedural inpatient population. Patients with sleep-related hypoventilation (eg, due to obesity, opiates, neuromuscular disease, etc.) as a subgroup of SDB may be at high risk for poor clinical outcomes in the inpatient setting. Although an existing guideline provides recommendations for treatment of obesity hypoventilation syndrome in the inpatient settings,[4] given the insufficient evidence and limited individual-level patient data regarding optimal inpatient management approaches for hypoventilation syndromes, the current guideline did not include this clinical entity. It is noteworthy that sleep disorders other than SDB (eg, parasomnias, restless legs syndrome) and hospital-specific environmental sleep disruption are also not the focus of this guideline. The recommendations are intended to provide guidance to optimize patient-centric inpatient clinical paradigms by broadly informing clinicians who care for the medically hospitalized patient population with suspected or an established diagnosis of OSA.

METHODS

The AASM commissioned a TF of sleep medicine clinicians with expertise in the management of adults hospitalized for acute medical illness (nonsurgical population) with OSA, along with guideline methodologists. The TF was required to disclose all potential conflicts of interest (COI), per the AASM's COI policy, prior to being appointed to the TF and throughout the research and writing of these documents. In accordance with the AASM's COI policy, TF members with a Level 1 conflict were not allowed to participate. TF members with a Level 2 conflict were required to recuse themselves from any related discussion or writing responsibilities. All relevant COI are listed in the Disclosure Statement.

The TF conducted a systematic review of the published scientific literature, focusing on patient-oriented, clinically relevant outcomes. The key terms, search limits, and inclusion/exclusion criteria specified by the TF are detailed in the supplemental material of the accompanying systematic review.[5] The purpose of the review was to determine whether the interventions of inpatient screening, diagnostics, treatment, sleep consultation, physiologic monitoring, and postdischarge management provided clinically meaningful improvements in relevant outcomes relative to no intervention on OSA. The TF set a clinically meaningful threshold for each outcome to determine whether the mean differences

between intervention and control or before and after intervention in the outcomes assessed were clinically meaningful.[5] The TF then developed clinical practice recommendations according to the GRADE process (Grading of Recommendations Assessment, Development and Evaluation).[6,7] The TF assessed the following 4 components to determine the direction and strength of a recommendation: certainty of evidence, balance of beneficial and harmful effects, patient values and preferences, and resource use. Details of these assessments can be found in the accompanying systematic review.[5] Taking these major factors into consideration, each recommendation statement was assigned a strength ("Strong" or "Conditional"). Additional information is provided in the form of "Remarks" immediately following the recommendation statements, when deemed necessary by the TF. Remarks are based on the evidence evaluated during the systematic review and are intended to provide context for the recommendations and to guide clinicians in the implementation of the recommendations in daily practice.

This clinical practice guideline reflects the evidence and state of knowledge at the time of the last literature search, December 2024. Scoping literature searches are performed every 1 to 2 years on all published AASM clinical practice guidelines to review new evidence. Based on this review, updates may be made if there are significant changes in areas such as the available interventions, outcomes of interest (or values placed on outcomes), or evidence of the existing benefits and harms.

Of note, when direct evidence was lacking, the panel relied on indirect evidence that included screening and diagnostic assessment together as part of a care management pathway.

GOOD PRACTICE STATEMENT

The following Good Practice Statement is based on expert consensus, and its implementation is suggested for appropriate and effective management of hospitalized adults diagnosed with SDB.

For medically hospitalized adults with an established diagnosis of SDB and on active treatment, existing treatment should be continued rather than withheld, unless contraindicated. (Good Practice Statement)

Key points

- Treatment of SDB should be continued regardless of modality (eg, PAP, hypoglossal nerve stimulation therapy, oral appliance therapy, pharmacotherapies) if feasible given the clinical setting.
- Using the patient's own PAP device and mask interface is preferred, unless prohibited (eg, hospital policy) or not feasible.
- PAP use/mask type/pressure and device settings or use of other treatment modalities should be documented in the electronic medical record.
- Relative contraindications to providing PAP therapy include, but are not limited to, facial trauma with concerns for pneumocephalus, aspiration concerns, and/or facial burns precluding use of a mask interface.

The importance of the implementation of this Good Practice Statement is supported by large population studies identifying estimates of continuation of in-hospital PAP therapy as low as 5.8%.[8,9] Home PAP settings should be used (theoretically the optimal therapeutic setting) recognizing that given changes in physiology often attributable to the indication for hospitalization, eg, exacerbation of cardiopulmonary disease and/or hypoventilation, may necessitate reassessment of therapy and potential need for concomitant supplemental oxygen. Albeit with limited evidence, PAP use may be contraindicated during the hospitalization due to aspiration risk and/or facial trauma among other reasons, thus requiring clinical judgment.[10] Measures to mitigate OSA severity that should be considered include lateral sleeping, elevating the head of the bed, and judicious use of opiates and sedatives, particularly in patients with untreated OSA.[11] Just as medication dosage and frequency are documented as part of medication reconciliation during patient intake as a quality and safety measure, PAP device type including pressure delivery type, ie, fixed PAP settings vs auto-adjusting PAP, mode of delivery, mask type and size, and manufacturer type should also be documented as part of patient intake.[11,12]

Use of home PAP devices in the hospital can be associated with cost savings[13] and therapeutic benefits, as well as patient comfort and effective adherence due to use of home humidification settings and optimal mask type/fit. Clinical engineering approval of the PAP device prior to use in the hospital is often required. Hospitals often use waivers of liability specific to use of home PAP devices. If inpatient use of home PAP devices is not permitted, an adequate supply of hospital devices should be available that support different modalities (eg, continuous PAP, auto-adjusting PAP, bilevel PAP, adaptive servoventilation, volume-assured pressure support), and respiratory therapy resources, including adequate mask interface options, to support device set-up and use. Recommendations to continue therapy apply not only to PAP therapy, but also to alternative non-PAP modalities including oral appliances and hypoglossal nerve stimulation.

RECOMMENDATIONS

The recommendations in this guideline were formulated to meet the needs of most patients in most situations. A "Strong" recommendation is one that clinicians should follow for almost all patients (ie, something that might qualify as a quality measure). A "Conditional" recommendation reflects a lower degree of certainty in the appropriateness of the patient care strategy for all patients. It requires that the clinician use clinical knowledge and experience and strongly consider the individual patient's values and preferences to determine the best course of action. The ultimate judgment regarding any specific care must be made by the treating clinician and the patient, taking into consideration the individual circumstances of the patient, available treatment options, and resources. The AASM expects this guideline to have an impact on professional behavior, patient outcomes, and—possibly—health care costs.

The following clinical practice recommendations are based on a systematic review and evaluation of evidence using the GRADE process. The implications of the strength of recommendations for guideline users are summarized in **Table 1**. Remarks are provided to guide clinicians in the implementation of these recommendations. **Table 2** summarizes the recommendations for interventions

Table 1—Implications of Strong and Conditional recommendations for users of American Academy of Sleep Medicine clinical practice guidelines.

User	Strong Recommendations: "We Recommend …"	Conditional Recommendations: "We Suggest …"
Clinicians	Almost all patients should be offered the recommended course of action. Adherence to this recommendation could be used as a quality criterion or performance indicator.	Most patients should be offered the suggested course of action; however, different choices may be appropriate for different patients. The clinician must help each patient determine if the suggested course of action is clinically appropriate and consistent with their values and preferences.
Patients	Almost all patients should be offered the recommended course of action, although a small proportion of patients would not choose it.	Most patients should be offered the suggested course of action, although some may not choose it. Different choices may be appropriate for different patients. The patient should work with their clinician to determine if the suggested course of action is clinically appropriate and consistent with their values and preferences.
Policy Makers	The recommended course of action can be adopted as policy for most situations. Adherence to the recommended course of action could be used as a quality criterion or performance indicator.	The ultimate judgment regarding the suitability of the suggested course of action must be made by the clinician and patient together, based on what is best for the patient. This decision-making flexibility should be accounted for when establishing policies.

in adult populations. A flowchart for the implementation of the recommendations is presented in **Figure 1**.

INPATIENT SCREENING, DIAGNOSIS, AND TREATMENT OF MEDICALLY HOSPITALIZED ADULTS WITH NO PRIOR DIAGNOSIS OR TREATMENT OF OSA

Recommendation 1: for medically hospitalized adults at increased risk for OSA, the AASM suggests in-hospital screening for OSA as part of an evaluation and management pathway that incorporates diagnosis and treatment with PAP rather than no in-hospital screening. (Conditional recommendation, low certainty of evidence)

Remarks

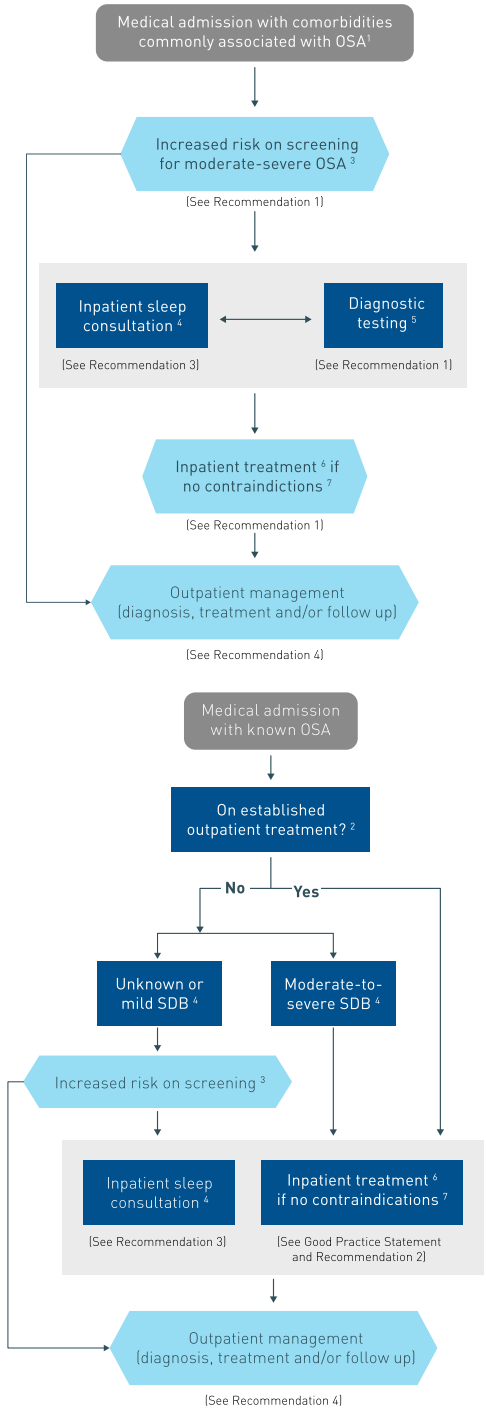
- *Screening may include validated questionnaires and/or screening with overnight high-resolution pulse oximetry (HRPO).*
- *When considering in-hospital screening as part of a management pathway, (1) patients who place a lower value on the potential reduction of clinically meaningful outcomes (eg, cardiovascular events) and place a higher value on the possible downsides associated with the use of PAP (eg, sleep disruption, discomfort), or (2) clinicians who perceive that the diagnosis or management of OSA may interfere with medical care, would reasonably decline OSA screening or PAP during the hospitalization.*
- *High risk for OSA is defined by signs and symptoms that suggest moderate-to-severe OSA (eg, excessive daytime somnolence plus 2 of the following: diagnosed hypertension; habitual loud snoring; witnessed apnea, gasping, or choking; and/or association of high-risk comorbidities as outlined in the* **Figure 1** *caption).*
- *Diagnostic testing for OSA should ideally be conducted after a patient has been medically stabilized during the hospital stay or postdischarge.*

Table 2—Summary of recommended interventions in medically hospitalized adults.

Intervention	Strength of Recommendation	Overall Certainty of Evidence
Medically hospitalized adults at increased risk for OSA		
Inpatient screening, diagnosis, & treatment (management pathway, no prior OSA diagnosis)	Conditional for	⊕⊕◯◯
Medically hospitalized adults with newly diagnosed OSA, or with a prior established diagnosis of moderate-to-severe OSA and not currently on treatment		
Inpatient treatment (newly diagnosed or established OSA diagnosis)	Conditional for	⊕⊕◯◯
Medically hospitalized adults newly diagnosed or at increased risk for or with an established diagnosis of OSA		
Inpatient sleep consultation	Conditional for	⊕◯◯◯
Peri-discharge management	Conditional for	⊕◯◯◯

GRADE certainty of evidence: ⊕◯◯◯ = very low, ⊕⊕◯◯ = low. OSA = obstructive sleep apnea.

Figure 1—Inpatient OSA management pathways.



[1]With signs and symptoms that indicate moderate-to-severe OSA and/or high-risk comorbidities (eg, heart failure, atrial fibrillation, acute coronary syndrome, chronic obstructive pulmonary disease, pulmonary hypertension, stroke, severe obesity). [2]Using regularly and benefitting from treatment. [3]STOP-BANG, STOP, high-resolution pulse oximetry, or pulse oximetry. [4]Shared decision making on whether to reevaluate, continue treatment, or monitor. [5]Portable sleep apnea testing or polysomnogram with need approved by sleep team and interpreted by sleep physician. [6]Consider inpatient treatment in some scenarios like hypoxia/comorbidities; shared decision making should consider OSA severity, patient values, and access to resources. [7]Relative contraindications (eg, facial trauma/burns, aspiration risk, nasogastric tube). FU = follow-up, OSA = obstructive sleep apnea, SDB = sleep-disordered breathing.

The TF identified 8 randomized controlled trials (RCTs) in which the pooled estimates demonstrated clinically meaningful improvements in mortality and incidence of OSA-related comorbidities (cardiovascular events) and nonclinically meaningful improvements in stroke recovery and readmission. One of the 8 RCTs reported secondary stroke recovery outcomes and was not included in the final meta-analysis for the critical outcome of stroke recovery. The diagnostic and management components of the pathway could occur either in the inpatient or outpatient setting depending upon the study. In the setting of limited direct evidence, the recommendation was framed as screening in the context of a management pathway given the inherent interrelationships between inpatient OSA screening, diagnosis and treatment, and the challenges of interpreting indirect evidence in each of these domains in isolation. Existing symptom-based screening approaches may have suboptimal performance in specific populations such as those with cardiovascular disease and stroke, so screening tools such as HRPO may help optimize use of inpatient resources.[14,15]

Although screening of OSA occurs in the inpatient setting, we also note the variability in the studies in terms of inpatient vs outpatient diagnostic assessments and timing of treatment initiation. Type of testing may also affect the ability to affect short-term outcomes; for example, compared to outpatient polysomnography (PSG), a home sleep apnea test (HSAT) after acute stroke may be able to reduce time to testing, increase diagnosis and treatment rates, and in those offered continuous PAP, result in greater improvements in sleepiness and recovery outcomes.[16]

The overall certainty of evidence was low due to risk of bias and imprecision. The cost for an evaluation and management pathway in the hospital was judged to vary, depending on the availability of staff and equipment. The intervention was deemed feasible to implement.

INPATIENT TREATMENT OF MEDICALLY HOSPITALIZED ADULTS WITH NEWLY DIAGNOSED OSA, OR WITH A PRIOR ESTABLISHED DIAGNOSIS OF OSA BUT NOT CURRENTLY ON TREATMENT

Recommendation 2: for medically hospitalized adults with newly diagnosed OSA, or with a prior established diagnosis of moderate-to-severe OSA but not currently on treatment, the AASM suggests the use of inpatient treatment with PAP rather than no PAP. (Conditional recommendation, low certainty of evidence)

Remarks

- *When considering in-hospital OSA treatment, (1) patients who place a lower value on the potential reduction of clinically meaningful outcomes (eg, cardiovascular events) and place a higher value on the possible downsides associated with the use of PAP (eg, sleep disruption, discomfort), or (2) clinicians who perceive that the diagnosis or management of OSA may interfere with medical care, would reasonably decline OSA screening or PAP during the hospitalization.*

The TF identified 16 RCTs involving primarily continuous PAP-naive patients in which the pooled estimates demonstrated

clinically meaningful improvements in mortality and incidence of OSA-related comorbidities (cardiovascular events) and non-clinically meaningful improvements in stroke recovery and readmission. Six of the 16 RCTs reported secondary stroke recovery outcomes and were not included in the final meta-analysis for the critical outcome of stroke recovery.

The overall certainty of evidence was low due to risk of bias and imprecision. The cost for the use of PAP in the hospital was judged to be moderate. The intervention was deemed feasible to implement.

INPATIENT SLEEP CONSULTATION OF MEDICALLY HOSPITALIZED ADULTS AT INCREASED RISK OR WITH AN ESTABLISHED DIAGNOSIS OF SDB

Recommendation 3: for medically hospitalized adults at increased risk for or with an established diagnosis of OSA, the AASM suggests that sleep medicine consultation be available as part of an evaluation and management pathway, rather than no sleep medicine consultation. (Conditional recommendation, very low certainty of evidence)

Remarks

- *It is recognized that there will be variability of the availability of hospital-based expertise and resources specific to sleep medicine consultation; therefore, we provide specific guidance as follows. Oversight by a board-certified sleep medicine clinician and/or an AASM-accredited sleep center is preferable. However, elements of this consultation, including education and follow-up plan, can be provided by those with requisite expertise, including advanced practitioners, nurses, sleep technologists, respiratory therapists, care coordinators, case managers, health educators, or other available resource personnel. Given the variability of expertise and resources available, creative consultation models of care such as teleconsult/telehealth, E-consult, and/or nursing or respiratory therapist care can be considered.*
- *Availability of inpatient diagnostics and treatment as part of the consultation should be taken into consideration in terms of feasibility of implementation of this recommendation.*

The TF identified 1 observational study in which the pooled estimate demonstrated an improvement in the number of follow-ups of patients with PSG and an increase in the number of OSA diagnoses. The TF discussed that although the Conditional recommendation is based on a single observational study, there is high value of the downstream benefits of inpatient consultation, including outpatient outcomes of an established diagnosis. Indirect evidence supports that the diagnosis of OSA may also lead to improvement in clinical outcomes, particularly in high-risk populations such as those with cardiopulmonary or neurologic disease. The inpatient consultation also provides a platform for more systematic implementation of guideline recommendations of inpatient OSA evaluation and management. This Conditional recommendation is aligned with data supporting the overall value of sleep medicine specialist expertise in the management of OSA.[17] The diagnostic and management components of the pathway could occur either in the inpatient or outpatient setting.

The overall certainty of evidence was very low due to selection bias. The cost for sleep medicine consultation in the hospital was judged to vary, depending on the availability of staff and equipment. The intervention was deemed feasible to implement.

PERI-DISCHARGE MANAGEMENT OF MEDICALLY HOSPITALIZED ADULTS AT INCREASED RISK OR WITH AN ESTABLISHED DIAGNOSIS OF OSA

Recommendation 4: for medically hospitalized adults at increased risk for or with an established diagnosis of OSA, the AASM suggests a discharge management plan to ensure timely diagnosis and effective management of OSA, rather than no plan. (Conditional recommendation, very low certainty of evidence)

Remarks

- *Timeliness: Consider an expedited evaluation and management plan to optimize postdischarge outcomes.*
- *Linkage to care: Consider ordering postdischarge testing or sleep medicine evaluation prior to discharge. Inpatient sleep testing prior to discharge and/or telehealth medicine may be an option to reduce barriers to care.*
- *Population management: Consider care coordination to ensure appropriate follow-up and postdischarge care.*

The TF identified 1 RCT and 6 observational studies in which the pooled estimates demonstrated clinically meaningful improvements in mortality, incidence of OSA-related comorbidities (recurrent myocardial infarction, cardiovascular events), readmission, and PAP adherence.

The overall certainty of evidence was very low due to risk of bias associated with observational studies and imprecision. The cost for a peri-discharge management plan in the hospital was judged to vary, depending on the availability of staff and equipment. The intervention was feasible to implement.

INPATIENT PHYSIOLOGIC MONITORING OF MEDICALLY HOSPITALIZED ADULTS AT INCREASED RISK OR WITH AN ESTABLISHED DIAGNOSIS OF OSA

For medically hospitalized adults at risk for or with a diagnosis of OSA, the AASM makes no recommendation regarding inpatient physiologic monitoring (eg, oximetry and/or capnography monitoring). There was insufficient evidence to make a recommendation, and further research and innovation are needed.

DISCUSSION

The merit and value of addressing OSA in the hospitalized adult resides in the confluence of the high prevalence of OSA of the inpatient population,[18–21] the association of unrecognized OSA

with poor health outcomes, decrements in quality of life, and the unique opportunity that the inpatient hospital setting presents to identify and manage OSA in those with high acuity of illness. Hospitalized patients, most often with a high burden of morbidity, are at risk for consequences of underdiagnosis and undertreatment of OSA and most vulnerable to adverse outcomes, not only during their inpatient stay, but also for the long term. The existing paradigm has focused thus far on the outpatient management of OSA; therefore, this clinical practice guideline was developed to focus on OSA evaluation and management in the inpatient setting. The recommendations culminate from the interpretation of the aggregated evidence from the systematic review of literature on OSA in the medically hospitalized adult. Four Conditional recommendations are presented, including (1) in-hospital screening for OSA as part of an evaluation and management pathway in at-risk patients that incorporates diagnosis and treatment with PAP therapy, (2) use of inpatient PAP therapy in those with an established diagnosis of moderate-to-severe OSA who are currently untreated, (3) sleep medicine consultation availability as part of an evaluation and management pathway in those with increased OSA risk or established OSA, and (4) a discharge management plan for timely diagnosis and effective management of OSA.

Inpatient OSA screening as part of the management pathway

Approach to OSA screening

Several studies have shown an estimated prevalence of OSA in inpatients ranging from 25 to 77%.[18–21] Given the high burden of undiagnosed OSA, there is an opportunity to screen and identify patients in the hospitalized setting who are more likely to be susceptible to adverse clinical outcomes if they have moderate-to-severe untreated OSA. Some studies have used screening questionnaires such as the STOP-BANG questionnaire, whereas others have utilized overnight continuous HRPO or limited portable sleep apnea screening devices.[22] Although questionnaires can be used to assess for OSA likelihood in patients with high pretest probability for OSA, limited objective testing offers the added benefit of assessing OSA severity and may be helpful in populations for which symptomatic screening has lower predictive value.[23–26] A 2-step screening protocol using both a questionnaire followed by objective testing (HRPO) has shown feasibility and a high positive predictive value when validated against gold-standard PSG in patients who are obese, with favorable resource utilization.[27,28]

High-risk inpatient subgroups and timing of OSA evaluation

Objective screening and diagnostics are recommended to be performed when patients are in a relatively stable condition after the resolution of an acute event (eg, decompensated heart failure, chronic obstructive pulmonary disease exacerbation). Relative contraindications to objective screening and diagnostics may include supplemental oxygen requirements ≥ 3 L/min, severe pain, impaired mental status, and sleep disruption due to conditions such as pain, nebulizer treatments, or blood draws.[28,29] Many of the high-risk comorbidities (eg, heart failure, atrial fibrillation, acute coronary syndrome, stroke, pulmonary hypertension) that warrant screening for OSA may merit eventual in-laboratory sleep testing for more detailed assessment of sleep-related hypoventilation, sleep-related hypoxia, and/or CSA. Therefore, although limited-channel sleep studies may not be the ideal diagnostic approach, they may still hold value to risk-stratify patients for clinical decision making.[30] Patients at high risk for OSA are at increased risk for rapid response team events.[31] Similarly, patients at high risk for OSA who are using narcotics may be at higher risk for escalation of care,[32] and preemptive OSA detection may be beneficial. Screening for OSA in patients admitted for chronic obstructive pulmonary disease exacerbation can help determine risk for both readmission and mortality in 6 months.[33] Patients with acute-on-chronic respiratory failure who are admitted to hospitals and require noninvasive positive pressure ventilation at discharge are often required by some insurance providers to rule out OSA prior to noninvasive positive pressure ventilation coverage. An inpatient sleep screening program utilizing objective testing may help with early approval of noninvasive positive pressure ventilation at the time of discharge.[34]

OSA inpatient diagnostic approaches

The decision to conduct inpatient screening alone vs diagnostic testing with either HSAT or PSG with or without titration is often a question of resources, costs, patient selection, and ensuring coordination of sleep care posthospitalization. Patients may benefit from inpatient diagnostic testing, especially when admission to inpatient rehabilitation and long-term care facilities may otherwise delay outpatient follow-up and early treatment would be expected to enhance recovery or prevent readmission. Types of diagnostic testing used in studies include unattended Type 2 and 3 sleep testing. Given resource and personnel limitations, full PSG in the inpatient setting is not available in most institutions; however, feasibility and benefit of PSG using a wireless system has been shown in the inpatient setting.[35] Some inpatient sleep programs may be able to conduct inpatient PSG with or without transcutaneous carbon dioxide monitoring for both diagnosis and optimizing treatment,[36] either with in-laboratory or bedside testing with technologist support,[37] which has the potential benefit of qualifying patients for less costly respiratory assist devices rather than noninvasive ventilation devices. HSAT may be more cost-effective and have lower resource utilization than PSG, and has been validated in certain inpatient populations like those with stroke.[16] Compared to HRPO screening, use of HSAT to establish OSA diagnosis has the benefit of being able to qualify patients for treatment, but neither may be appropriate for other inpatients where hypoventilation or CSA may be more of a concern.

Given the complexity of titration with the need for technologist monitoring combined with environmental challenges in the inpatient setting, split night sleep studies or PAP titration studies are likely beneficial in only select patient populations with high acuity of illness. For example, in hospitalized patients with hypoventilation, those who are adherent with PAP therapy after in-hospital PAP titration have fewer readmissions than nonadherent patients or those who were never set up with PAP therapy.[36]

Sleep health disparities in the inpatient setting

Minority communities and communities in rural areas have a high prevalence of undiagnosed OSA.[21,38–40] Additionally, the

increasing reliance of patients with low socioeconomic status on hospital care, given limited availability of preventative care[41,42] and the low comfort level of rural primary care physicians in managing OSA,[21] make inpatient screening programs more likely to improve health care disparities. Well-structured inpatient sleep screening programs may help to substantially mitigate bias in OSA and promote equity.[38,39]

Impact of inpatient OSA screening and health care costs

Median hospitalization cost for patients with OSA is significantly higher than for patients without OSA.[3] OSA diagnosis is associated with longer hospital stay, intensive care unit transfer, increased intubations, and 22% higher costs in hospitalized patients with pneumonia.[8] Coronavirus disease 2019 admissions with OSA had a longer length of stay and a greater number of intensive care unit admissions.[43] Hospitalized patients with heart failure who had SDB had near-double readmission costs postdischarge compared to those without SDB.[44] The impact of screening and evaluating OSA in hospitalized patients may result in cost savings in both hospital and ambulatory billing. A study done in a rural hospital demonstrated a cost benefit specific to hospitalized patients with OSA who were adherent to PAP therapy.[44,45] HSAT during or shortly after admission may be a cost-effective and more efficient approach than postdischarge PSG to diagnosis and inform treatment of patients with acute stroke and result in improvement of outcomes.[37] Payer policies should allow for timely diagnostics and therapy in high-risk populations and flexibility for follow-up that takes into account patient disposition and local resources.

Inpatient OSA treatment in those with newly diagnosed OSA, or with a prior established diagnosis of OSA but not currently on treatment

In addition to adult patients newly diagnosed with OSA during admission, and in adult patients with a known preadmission diagnosis of OSA who are not already on treatment, we recommend initiation of PAP therapy, interventions to address any nonadherence prior to hospitalization, and a discussion of strategies to optimize postdischarge adherence as well as alternatives to PAP. Of note, the inpatient setting may pose a challenge for introduction to PAP therapy for those with a preadmission diagnosis of OSA not on treatment due to more of a focus on addressing the reason for admission and stabilization of the patient, in-hospital environmental factors and distractions such as noise, and limited in-hospital support for education and PAP acclimation. That said, more immediate OSA treatment may be beneficial to optimize clinical outcomes directly related to the medical reason for admission and reduce short-term recurrent risk of clinical progression or decompensation, particularly in those with cardiopulmonary and neurologic disease.

Inpatient OSA sleep consultation

It is recommended that sleep medicine consultation be available to evaluate and manage medically hospitalized patients at risk for or with a known OSA diagnosis, particularly when the required clinical decision making is more complex. It is recommended that the sleep medicine consultation preferably be overseen by a board-certified sleep medicine clinician and/or an AASM-accredited sleep center. However, involvement of other core members, when feasible, including advanced practitioners, nurses, sleep technologists, respiratory therapists, care coordinators, and case managers, could provide a beneficial multidimensional team approach. It is recognized that the feasibility of implementing inpatient sleep medicine consultation will be dependent upon the personnel, equipment, and resources available, which will vary across institutions.

Peri-discharge management of OSA

There is improvement in mortality, cardiovascular events, and readmissions once PAP therapy is implemented and adherence thresholds are met within 3 months of hospital discharge based upon our systematic review.[5] Therefore, once the patient is screened and identified to be at increased risk for OSA or diagnosed with moderate-to-severe OSA during the inpatient hospital stay, implementation of a peri-discharge management pathway should be considered to improve postdischarge outcomes. Discussions with the patient should include counseling about other treatment options beyond PAP therapy, including medications, dental devices, and surgery.

A focus on high-risk populations is recommended, eg, those with resistant hypertension, heart failure, coronary artery disease, pulmonary hypertension, atrial fibrillation, preeclampsia, and stroke,[46] to reduce health care utilization and length of stay, ER visits, and hospital readmissions.[44,45,47] Use of a peri-discharge management pathway has the potential to reduce sleep health disparities by facilitating early OSA detection and treatment in the Black and Latino populations.[38,48]

Transition of care to the outpatient setting could be achieved by utilizing sleep navigators, discharge planners, and/or case managers to expedite sleep study scheduling and/or sleep clinic appointments at the time of discharge. Telemedicine could be considered for postdischarge monitoring or establishing care in the outpatient setting, especially in resource-limited systems.[49] The peri-discharge management care pathway can lead to offering fast-track clinics, expediting prior authorization of sleep studies, and involvement of sleep clinicians, nurses, and/or medical assistants. Specific care paths with processes to ensure postdischarge follow-up should be developed, given the known high percentage of patients who are lost to follow-up despite identifying an inpatient diagnosis of OSA.[50]

Inpatient physiological monitoring in SDB

The TF did not develop specific recommendations regarding the use of physiologic monitoring in hospitalized patients with OSA or other forms of SDB due to the limited evidence. Clinicians can consider adopting oximetry and/or capnography monitoring as delineated in prior clinical practice guidelines for hypercapnic respiratory failure and obesity hypoventilation syndrome[4] and as detailed in prior multisociety statements.[51]

Observational studies[52] reveal that respiratory depression is common in those receiving opioids and associated with a longer length of stay and rapid response activation. Capnography may allow for early detection of respiratory depression prior to desaturation, particularly in forms of SDB associated with hypoventilation, but studies[53] have not demonstrated any difference in rates of intensive care unit transfer or reintubation.

In the acute care setting, physiologic monitoring is less standard and highly variable, depending more on local practice patterns, staffing parameters, and resources. The potential is high for spurious or inaccurate values, and much like with cardiac monitoring, pulse oximetry and capnography are often faulty due to sensor displacement or malfunction. This may lead to increased sleep disruption from frequent alarm signals, and alarm fatigue may delay staff evaluation for clinically significant issues, which could be detrimental.

FUTURE DIRECTIONS

For inpatient OSA, there is a need for rigorously conducted observational studies and clinical RCTs to examine the effectiveness of objective and patient-reported screening approaches, diagnostic testing approaches, and OSA interventions. Characterizing efficient strategies for patient-reported and objective OSA screening with optimal performance characteristics in the inpatient setting is needed. Identifying the optimal timing for diagnostic testing, the most accurate approach to portable sleep apnea testing, and utility of triaging of patients with highly complex cardiopulmonary pathophysiology (eg, hypoventilation syndromes and CSA) to potentially undergo full PSG deserves further investigation. We particularly note a paucity of data specific to management of hypoventilation syndromes in the inpatient setting, which anecdotally generate a high proportion of consultations to sleep medicine. For example, RCTs designed to ascertain whether patients with sleep-related hypoventilation syndromes should undergo inpatient PAP titration studies to optimize settings vs empiric therapy and whether patients should be discharged on PAP therapy including noninvasive ventilation are priority areas of investigation specific to clinically relevant outcomes, including patient-centered outcomes, hospital readmissions, and mortality.[54] Because the benefits of postdischarge evaluation for OSA in the ambulatory setting vs inpatient sleep consultative care remain unclear, more data about optimal and creative inpatient consultative care delivery approaches, such as integrated sleep medicine mobile models,[55] are needed. The use of inpatient physiologic monitoring of key cardiopulmonary signals such as oximetry, capnography, and/or telemetry may allow the ability to detect early warning signs of a deteriorating clinical state in those with known or suspected OSA; however, the effect on clinical outcomes remains unclear. Finally, aspects of the peri-discharge care of the hospitalized patient with established or suspected OSA also warrants further investigation to ensure postdischarge treatment and follow-up with a sleep medicine or alternative clinician, and to elucidate the role and utility of postdischarge telemedicine. More research is also needed to determine the efficacy and costs of different screening and diagnostic algorithms specific to OSA in hospitalized patients, including accounting for the downstream preventative costs. Clinical trials (with high consideration of pragmatic clinical trials) to assess the effect of screening and management of OSA including understudied areas of CSA and sleep-related hypoventilation are needed, with a focus on clinical outcomes, patient-reported outcomes, and cost-effectiveness to optimally inform clinical management pathways.

SUMMARY

This clinical guideline provides 4 recommendations for the adult hospitalized medical patient: (1) inpatient screening of OSA in high-risk patients as part of an integrated evaluation and management pathway, (2) use of PAP therapy in those with moderate-to-severe OSA who are currently untreated, (3) sleep medicine consultation for those with increased OSA risk or established OSA, and (4) peri-discharge plans for management of OSA with a goal to minimize loss to follow-up. All recommendations are Conditional due to the low to very low certainty of evidence. The TF determined that there was insufficient evidence to provide recommendations specific to the utility of inpatient physiologic monitoring in OSA in the hospitalized medical patient.

The recommendations were informed by the evidence collected for the systematic review of the OSA literature in medically hospitalized adults.[5] When implementing the recommendations, it is recognized that there will be marked variation in hospital and institutional resources to comprehensively screen, diagnose, and treat OSA in the inpatient setting. The recommendations provided are intended to serve as a guide to move the field forward in prioritizing the need to develop systematic approaches to manage OSA in the inpatient setting as the nascent field of inpatient sleep medicine continues to evolve. We strongly encourage readers to refer to the companion systematic review for a more detailed presentation and assessment of the evidence.

ABBREVIATIONS

AASM, American Academy of Sleep Medicine
COI, conflicts of interest
CSA, central sleep apnea
GRADE, Grading of Recommendations Assessment, Development and Evaluation
HRPO, high-resolution pulse oximetry
HSAT, home sleep apnea test
OSA, obstructive sleep apnea
PAP, positive airway pressure
PSG, polysomnography
RCT, randomized controlled trial
SDB, sleep-disordered breathing
TF, task force

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The development of this paper was funded by the American Academy of Sleep Medicine (AASM).

- Dr. Patil serves on the AASM Board of Directors and is Chair of the Guidelines Advisory Panel (GAP), having been the GAP liaison from June 2023 to August 2025. Dr. Patil is a consultant for Primasun, Inc.
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- Dr. Mustafa is a paid consultant for the AASM and an affiliated member of the U.S. GRADE Network and the Evidence Foundation.
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- Dr. Auckley was the President (2019–2020) and member of the Board of Directors (2018–2024) of the Society of Anesthesia and Sleep Medicine. He has served as Chair of the Test Writing Committee (2020–2022) and Sleep Medicine/Maintenance of Certification Approval Committee (2019–2024) for the American Board of Internal Medicine. He has received a research grant from Medtronic for a study on inpatient monitoring via oximetry and capnography. He receives royalties for having served as a consultant for UpToDate. He is the author of a sleep-related guidance document titled "Society of Anesthesia and Sleep Medicine Guidelines on Preoperative Screening and Assessment of Adult Patients With Obstructive Sleep Apnea."
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- Dr. Sharma has served as a speaker on the topic of central sleep apnea for ZOLL Respicardia (2023–2024).

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