OSA for Primary Care Part 1

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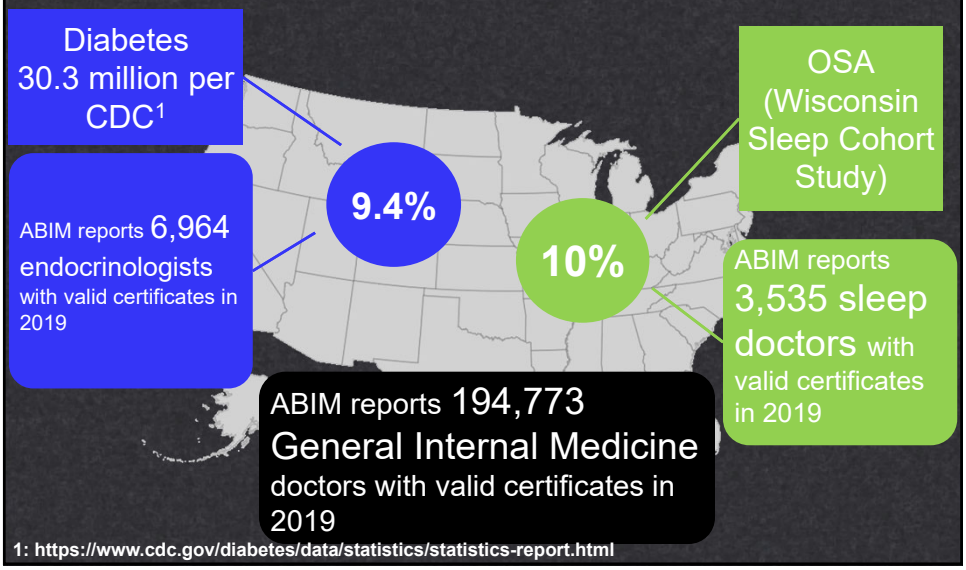
Learning objectives

- Appropriate screening in a primary care setting
- Approach to diagnosing OSA

Should sleep manage *all* OSA patients?



1: https://www.cdc.gov/diabetes/data/statistics/statistics-report.html

Wisconsin Sleep Cohort Study

1988-1994 to 2007-2010

10% with mild OSA

3.8% to 6.5% with moderate to severe OSA

Extrapolated to 2009

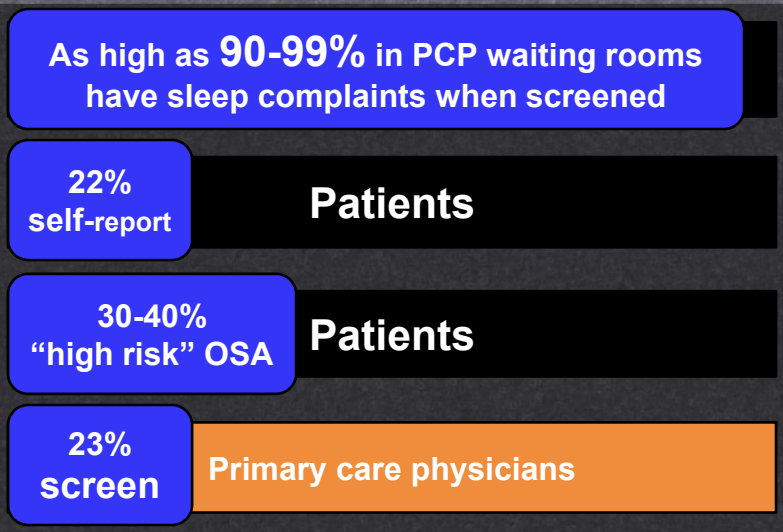
16% with mild OSA

20-30% for men, 10-15% for women age 30-70

10% with moderate to severe OSA

1: Young T, Palta M, Dempsey J, Skatrud J, Weber S, Badr S. The occurrence of sleep-disordered breathing among middle-aged adults. *N Engl J Med*. 1993;328(17):1230-1235.
2: Young T, Palta M, Dempsey J, Peppard PE, Nieto FJ, Hla KM. Burden of sleep apnea: rationale, design, and major findings of the Wisconsin Sleep Cohort study. *WMJ*. 2009;108(5):246-249.

The OSA burden falls on the PCP



1: Mold JW, Quattlebaum C, Schinnerer E, et al. Identification by primary care clinicians of patients with obstructive sleep apnea: a practice-based research network (PBRN) study. J Am Board Fam Med. 2011 Mar-Apr;24(2):138-45.
2: Mold JW, Woolley JH, Nagykaldi Z. *Associations between night sweats and other sleep disturbances: an OKPRN study. Ann Fam Med 2006;4:423–6*

Screening asymptomatic patients

- **USPSTF; 2017**

  "The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for OSA in asymptomatic adults."

- **AASM response to above; 2017**

  "…the AASM recommends screening patients who have a high risk for OSA, even if they don't have any sleep-related symptoms."

Routine health examination

Questions to ask, prompting a comprehensive sleep evaluation.

- Patient obese?
- Retrognathia?
- Daytime sleepiness?
- Snoring?
- Hypertension?

1. Consensus statement by the AASM clinical practice guidelines; 2009

Screening surveys

- STOP-BANG scoring
- ESS (Epworth Sleepiness Scale)
- Berlin Questionnaire
- Flemon's Modified Neck Circumference
- Multivariate apnea prediction index

Case 1 – Symptomatic patient

55 year old male is accompanied by his wife. He has gained weight over the years and his wife is now frightened by him holding his breath while asleep, followed by gasping for air. He falls asleep at work and when watching TV, has morning headaches and sleeps elevated on a wedge pillow because of nocturnal acid reflux.

Symptoms of OSA

- Witnessed apneas, snoring, gasping, or waking up choking at night
- Insomnia (sleep fragmentation, difficulty staying asleep)
- Excessive sleepiness or non-refreshing sleep
  - Need to ask sleep hours to know if sleep deprived
- Nocturia, morning headaches, decreased libido, GERD
- Decreased concentration, memory loss, irritability

Physical Examination

- **BMI ≥ 30**
- **Blood pressure**
- **Respiratory, cardiovascular, neurologic exams**
- **Neck circumference**
  ≥ 17" men ≥ 16" women
- **Facial anatomy**
  - **Nasal patency/septal deviation**
  - **Crowded oropharynx**
  - **Mallampati commonly used**

Mallampati Scoring

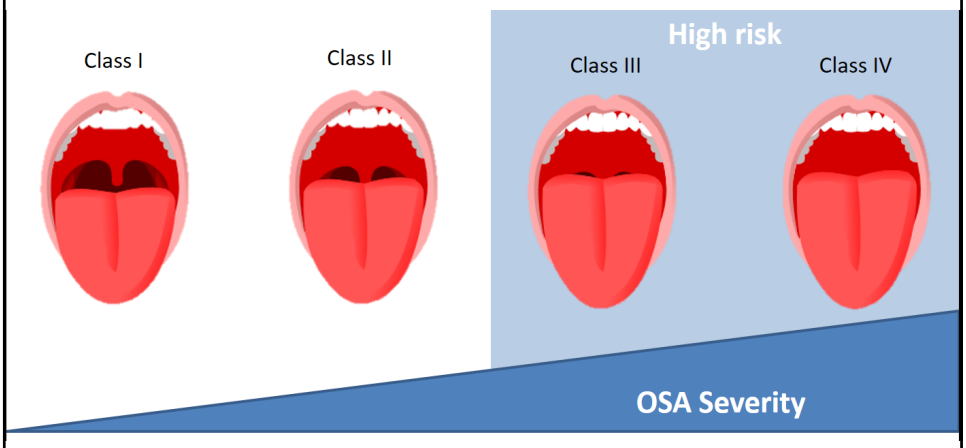
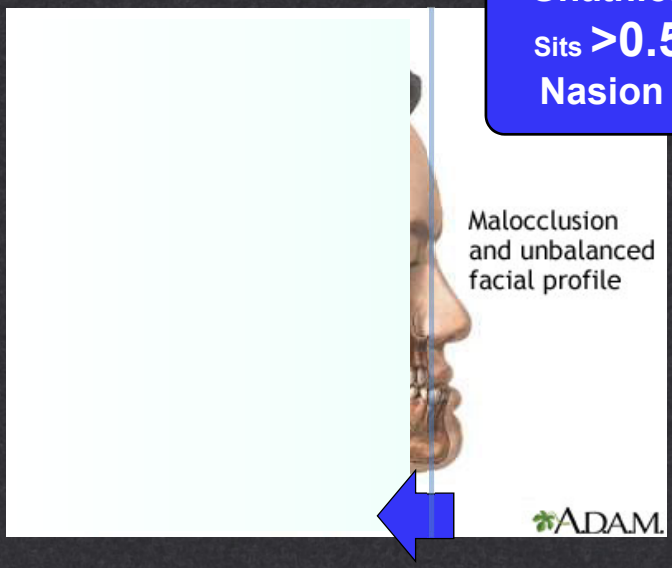


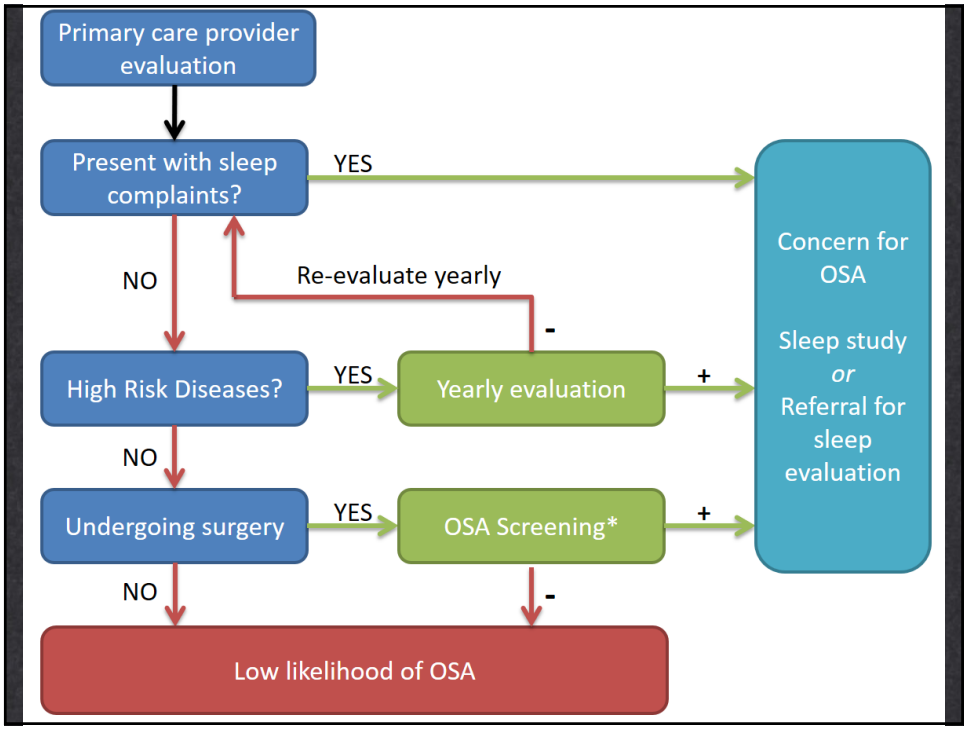
Image adapted from https://commons.wikimedia.org/wiki/File:Mallampati.svg
Miller, J. N., & Berger, A. M. (2016). Screening and assessment for obstructive sleep apnea in primary care. *Sleep medicine reviews*, *29*, 41-51.

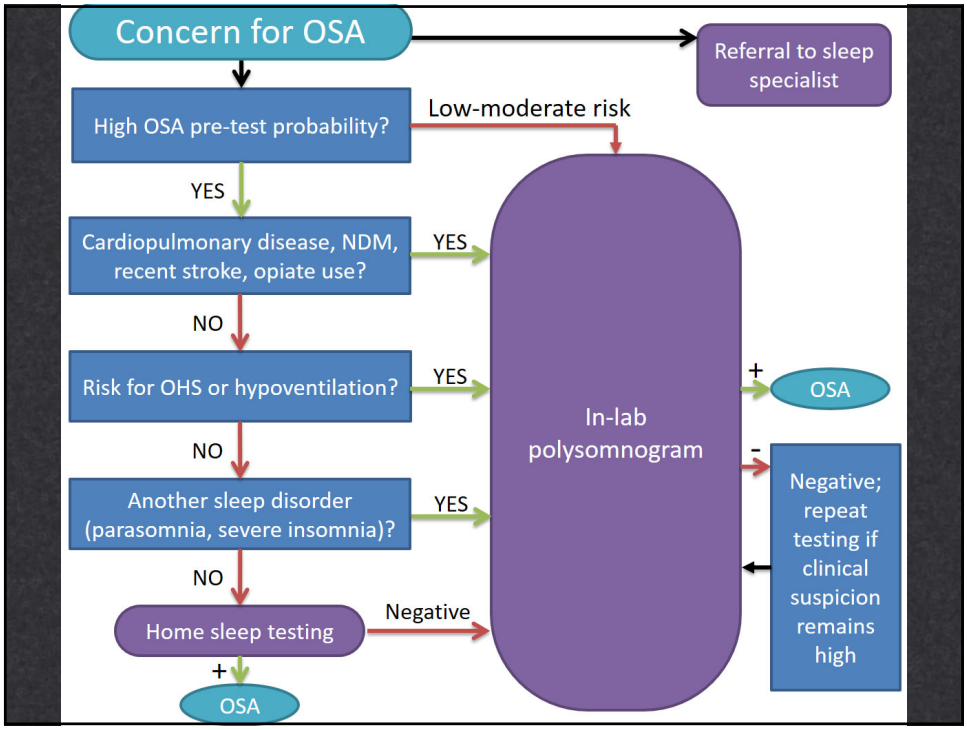
Retrognathia

Gnathion (midline chin)
Sits **>0.5 cm** behind
Nasion (between eyes)



https://medlineplus.gov/ency/imagepages/8500.htm





Home testing (minimum)

- Airflow
- Respiratory effort
- Blood oxygenation

In-laboratory testing

- Airflow
- Respiratory effort
- Blood oxygenation
- EEG → Sleep staging
- EOG → REM sleep
- EKG → Single lead
- EMG → Detect leg movements
- CO2 monitoring (Optional)

- Apnea
  - Airflow cessation
- Hypopnea
  - Reduced airflow
  - Associated oxygen desaturation

Each last at least 10 seconds

- Respiratory Effort-Related Arousal (RERA)
  - Arousal caused by airflow, not qualifying for above

AHI (Apnea Hypopnea Index)

$$AHI = \frac{Apneas + Hypopneas}{Total\ sleep\ time}$$

RDI (Respiratory Disturbance Index)

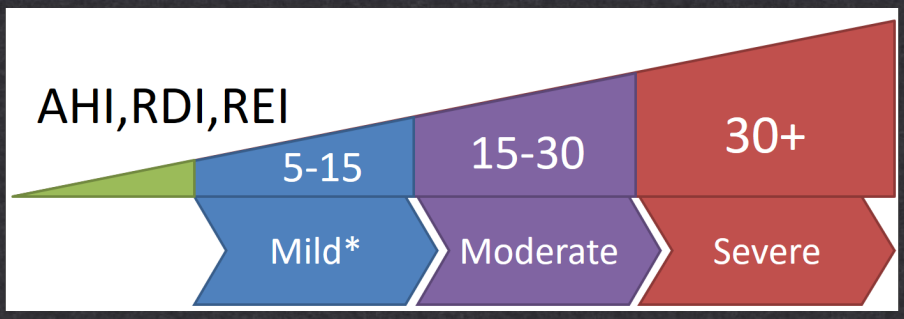
$$RDI = \frac{Apneas + Hypopneas + RERAs}{Total\ sleep\ time}$$

REI (Respiratory Event Index)

$$REI = \frac{Apneas + Hypopneas}{Total\ Recording\ Time}$$

Home Sleep testing	In-lab polysomnogram
Limited channels	Full study
Only if OSA has a high pretest probability	Gold standard OSA test
Not appropriate if severe comorbid diseases	
$	$$$
Reports REI Events / Recording Time	Reports AHI, RDI Events / Sleep Time

OSA (Obstructive sleep apnea)



*AHI ≥ 5 -15 with symptoms

- Excessive daytime sleepiness
- Impaired cognition
- Mood disorders
- Insomnia
- Waking up breath holding, gasping, or choking
- HTN, ischemic heart disease, or stroke

Central Sleep Apnea

- Absence of air-flow and respiratory effort
- Examples:
  - Cheyne-Stokes respiration in heart failure.
  - Opiates causing ataxic breathing

Obesity hypoventilation syndrome

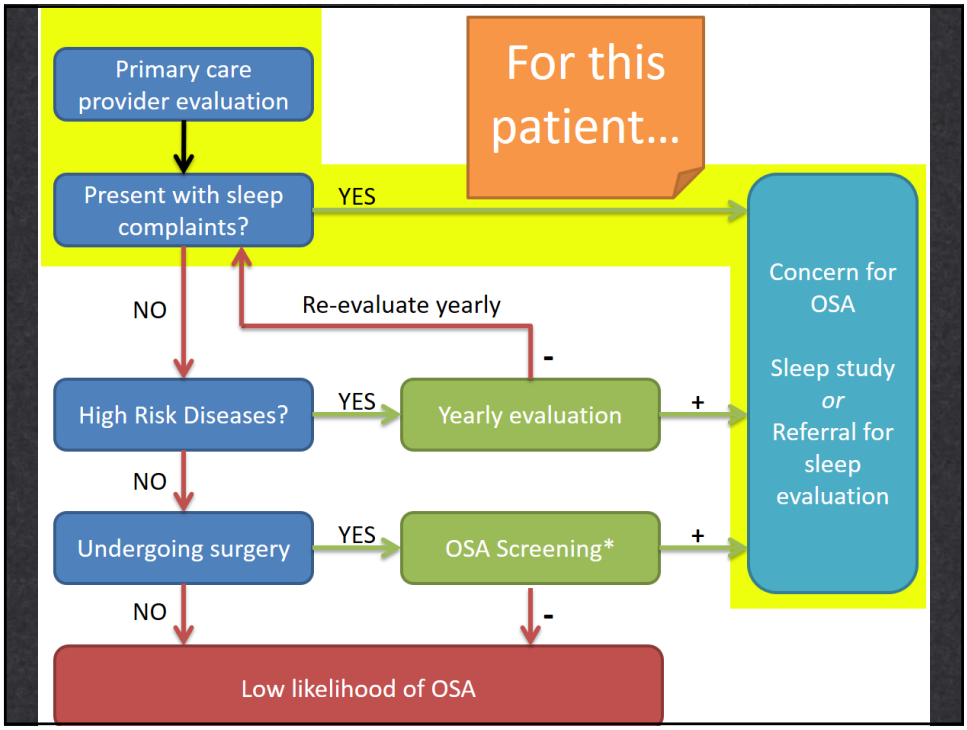
Diagnostic criteria:

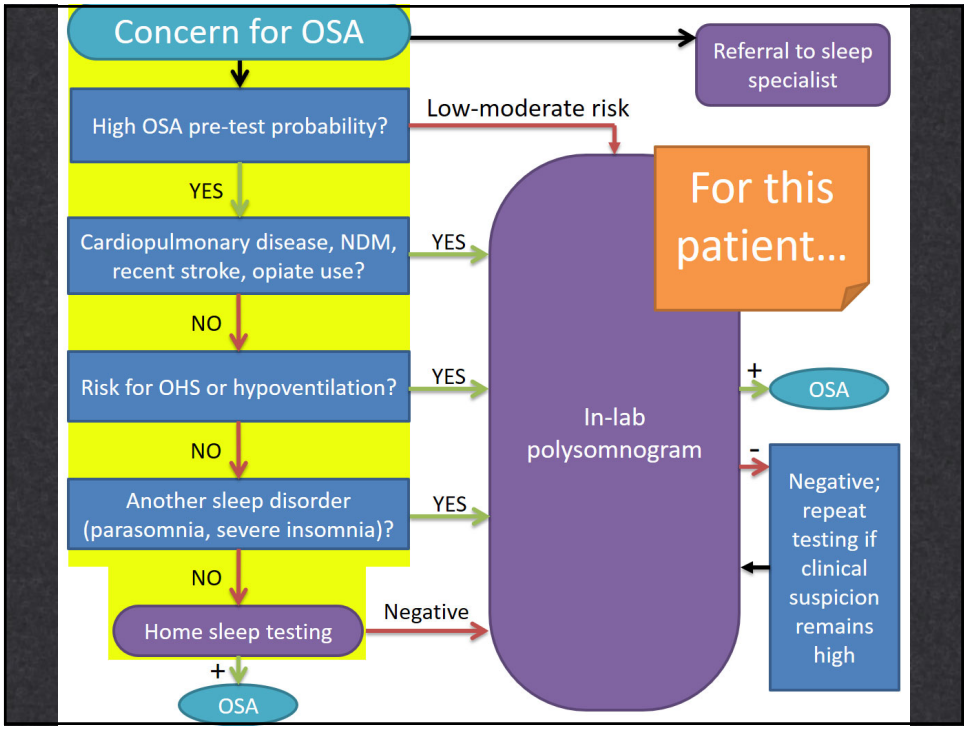
- BMI ≥ 30
- Sleep disordered breathing
- Daytime hypercapnia
  - PaCO2 ≥ 45 mm Hg
  - Other hypoventilation causes excluded

Obesity hypoventilation syndrome

Prevalence 8-20% in patients undergoing sleep testing

- High pretest probability: BMI ≥ 40
  Obtain ABG
- Low/mod pretest probability: BMI 30-40
  Obtain serum bicarbonate
  If bicarbonate ≥ 27 → ABG


For this patient…
Primary care provider evaluation
Present with sleep complaints?
YES
NO
Re-evaluate yearly
-
High Risk Diseases?
YES
Yearly evaluation
+
NO
Undergoing surgery
YES
OSA Screening*
+
NO
-
Low likelihood of OSA
Concern for OSA
Sleep study
or
Referral for sleep evaluation

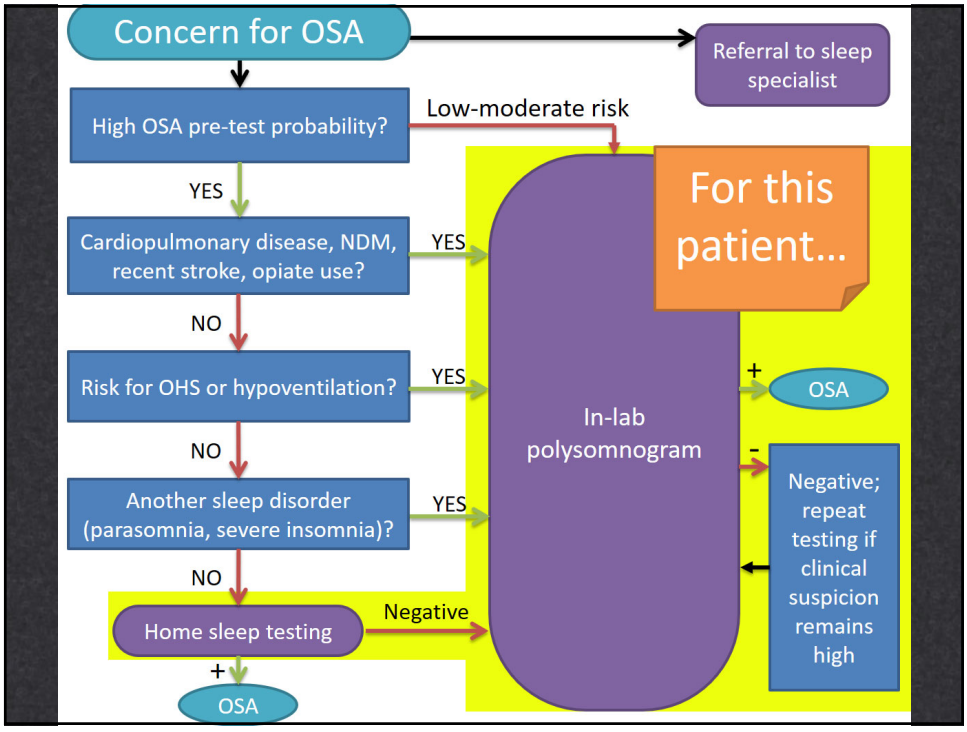

Concern for OSA
Referral to sleep specialist
High OSA pre-test probability?
Low-moderate risk
YES
Cardiopulmonary disease, NDM, recent stroke, opiate use?
YES
NO
Risk for OHS or hypoventilation?
YES
NO
Another sleep disorder (parasomnia, severe insomnia)?
YES
NO
Home sleep testing
Negative
+
OSA
For this patient…
In-lab polysomnogram
+
OSA
-
Negative; repeat testing if clinical suspicion remains high

Home sleep study results = REI 3.9

Overview

REI(AHI): 3.9 /h ODI: 3.1 /h Snore Percentage: 11.0 %

Respiratory Indices	Index Total	Index Supine	Index Non-supine	Count
Apneas + Hypopneas (AH):	3.9/h	11.2/h	2.2/h	39
Apneas:	1.5/h	3.7/h	1.0/h	15
Obstructive (OA):	1.3/h	2.7/h	1.0/h	13
Mixed (MA):	0/h	0/h	0/h	0
Central (CA):	0.2/h	1.1/h	0/h	2
Hypopneas:	2.4/h	7.5/h	1.2/h	24
Obstructive (OH):	0/h	0/h	0/h	0
Central (OC):	0/h	0/h	0/h	0
Obstructive Apnea Hypopnea (OA + MA + OH):	1.3/h	2.7/h	1.0/h	13
Central Apnea Hypopnea (CA + CH):	0.2/h	1.1/h	0/h	2
Hypoventilation:	0/h	0/h	0/h	0
Respiration Rate (per m):	18.4/m	18.3/m	18.4/m	
	Percentage of Sleep			Duration
Snore:	11.0%	7.9%	11.7%	65.9m
Flow Limitation:	10.0%	18.7%	8.0%	24.8m



Case 2 – Hospital follow up

A 63 year old male who had a heart attack 6 months ago. Recent echocardiogram shows ischemic cardiomyopathy with an estimated ejection fraction of 40-45%. When asked, he has always snored but it never bothered him.

Hypertension | Atrial Fibrillation | Congestive Heart Failure | Stroke | Obesity | Type II Diabetes | Arrhythmias

High Risk Patients

- Treatment refractory hypertension
- Atrial fibrillation
- Congestive heart failure
- Stroke
- Obesity (BMI > 30)
- Impaired glucose tolerance, or type 2 diabetes
- Nocturnal dysrhythmias
- Pulmonary hypertension
- High-risk driving populations*
- Preoperative for bariatric surgery

Yearly evaluation for OSA symptoms

AASM 2009 Guidelines.

Hypertension | Atrial Fibrillation | Congestive Heart Failure | Stroke | Obesity | Type II Diabetes | Others

Prevalence in hypertension

- **Up to 50%** of patients with hypertension have OSA in observational studies
- Cohort of patients with **difficult to control** hypertension
  - **64%** prevalence of OSA

1. T Konecny, T Kara, VK Somers: Obstructive sleep apnea and hypertension: an update. *Hypertension.* 63 (2):203-209 2014
2. RP Pedrosa, LF Drager, CC Gonzaga, et al.: Obstructive sleep apnea: the most common secondary cause of hypertension associated with resistant hypertension. *Hypertension.* 58:811-817 2011

Hypertension | Atrial Fibrillation | Congestive Heart Failure | Stroke | Obesity | Type II Diabetes | Others

Prevalence in atrial fibrillation

- Cohort of patients with atrial fibrillation in 2005[1]
  - **32-49%** of patients had OSA
- 12 month period **after cardioversion** in OSA patients[2]
  - **82% recurrence rate if untreated**
  - 42% recurrence rate while on effective CPAP

1. AS Gami, PA Friedman, MK Chung, et al.: Therapy insight: interactions between atrial fibrillation and obstructive sleep apnea. *Nat Clin Pract Cardiovasc Med.* 2:145-149 2005
2. Kanagala, N Murali, P Friedman, et al.: Obstructive sleep apnea and the recurrence of atrial fibrillation. *Circulation.* 107:2589-2594 2003

Hypertension | Atrial Fibrillation | **Congestive Heart Failure** | Stroke | Obesity | Type II Diabetes | Others

Prevalence in Systolic Heart Failure

- **61%** of 450 patients with a sleep related breathing disorder.
  - Obstructive sleep apnea
  - **Central sleep apnea**

A home sleep study would <u>not</u> be appropriate in this group since the prevalence of <u>central</u> sleep apnea is high

DD Sin, F Fitzgerald, JD Parker, et al.: Risk factors for central and obstructive sleep apnea in 450 men and women with congestive heart failure. *Am J Respir Crit Care Med.* 160:1101-1106 1999

Hypertension | Atrial Fibrillation | Congestive Heart Failure | **Stroke** | Obesity | Type II Diabetes | Others

Prevalence in stroke patients

- Cohort studies
  - 1996 study, 47 patients monitored for SaO2 desaturations. 18 of 19 tested with PSG.
    - **38%** with **AHI over 10**
  - 2008 prospective study in 25 patients with ischemic stroke
    - **74%** of patients with **AHI > 5**

1. A Tosun, O Kokturk, G Kaymak Karatas, et al.: Obstructive sleep apnea in ischemic stroke patients. *Clinics.* 63:625-630 2008
2. DC Good, JQ Henkle, D Gelber, et al.: Sleep-disordered breathing and poor functional outcome after stroke. *Stroke.* 27:252-259 1996

Hypertension | Atrial Fibrillation | Congestive Heart Failure | Stroke | **Obesity** | Type II Diabetes | Others

Increased weight = increased OSA

10% weight gain increases OSA severity (AHI) by about 32%

10% weight loss reduces OSA severity (AHI) by about 26%

Peppard, Paul E., et al. "Longitudinal study of moderate weight change and sleep-disordered breathing." Jama 284.23 (2000): 3015-3021.

Hypertension | Atrial Fibrillation | Congestive Heart Failure | Stroke | Obesity | **Type II Diabetes** | Others

Prevalence in type 2 diabetes

- Data from SHHS (Sleep heart health study)
  - **58%** of **type II diabetes** patients had elevated AHI
- Type 2 diabetes and obesity
  - **87% of patients had OSA**
- Primary care setting (2012)
  - Retrospective study; 16,066 patients
  - **18% of type 2 diabetics** with OSA diagnosis

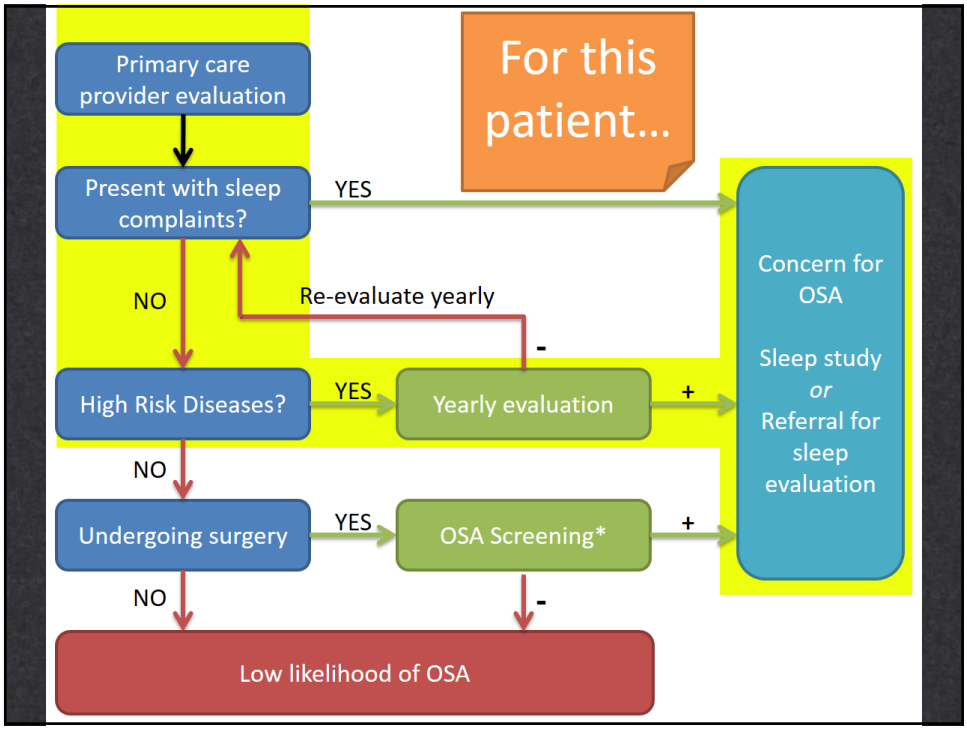
1. NM Punjabi, E Shahar, S Redline, et al.: Sleep-disordered breathing, glucose intolerance, and insulin resistance: the Sleep Heart Health Study. for; the Sleep Heart Health Study Investigators *Am J Epidemiol.* 160 (6):521-530 2004
2. GD Foster, MH Sanders, R Millman, et al.: Obstructive sleep apnea among obese patients with type 2 diabetes. *Diabetes Care.* 32:1017-1019 2009
3. Heffner JE, Rozenfeld Y, Kai M, Stephens EA, Brown LK. Prevalence of diagnosed sleep apnea among patients with type 2 diabetes in primary care. Chest2012;141:1414–1421

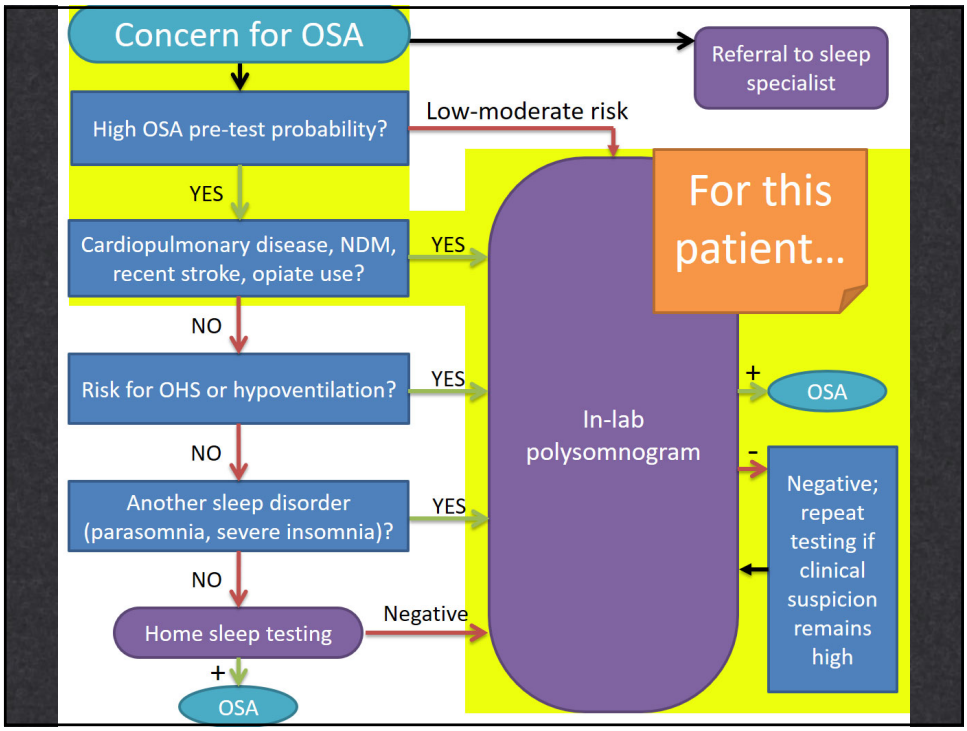
Hypertension | Atrial Fibrillation | Congestive Heart Failure | Stroke | Obesity | Type II Diabetes | Others

Other associations

- Prevalence of OSA in Coronary Artery Disease
  - 35-57%
- Prevalence of OSA in Pulmonary Hypertension
  - 17-52%
    - (in patients with pulmonary or cardiac disease)
- Increased risk for cardiac arrhythmias
  - Type II-III AV block/sinus arrest in 7% of OSA patients
  - Odds ratio for ventricular ectopy of 1.7

1. Hedner J, Franklin K, Peker Y. Obstructive sleep apnea and coronary artery disease. In: Kryger, Roth, Dement, editors. Principals and Practice of Sleep Medicine. 4th ed. Philadelphia, PA: Elsevier Inc; 2005. p. 1203-7
2. Atwood CW, McCrory D, Garcia JG, Abman SH, Ahearn GS. Pulmonary artery hypertension and sleep-disordered breathing: ACCP evidence-based clinical practice guidelines. Chest 2004; 126: 72-7
3. Becker H, Brandenburg U, Peter JH, Von Wichert P. Reversal of sinus arrest and atrioventricular conduction block in patients with sleep apnea during nasal continuous positive airway pressure. Am J Respir Crit Care Med 1995; 151: 215-8.
4. Mehra R, Benjamin EJ, Sharar E, Gottlieb DJ, Nawabit R, Kirchner HL, et al. Association of nocturnal arrhythmias with sleep disordered breathing: the Sleep Heart Health Study. Am J Respir Crit Care Med 2006; 173: 910-6.

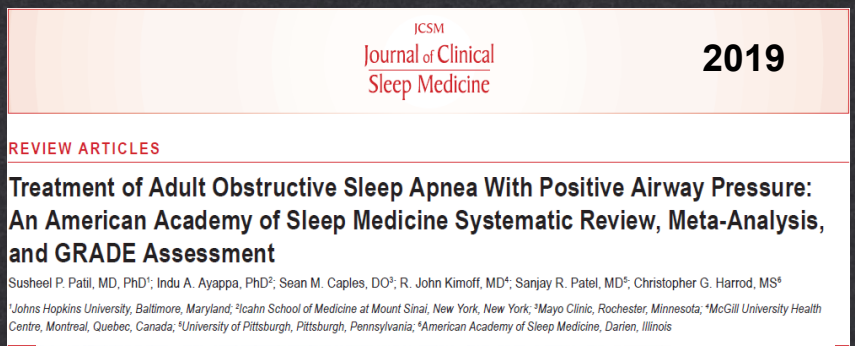




OSA treatment

- PAP is recommended 1st line
  - All OSA severity
  - Excessive sleepiness
  - Impaired quality of life
  - Comorbid hypertension
- In-lab CPAP titration
- AutoCPAP
  - Symptomatic patients
  - No significant comorbid illnesses

Recommended Reading/Guidelines



JCSM
Journal of Clinical Sleep Medicine

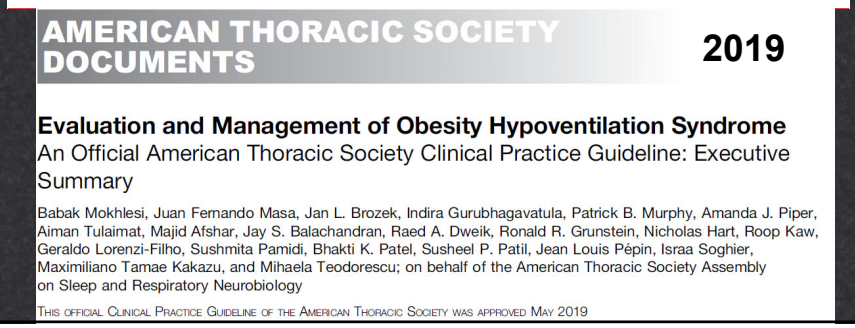
2019

REVIEW ARTICLES

Treatment of Adult Obstructive Sleep Apnea With Positive Airway Pressure: An American Academy of Sleep Medicine Systematic Review, Meta-Analysis, and GRADE Assessment

Susheel P. Patil, MD, PhD[1]; Indu A. Ayappa, PhD[2]; Sean M. Caples, DO[3]; R. John Kimoff, MD[4]; Sanjay R. Patel, MD[5]; Christopher G. Harrod, MS[6]

[1]Johns Hopkins University, Baltimore, Maryland; [2]Icahn School of Medicine at Mount Sinai, New York, New York; [3]Mayo Clinic, Rochester, Minnesota; [4]McGill University Health Centre, Montreal, Quebec, Canada; [5]University of Pittsburgh, Pittsburgh, Pennsylvania; [6]American Academy of Sleep Medicine, Darien, Illinois



AMERICAN THORACIC SOCIETY DOCUMENTS

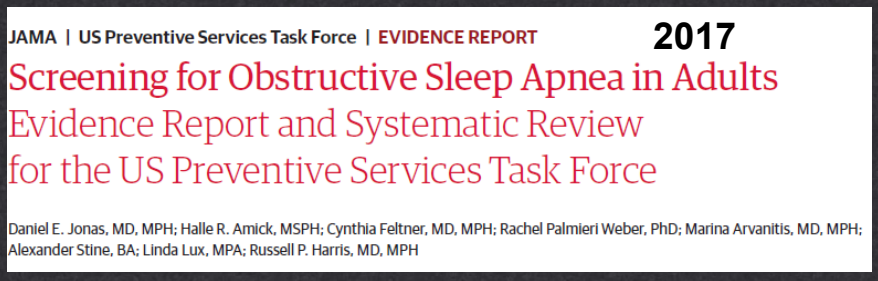
2019

Evaluation and Management of Obesity Hypoventilation Syndrome
An Official American Thoracic Society Clinical Practice Guideline: Executive Summary

Babak Mokhlesi, Juan Fernando Masa, Jan L. Brozek, Indira Gurubhagavatula, Patrick B. Murphy, Amanda J. Piper, Aiman Tulaimat, Majid Afshar, Jay S. Balachandran, Raed A. Dweik, Ronald R. Grunstein, Nicholas Hart, Roop Kaw, Geraldo Lorenzi-Filho, Sushmita Pamidi, Bhakti K. Patel, Susheel P. Patil, Jean Louis Pépin, Israa Soghier, Maximiliano Tamae Kakazu, and Mihaela Teodorescu; on behalf of the American Thoracic Society Assembly on Sleep and Respiratory Neurobiology

This official Clinical Practice Guideline of the American Thoracic Society was approved May 2019

Recommended Reading/Guidelines



JAMA | US Preventive Services Task Force | EVIDENCE REPORT

2017

Screening for Obstructive Sleep Apnea in Adults
Evidence Report and Systematic Review for the US Preventive Services Task Force

Daniel E. Jonas, MD, MPH; Halle R. Amick, MSPH; Cynthia Feltner, MD, MPH; Rachel Palmieri Weber, PhD; Marina Arvanitis, MD, MPH; Alexander Stine, BA; Linda Lux, MPA; Russell P. Harris, MD, MPH

Contents lists available at ScienceDirect

Sleep Medicine Reviews

2015

journal homepage: www.elsevier.com/locate/smrv

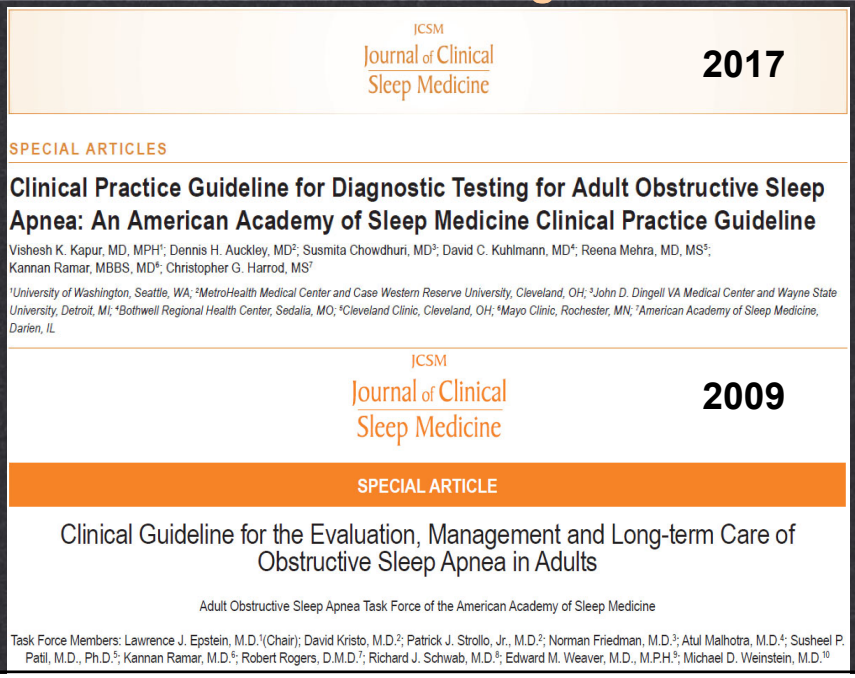
CLINICAL REVIEW

Screening and assessment for obstructive sleep apnea in primary care

Jennifer N. Miller*, Ann M. Berger

University of Nebraska Medical Center, USA

Recommended Reading/Guidelines



JCSM
Journal of Clinical Sleep Medicine

2017

SPECIAL ARTICLES

Clinical Practice Guideline for Diagnostic Testing for Adult Obstructive Sleep Apnea: An American Academy of Sleep Medicine Clinical Practice Guideline

Vishesh K. Kapur, MD, MPH[1]; Dennis H. Auckley, MD[2]; Susmita Chowdhuri, MD[3]; David C. Kuhlmann, MD[4]; Reena Mehra, MD, MS[5]; Kannan Ramar, MBBS, MD[6]; Christopher G. Harrod, MS[7]

[1]University of Washington, Seattle, WA; [2]MetroHealth Medical Center and Case Western Reserve University, Cleveland, OH; [3]John D. Dingell VA Medical Center and Wayne State University, Detroit, MI; [4]Bothwell Regional Health Center, Sedalia, MO; [5]Cleveland Clinic, Cleveland, OH; [6]Mayo Clinic, Rochester, MN; [7]American Academy of Sleep Medicine, Darien, IL

JCSM
Journal of Clinical Sleep Medicine

2009

SPECIAL ARTICLE

Clinical Guideline for the Evaluation, Management and Long-term Care of Obstructive Sleep Apnea in Adults

Adult Obstructive Sleep Apnea Task Force of the American Academy of Sleep Medicine

Task Force Members: Lawrence J. Epstein, M.D.[1](Chair); David Kristo, M.D.[2]; Patrick J. Strollo, Jr., M.D.[2]; Norman Friedman, M.D.[3]; Atul Malhotra, M.D.[4]; Susheel P. Patil, M.D., Ph.D.[5]; Kannan Ramar, M.D.[6]; Robert Rogers, D.M.D.[7]; Richard J. Schwab, M.D.[8]; Edward M. Weaver, M.D., M.P.H.[9]; Michael D. Weinstein, M.D.[10]

Obstructive Sleep Apnea Part 2: Follow Up

Madelyn Rosenthal, MD
Assistant Professor- Clinical
Department of Internal Medicine
Division of Pulmonary Medicine
The Ohio State University Wexner Medical Center

Disclosures

- Nothing to disclose

Objectives

- What to address at a follow up visit?
- PAP adherence
- Residual Daytime Sleepiness
- Nasal Congestion

What should be addressed at follow up for OSA? [1]

1. OSA specific quality of life measures
   - Ex. Functional Outcomes of Sleep Questionnaire[2]
2. Patient and bed partner satisfaction

1 Epstein LJ, et al; Adult Obstructive Sleep Apnea Task Force of the American Academy of Sleep Medicine. Clinical Guideline for Evaluation, Management and Long-term Care of Obstructive Sleep Apnea in Adults. *JCSM*. 2009 Jun; 5(3): 263-76.
2. Weaver TE, et al. An instrument to measure functional status outcomes from disorders of excessive sleepiness. *Sleep*. 1997; Oct 20 (10): 835-43

What should be addressed at follow up for OSA continued?

3. Avoidance of factors worsening disease severity
   - Alcohol and sedatives
4. Obtaining adequate amount of sleep
5. Weight loss for overweight/obese patients

Epstein LJ, et al; Adult Obstructive Sleep Apnea Task Force of the American Academy of Sleep Medicine. Clinical Guideline for Evaluation, Management and Long-term Care of Obstructive Sleep Apnea in Adults. *JCSM*. 2009 Jun; 5(3): 263-76.

What should be addressed at follow up for OSA continued?

6. Adherence
   - Up to 30% of newly diagnosed patients refuse PAP treatment from the beginning.[1]
   - Approximately 25% discontinue PAP within the first year. [2]

1 P Collard, T Pieters, et al. Compliance with nasal CPAP in obstructive sleep apnea patients. *Sleep Med Rev.* 1997; 1 (1): 33-44.
2 N McArdle, G Devereux, et al. Long-term use of CPAP therapy for sleep apnea/hypopnea syndrome. *Am J Respir Crit Care Med.* 1999; 159 (4 pt 1): 1108-1114.

Adherence

What defines adherence to therapy per CMS?

1. Office visit follow-up between 31 and 90 days after starting PAP.
2. Within the 1st 90 days, PAP use ≥ 4 hours per night on ≥70% of nights over a consecutive 30 day period.
3. Patient's symptoms have improved.

Adherence

Factors associated with poor adherence:

- Poor early adherence
- Bed partner referral
- High Mask Leak
- High nasal resistance
- Race
- Lower socioeconomic group
- Psychiatric Comorbidity

Adherence

Factors associated with good adherence:

- Pretreatment daytime somnolence
- Good early adherence
- Subjective improvement
- High oxygen desaturation index

Ways to Improve Adherence

- Education
- Cognitive behavioral therapy
- Desensitization
- Telemedicine

- The earlier patients seek help, the more likely they will succeed!!

Adherence

- What defines adherence to therapy per CMS?

1. Office visit follow-up between 31 and 90 days after starting PAP.
2. Within the 1st 90 days, PAP use ≥ 4 hours per night on ≥70% of nights over a consecutive 30 day period.
3. Patient's symptoms have improved.

Case 1

- 35 year old man with a history of Down Syndrome presents for follow up.
- First visit since diagnosis of severe obstructive sleep apnea (AHI 55 events/hr).
- He is accompanied by his aunt who reports no change in symptoms of excessive daytime sleepiness.
- Reports that he is using his machine every night while sleeping.

Case 1 Continued

Compliance Summary	
Date Range	2/2/2019 - 3/14/2019 (41 days)
Days with Device Usage	37 days
Days without Device Usage	4 days
Percent Days with Device Usage	90.2%
Cumulative Usage	12 days 9 hrs. 51 mins. 11 secs.
Maximum Usage (1 Day)	11 hrs. 29 mins. 27 secs.
Average Usage (All Days)	7 hrs. 15 mins. 52 secs.
Average Usage (Days Used)	8 hrs. 3 mins.
Minimum Usage (1 Day)	19 mins. 21 secs.
Percent of Days with Usage >= 4 Hours	85.4%
Percent of Days with Usage < 4 Hours	14.6%
Total Blower Time	13 days 7 hrs. 7 mins. 31 secs.

Case 1 continued- Why still sleepy?

Causes of continued sleepiness

1. Inadequate CPAP treatment
    - Inadequate pressure

Case 1 continued- Why still sleepy?

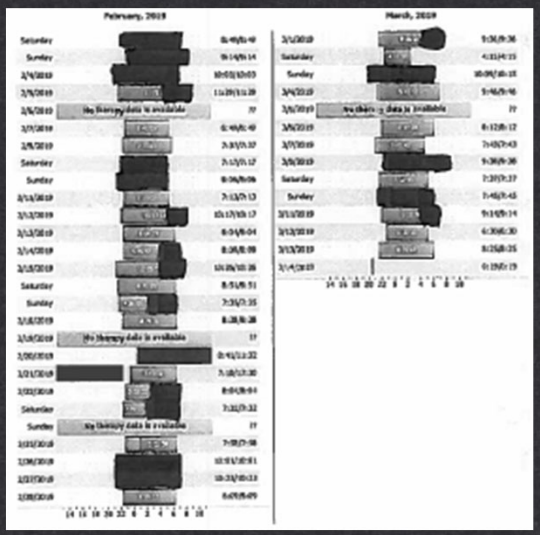
- What is the residual AHI?

Auto-CPAP Summary	
Auto-CPAP Mean Pressure	7.6 cmH2O
Auto-CPAP Peak Average Pressure	8.1 cmH2O
Average Device Pressure <= 90% of Time	8.7 cmH2O
Average Time in Large Leak Per Day	0 secs.
Average AHI	2.5
Device Settings as of	3/14/2019

Case 1 Continued- Why still sleepy?

Causes of continued sleepiness:

1. Inadequate CPAP treatment
   - Is the patient adherent to therapy and using PAP appropriately?



Case 1 continued- Why still sleepy?

1. Inadequate CPAP treatment
   - Mask leak, mouth leak or both arousing patient?

Auto-CPAP Summary	
Auto-CPAP Mean Pressure	7.6 cmH2O
Auto-CPAP Peak Average Pressure	8.1 cmH2O
Average Device Pressure <= 90% of Time	8.7 cmH2O
Average Time in Large Leak Per Day	0 secs.
Average AHI	2.5

Case 1 continued- Why still sleepy?

2. Disturbance of sleep from PAP discomfort
3. Another sleep disorder- insufficient sleep, narcolepsy, restless legs syndrome, periodic limb movements of sleep disorder
4. Depression or mood disorder

Case 1 continued- Why still sleepy?

5. Chronic pain disorders.
6. Medications or other medical disorders disrupting sleep.
7. Residual hypersomnia in patients with adequately treated OSA.

Case 1 continued- Why still sleepy?

- If PAP usage is optimized for at least 3 months and patient continues to be sleepy and other causes are ruled out, consider:
  - Referral to a Sleep Medicine Specialist for further evaluation.

Case 2:

- 45 year-old Caucasian male presents for follow up of his obstructive sleep apnea.
- An overnight PSG showed severe obstructive sleep apnea (AHI 45 events/hour).

Case 2 continued

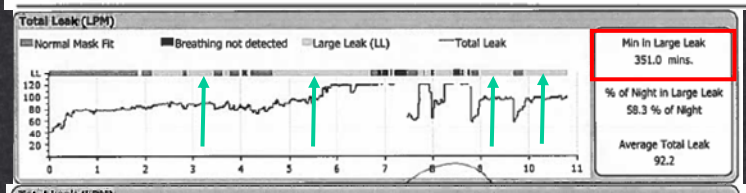
- He underwent titration and was started on a CPAP of 13 cmH_2O.
- He notes minimal improvement in his symptoms with his Epworth Sleepiness Scale decreasing from 16 to 14.
- Complains of nasal congestion.

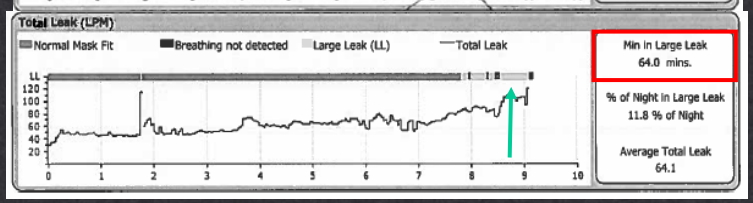
Compliance Summary

Date Range	5/4/2019 - 8/1/2019 (90 days)
Days with Device Usage	79 days
Days without Device Usage	11 days
Percent Days with Device Usage	87.8%
Cumulative Usage	30 days 13 hrs. 27 mins. 39 secs.
Maximum Usage (1 Day)	17 hrs. 23 mins. 32 secs.
Average Usage (All Days)	8 hrs. 8 mins. 58 secs.
Average Usage (Days Used)	9 hrs. 17 mins. 3 secs.
Minimum Usage (1 Day)	1 hrs. 3 mins. 55 secs.
Percent of Days with Usage >= 4 Hours	86.7%
Percent of Days with Usage < 4 Hours	13.3%
Total Blower Time	32 days 23 hrs. 27 mins. 27 secs.

CPAP Summary (Philips Respironics)

Average Time in Large Leak Per Day	2 hrs. 15 mins. 49 secs.
Average AHI	14.7
CPAP	13.0 cmH2O





Case 2 continued

How to address mask leaks?

- Evaluate condition of mask- worn cushions or headgear?
- If the patient is wearing a nasal mask or pillows and has dry mouth consider addition of a chin strap
- Alternatively, switch to full facemask.
- Increased humidity could overcome mild leak

Case 2 continued

- What to consider in a patient complaining of nasal congestion after starting CPAP?
  - Did the patient have nasal congestion prior to initiation of PAP therapy?
    - Yes: evaluate for obstruction, review history of trauma, and for allergic components.

Case 2 continued

- Did the patient have nasal congestion prior to initiation of PAP therapy?
  - No: do symptoms occur only at night when sleeping? likely related to drying of the nasal mucosa.
    - Suspect mask or mouth leak

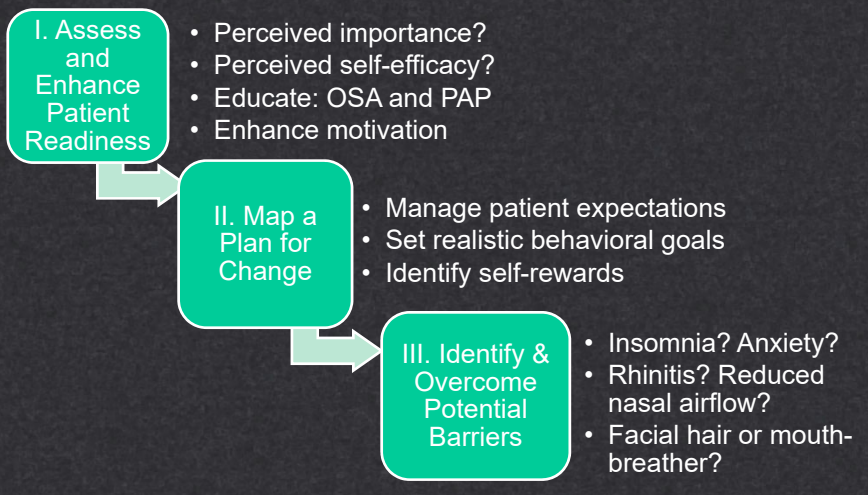
Case 2 continued

- Underlying nasal congestion
  - Use nasal corticosteroids
  - Inhaled antihistamines (astelin) or oral antihistamines
- Inferior turbinate hypertrophy
  - Referral to ENT for turbinate reduction

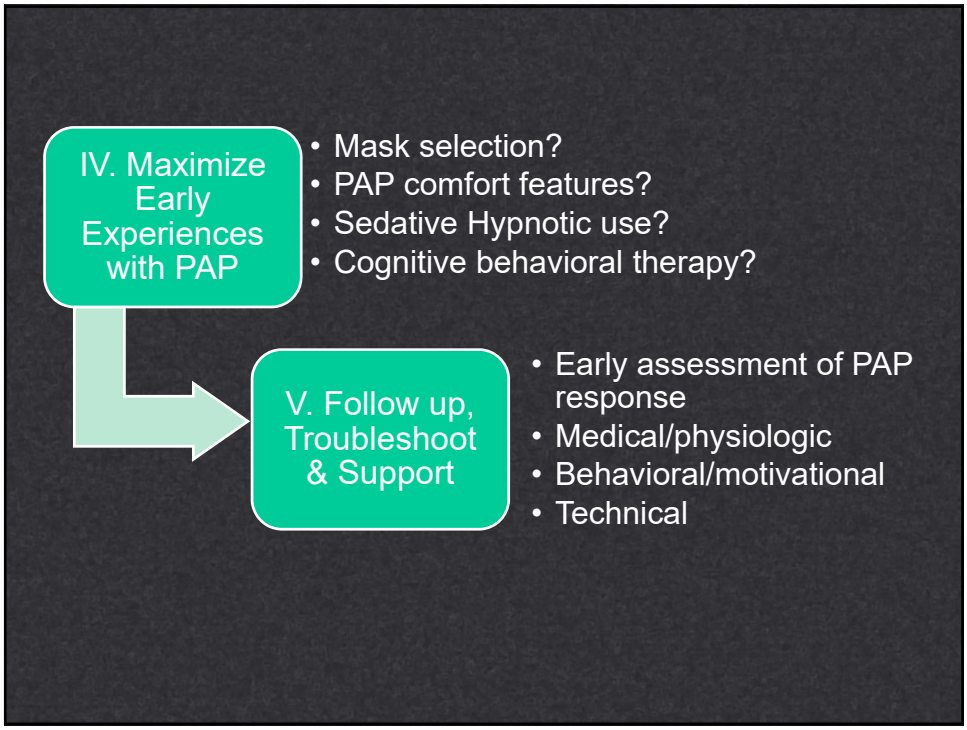
Case 2 continued

- **Chin strap added and humidification was increased resulting in improvement in his symptoms.**

Algorithm for CPAP Success



EM Wickwire, CJ Lettieri, AA Cairns, NA Collop. Maximizing Positive Airway Pressure Adherence in Adults: A Common-Sense Approach. *Chest.* 2013; 144 (2): 680-693.


IV. Maximize Early Experiences with PAP
• Mask selection?
• PAP comfort features?
• Sedative Hypnotic use?
• Cognitive behavioral therapy?
V. Follow up, Troubleshoot & Support
• Early assessment of PAP response
• Medical/physiologic
• Behavioral/motivational
• Technical