

# Sleep Labs are Obsolete for Perioperative Assessment of Sleep-Disordered Breathing: Pro

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# Conflicts of Interest

- Consultant
  - American Academy of Sleep Medicine
  - AIM Specialty Health
  - eviCore Healthcare



# AASM Clinical Guidelines

- Recommend polysomnography (PSG), or home sleep apnea testing (HSAT), be used for the diagnosis of OSA in uncomplicated adult patients. (STRONG)
- Recommend that PSG, rather than HSAT testing, be used in patients with significant cardiorespiratory disease, potential respiratory muscle weakness due to neuromuscular condition, awake hypoventilation or suspicion of sleep related hypoventilation, chronic opioid medication use, history of stroke or severe insomnia. (STRONG)
- Recommend that clinical tools, questionnaires and prediction algorithms not be used to diagnose OSA in adults, in the absence of PSG or HSAT. (STRONG)



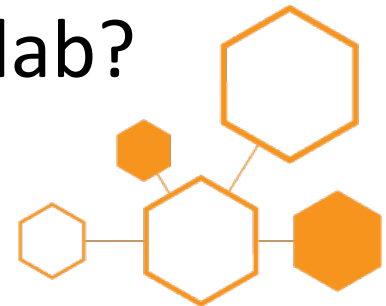
# Is Pre-op Evaluation Different?

- Undergoing a procedure that may potentially worsen presence and severity of OSA
- OSA may interfere with procedure or recovery
- Short time from evaluation to procedure



# Questions

- Does OSA increase the risk of peri-operative complications?
- Does intervention reduce complications?
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- Does screening require sleep testing to identify those at risk?
- Must sleep testing be done in a sleep lab?



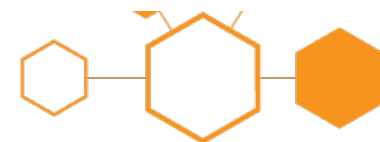
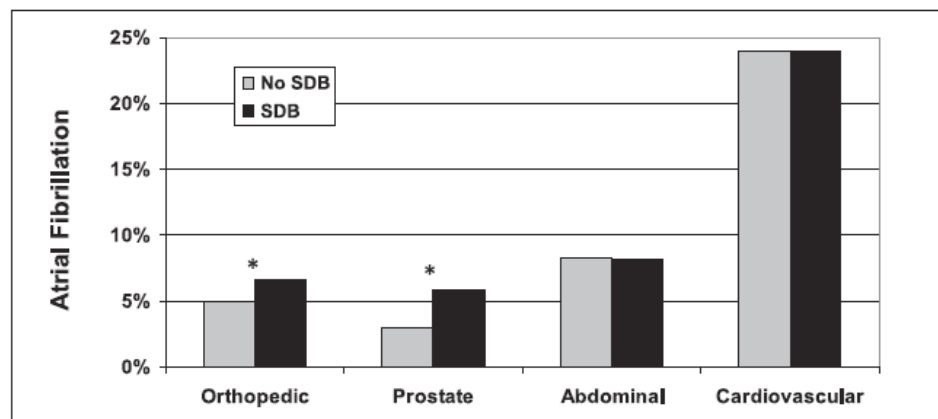
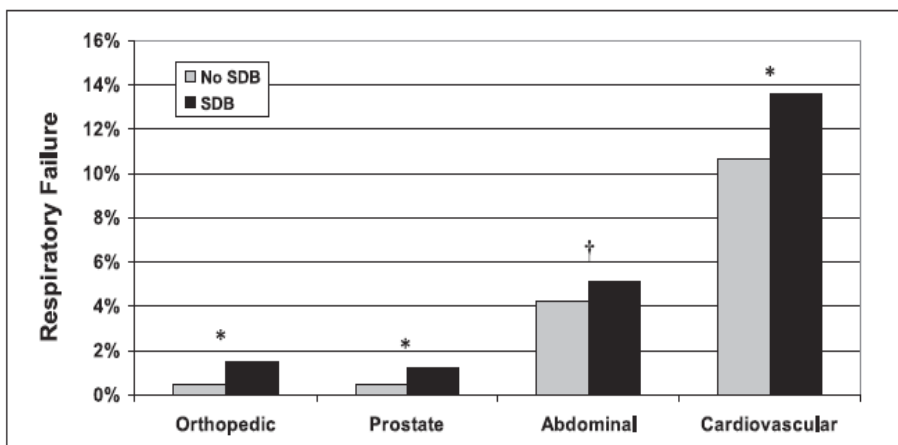
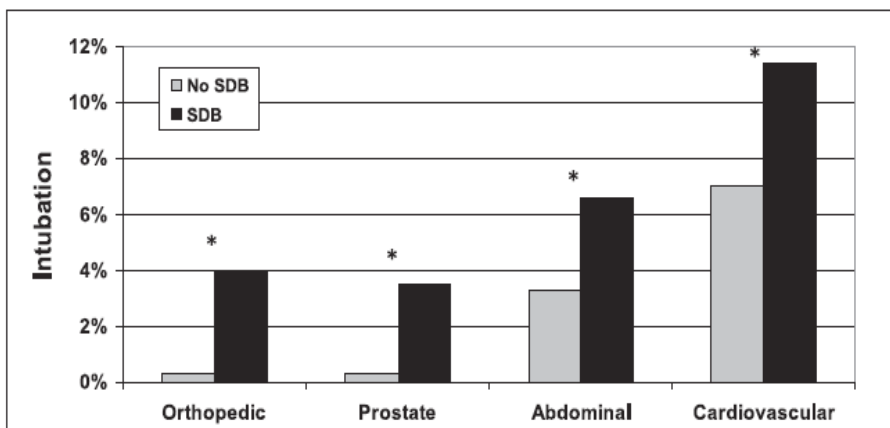
# Complication Risk

- No difference in complication or mortality rates between hospitalized patients with or without OSA undergoing cardiovascular surgery
  - 107 patient
  - 73% with OSA

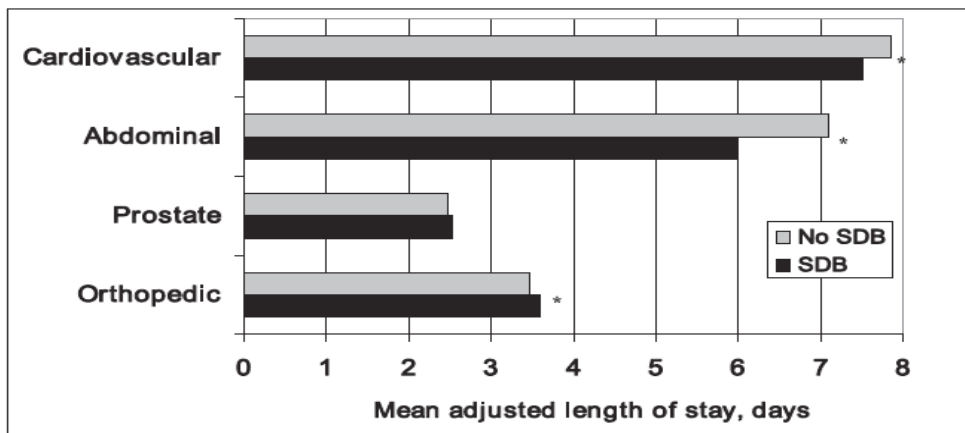


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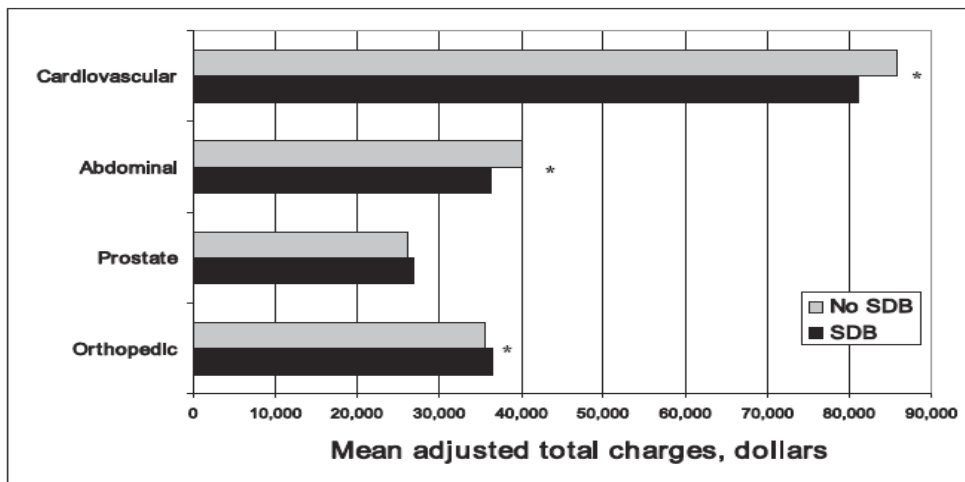
- SDB associated with increased rates of intubation, resp. failure & a. fib.
- N= 1,058,710



# Complication Risk



- No increased in-hospital mortality, LOS, or cost





# Complication Risk

## Postoperative Complication Risk OSA vs. NonOSA

N=471	P Value	Odds Ratio
Post op Hypoxemia	0.009	7.9
ICU transfer	0.049	5.7
Length of Stay	0.049	1.7
Any Complication	0.003	6.9



# Complication Risk

- Increased risk of postoperative reintubation in OSA
  - N= 108,479
  - OSA risk by PSAP Score
    - Ramachandran et al. *Anesth Analg* 2017;125:272–9
- Increased ICU stay and duration of mechanical ventilation in OSA patients undergoing valve replacement
  - N= 209
  - OSA risk by PSG
    - Ding et al. *J Clin Sleep Med* 2016;12(10):1331–1337



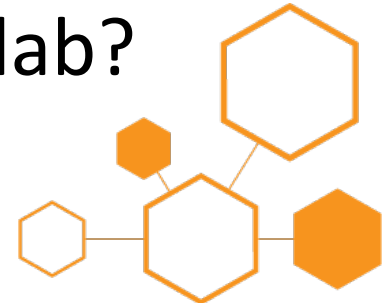
# Complication Risk

- 2 independent meta-analyses concluded OSA associated with increased risk for post-operative complications
  - Kaw et al. Br J Anaesth. 2012;109:897–906
  - Hai et al. Clin Anesth. 2014;26:591–600.
- SASM Guideline on Preoperative Screening and Assessment of Patients with OSA:
  - Patients With a Diagnosis of OSA Should Be Considered to Be at Increased Risk for Perioperative Complications (Level of Evidence: Moderate. Grade of Recommendation: Strong for)
    - Chung et al Anesth Analg 2016;123:452-73



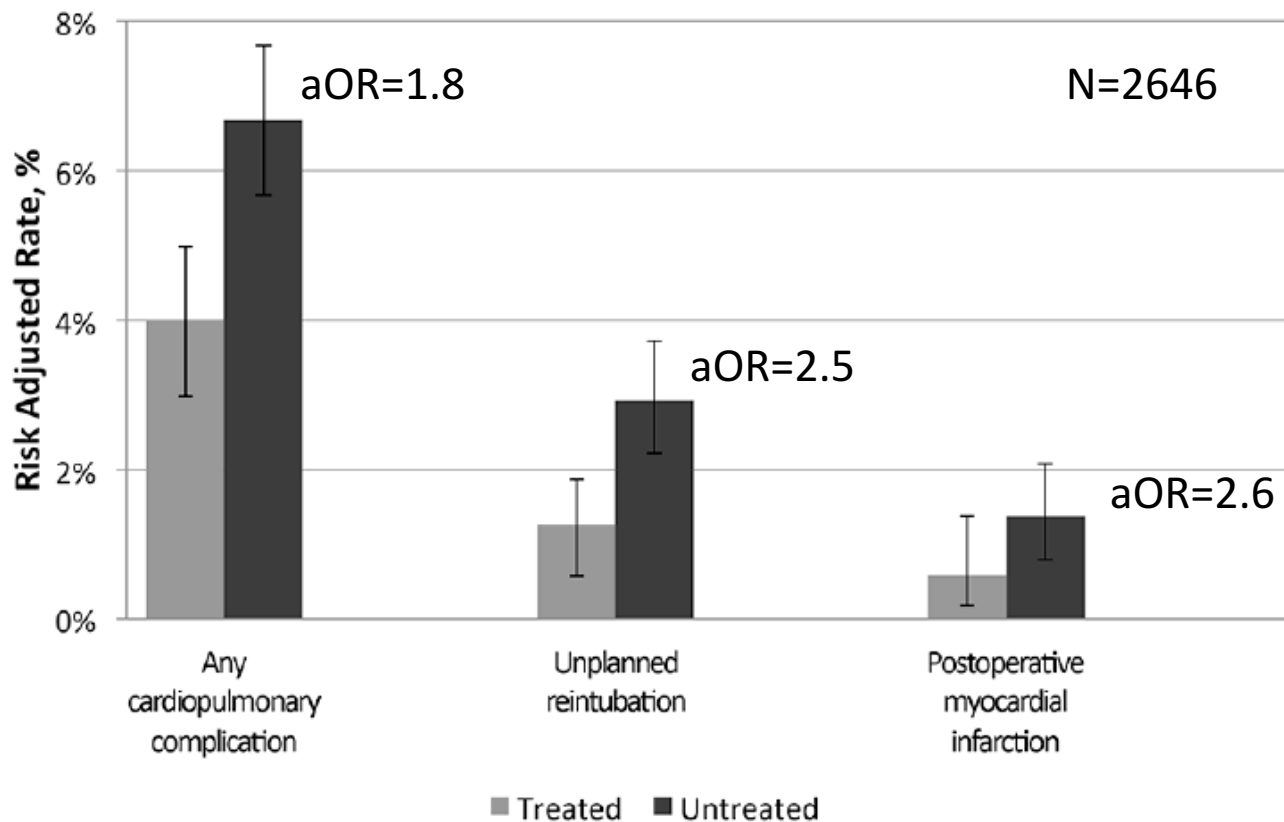
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# Increased Cardiopulmonary Complications in Untreated OSA

Risk-Adjusted Rates of Postoperative Cardiopulmonary Complications for Treated and Untreated Obstructive Sleep Apnea Patients

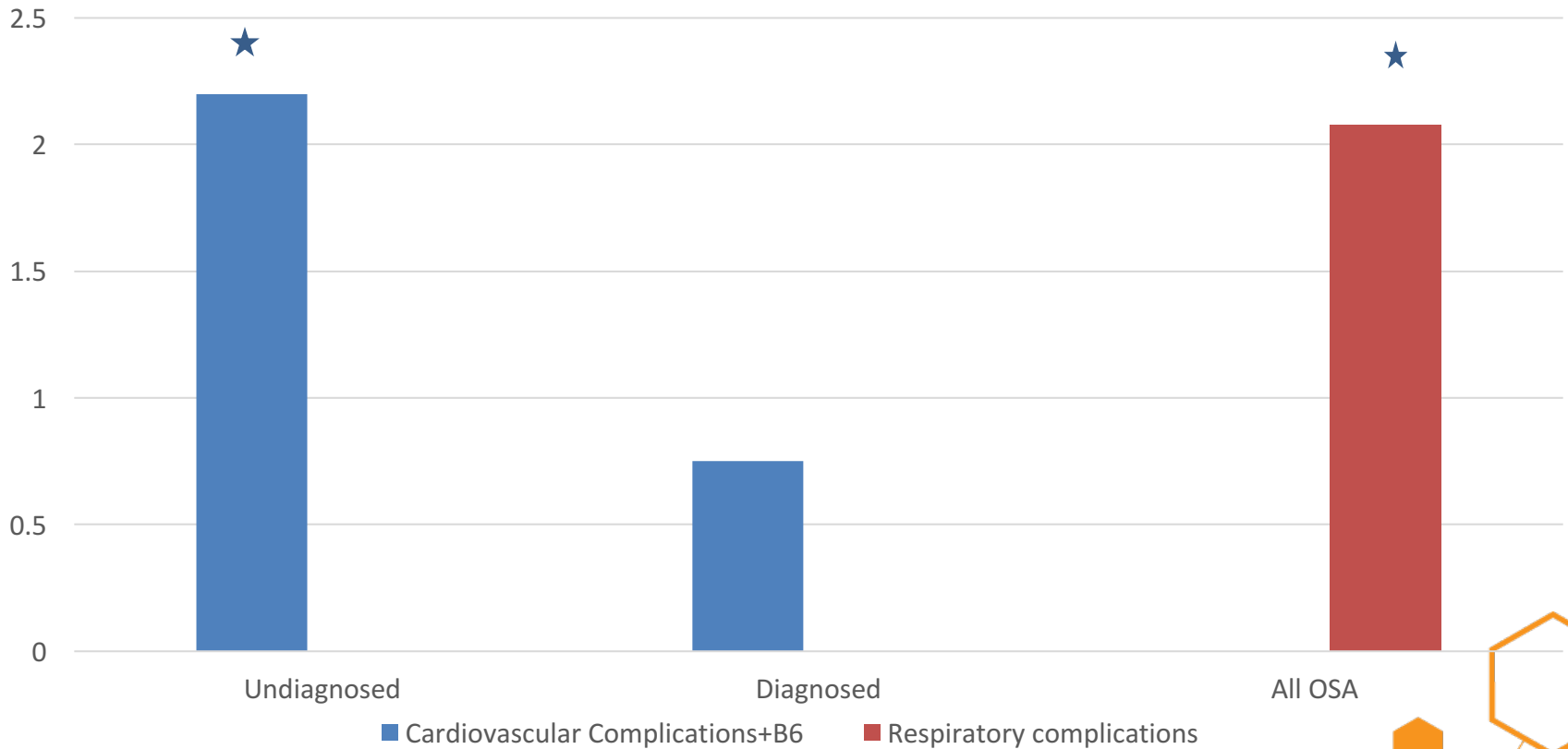


- 10% of 26,842 pre-op patients with diagnosed or suspected OSA
- 55% Untreated



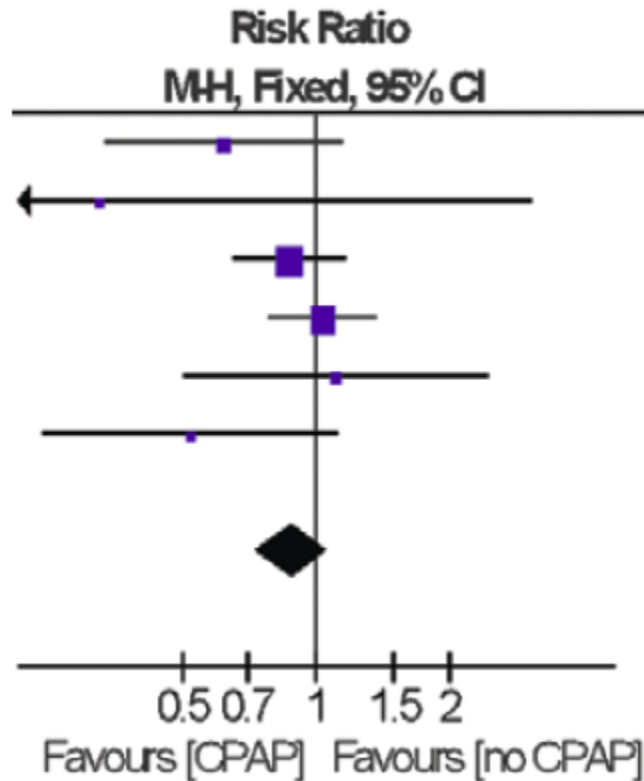
# Impact of Preop Diagnosis and Treatment

Odds Ratio of Complications vs. Matched Controls

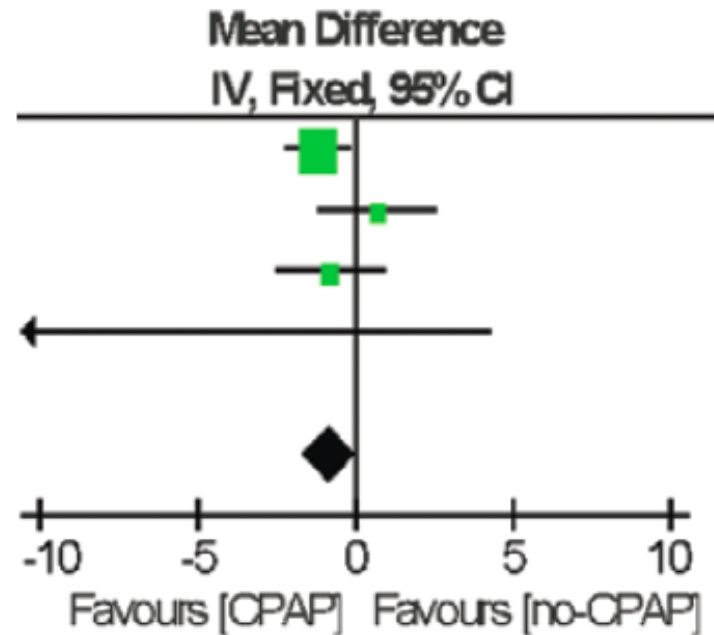


# Effect of PAP Therapy

## Perioperative Complications



## Hospital Length of Stay



Meta analysis N= 6 studies,  
904 patients



# SASM Guideline

- In patients with OSA, 9 studies demonstrated that CPAP applied preoperatively and/or postoperatively may have some beneficial effect on postoperative complications. These studies are mainly of low to moderate quality.
- Approximately 45% of patients with newly diagnosed OSA were adherent to APAP therapy in the perioperative period





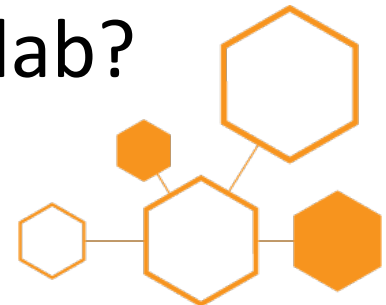
# OSA Intervention

- SASM Guideline
  - Patients Should Be Encouraged to Wear Their PAP Device at Appropriate Times During Their Stay in the Hospital, Both Preoperatively and Postoperatively (Level of Evidence: Moderate. Grade of Recommendation: Strong for)
    - Chung et al Anesth Analg 2016;123:452-73



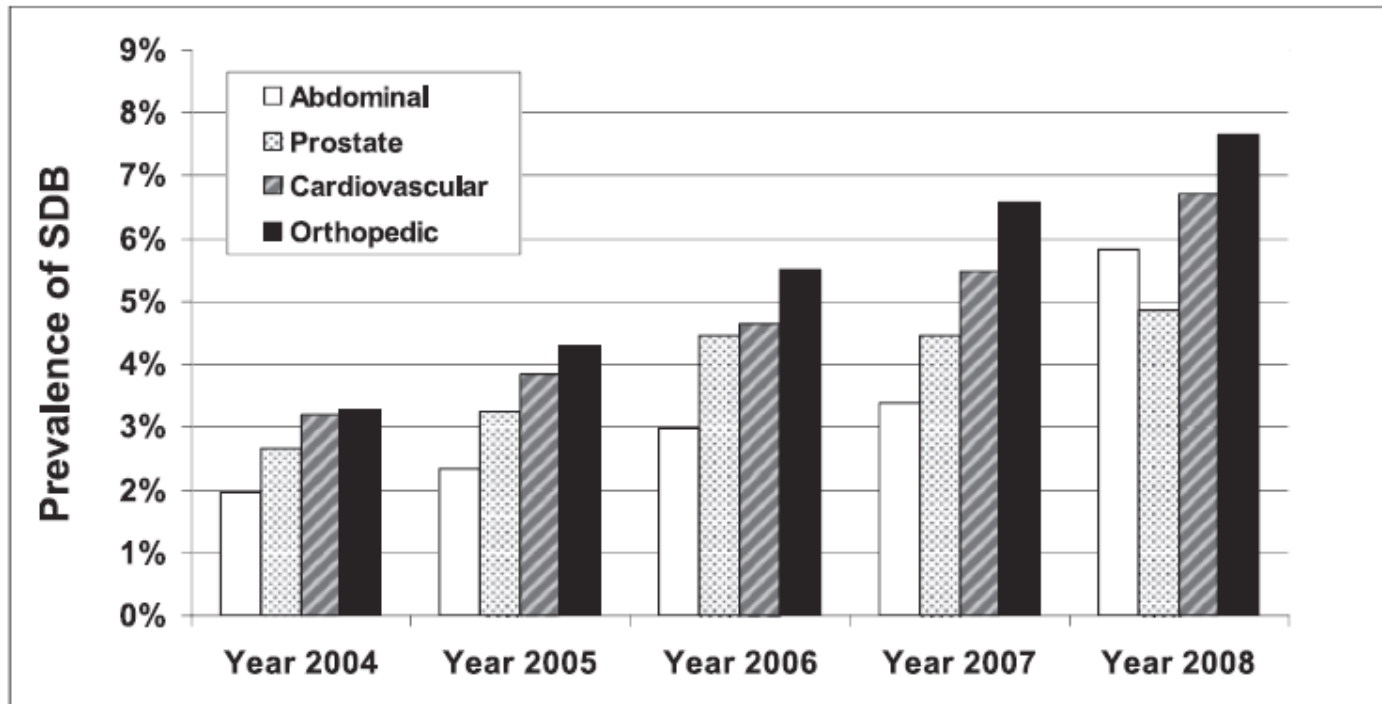
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# Recognition

- Increased recognition of OSA in surgical pop.
- Still below expected prevalence



# Prevalence Rates

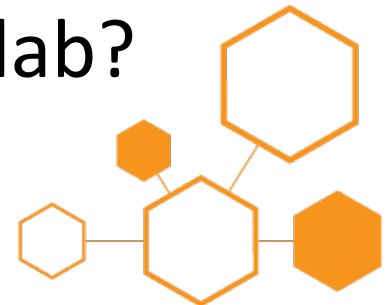
Surgery	Prevalence	Study
Bariatric surgery	36-70%	Stefan. J Clin Sleep Med 2016;12(11):1507–1516
Cardiovascular surgery	73%	Foldvary-Schaefer. J Clin Sleep Med 2015;10:1083-89
Gynecologic Abdominal surgery	50%	Bamgbade. Int J Gynaecol Obstet. 2017; 138:69-73
Elective surgery	24%	Finkel. Sleep Med 2009;10:753–8.
General & Vascular surgery	10%	Abdelsattar. SLEEP 2015;38(8):1205–1210

- Most cases undiagnosed at time of surgery



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# Do Questionnaires Risk Stratify?

STOP BANG (8)	Berlin Questionnaire (3)	ASA Checklist (2)
Difficult mask ventilation	↑ Post op Atrial fibrillation	Cardiopulmonary post op complications
Difficult intubation	Longer intubation	
↑ ICU admission		
↑ Cardiopulmonary post op complications		
↑ Length of stay		

There is evidence that these questionnaires may be able to predict some postoperative complications. However, confounders in studies limit strength of recommendation for use.



# SASM Guideline

- Preop screening tools can identify at risk patients
  - STOP Bang, Berlin, ASA checklist, P-SAP
  - Sensitivity/specificity→false positive and negatives
    - lower thresholds→ improved sensitivity but increased resource utilization
    - Higher thresholds→reduced sensitivity and increased false-negative rates but improved resource utilization.
    - Higher threshold should be adopted in the population with a lower prevalence of OSA.



# SASM Guideline

- Preop patients should be screened for OSA – weak
  - Little evidence screening reduces complications
  - Goal is to risk stratify and suggest methods to prevent or treat problems without creating undue economic burden on the health care system.
  - Benefits of screening
    - Reduce complications
    - Targeted perioperative interventions (i.e. adjust anesthesia type)
    - Improve general health by identifying OSA





# Screening vs. Screening + Testing

## Advantages of Testing

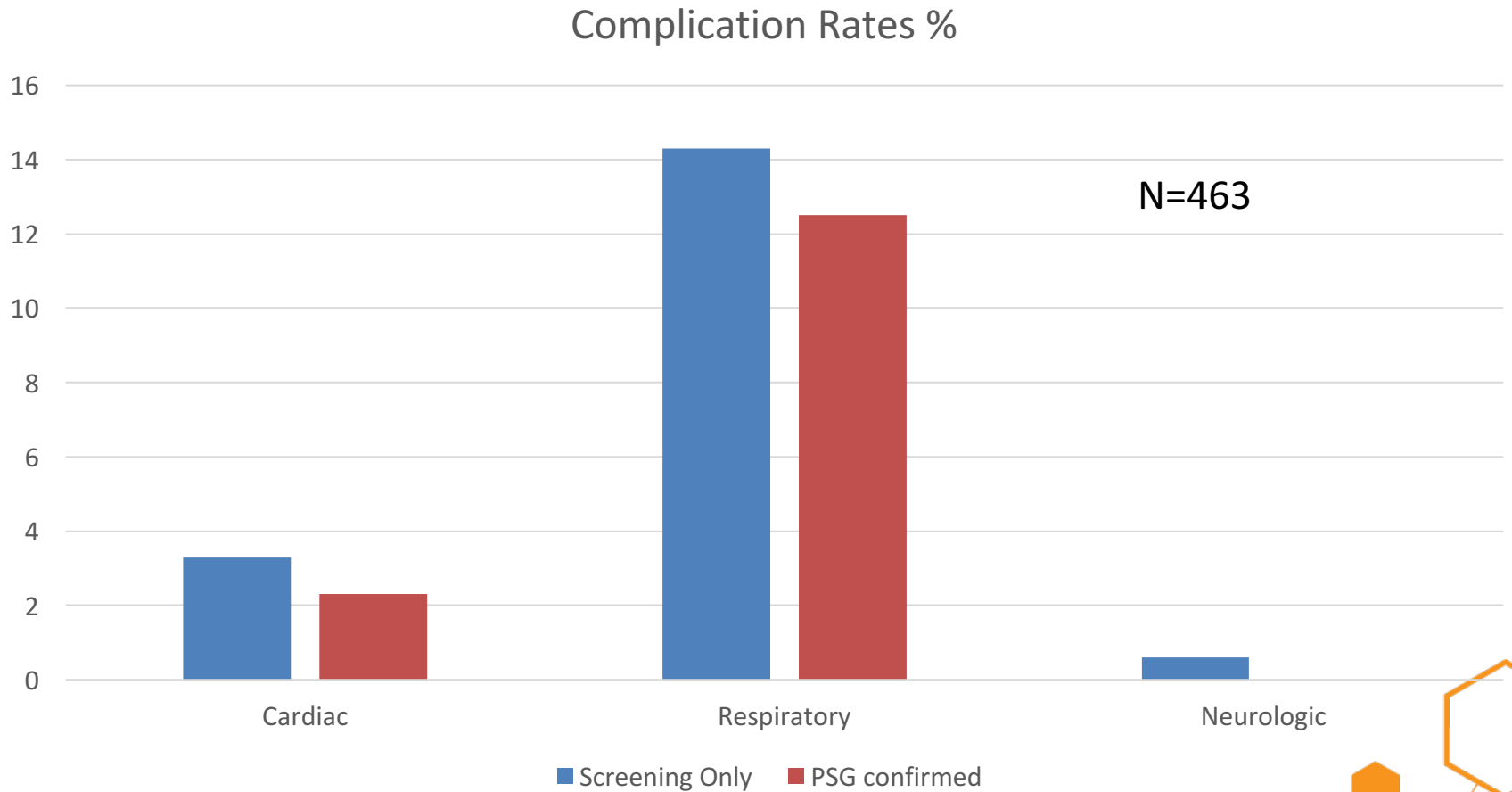
- Definitive diagnosis
- Initiation of appropriate therapy
- Identification risk stratifies for perioperative complications

## Disadvantages of Testing

- May delay procedure
- Increased cost
- Questionable benefit of treatment in reducing perioperative complications



# Comparison of Testing vs. Screening



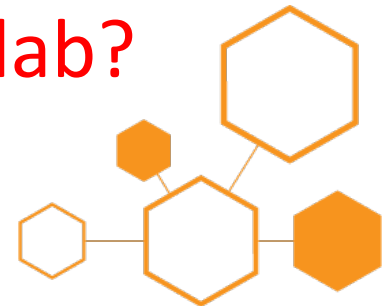
# SASM Guideline

- There Is Insufficient Evidence to Support Canceling or Delaying Surgery to Perform More Advanced Screening Techniques or Sleep Testing to Diagnose OSA in Those Patients Identified as Being at High Risk of OSA Preoperatively, Unless There Is Evidence of an Associated Significant or Uncontrolled Systemic Disease or Additional Problems With Ventilation or Gas Exchange (Level of Evidence: Low. Grade of Recommendation: Weak for)
  - Inadequate evidence in the literature to recommend the use of sleep testing such as polysomnography in the preoperative period
  - Does not relate to procedures in which polysomnography is performed as part of the accepted preoperative management, usually because of a high prevalence of OSA (eg, bariatric surgery, tonsillectomy, or upper airway surgery for OSA)



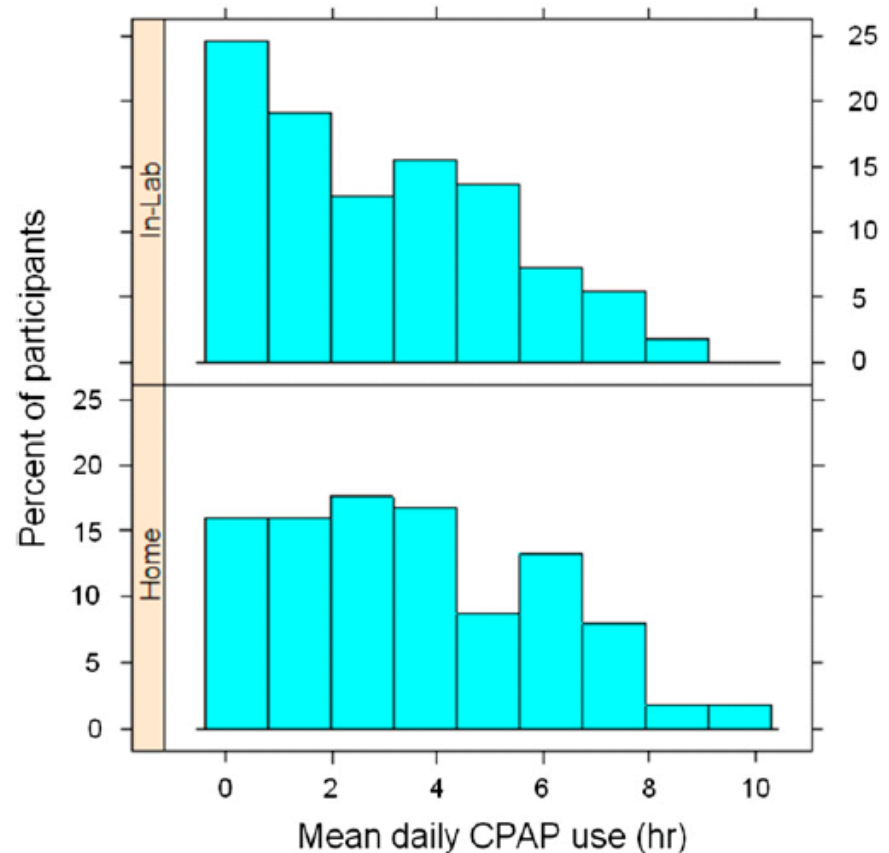
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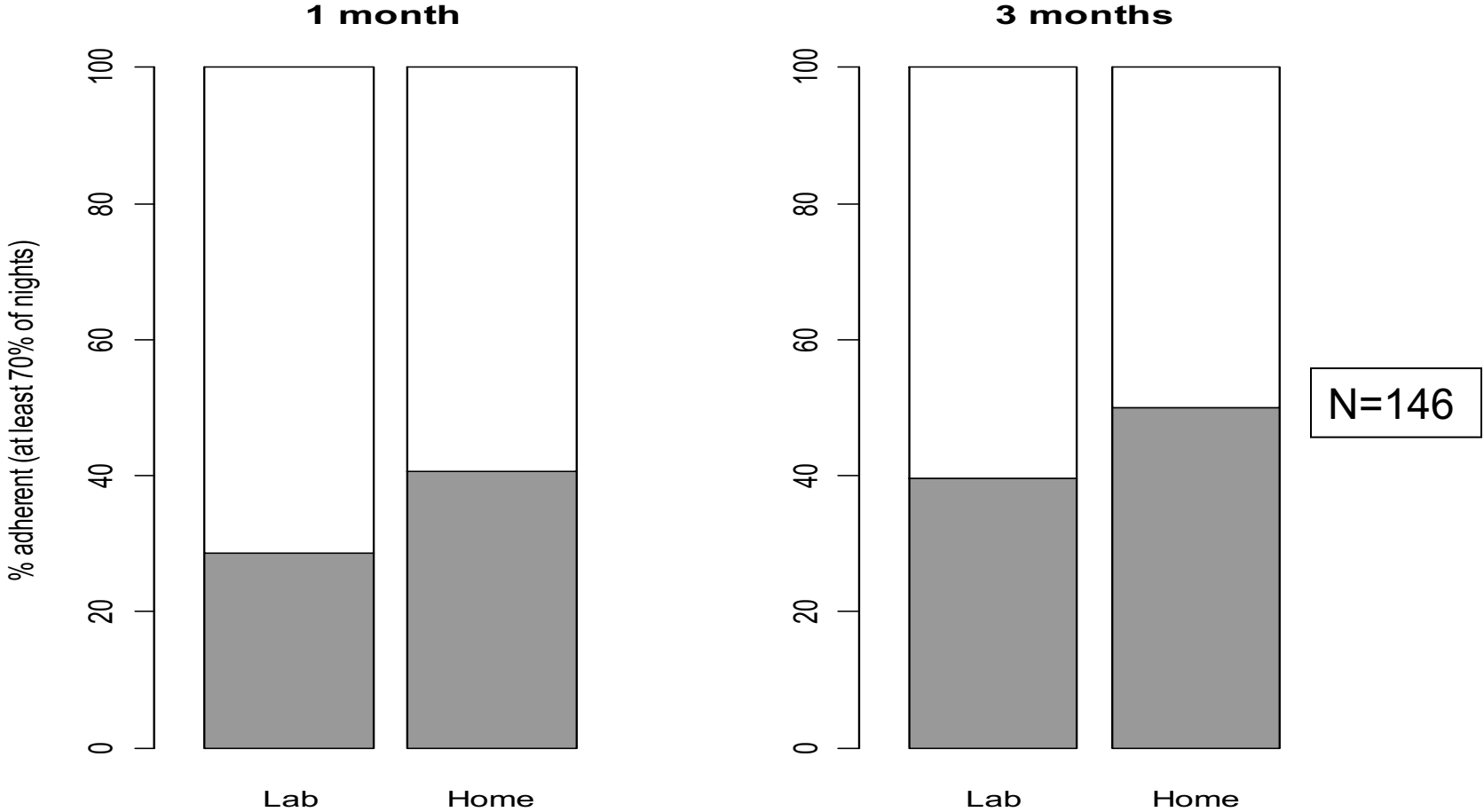
# VA Study

- 300 patients
- Randomized to In-lab or HST
- Results:
  - Similar PAP use
  - Similar improvement in daytime sx



*Figure 2.* Distribution of mean hours of continuous positive airway pressure (CPAP) use per day during the first 3 months of CPAP treatment in participants randomized to in-laboratory (*top*) and home (*bottom*) testing. Over the treatment period, mean CPAP use was  $3.49 \pm 2.45$  hours/day in the home group and  $2.92 \pm 2.32$  hours/day in the in-laboratory group ( $P = 0.08$ ).

# Home PAP: Percent Adherent: Medicare Criteria



Rosen et al. SLEEP 2012;35(6):757-767

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