

Obstructive Sleep Apnea in Pregnancy: Why all the Fuss?



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Disclosures

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Objectives

- Review the scientific evidence demonstrating potential maternal/fetal harm from obstructive sleep apnea
- Discuss clinical considerations for the affected women

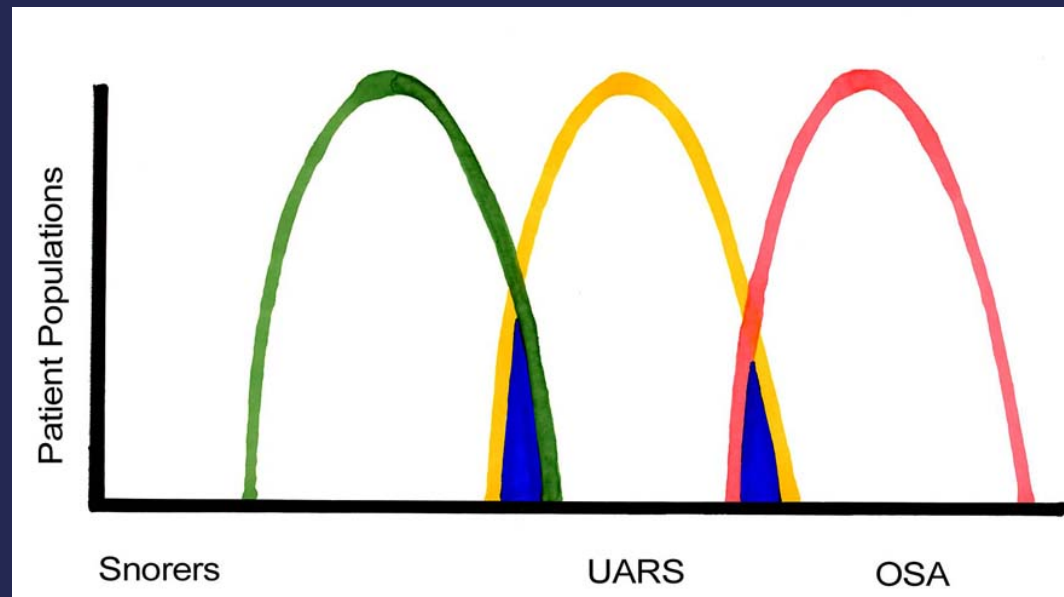
Why study the role of sleep?

Rationale

- Approximately 1/3 of a person's life is spent in sleep
- Little research on its impact in pregnancy
- Significant body of literature demonstrating the impact of abnormal sleep on the human body

Sleep Disordered Breathing- Obstructive Sleep Apnea

- Represents a continuous spectrum of disease
- OSA is marked by repetitive interruption of ventilation
 - Apnea: an interruption ≥ 10 s with ongoing respiratory effort
 - Hypopnea: decrease in the ventilatory flow with associated decrease in oxygen saturation or arousal



1978

Fetal response to periodic sleep apnea: a new syndrome in obstetrics

S.J. Joel-Cohen and A. Schoenfeld

Department of Obstetrics and Gynecology, Beilinson Medical Center, Tel-Aviv University Medical School, Israel

EUROP. J. OBSTET. GYNEC. REPROD. BIOL., 1978, 8/2, 77-81

Age-Specific Estimates of Sleep-Disordered Breathing in the General Population, According to Apnea-Hypopnea Score and Sex

AGE (YR)	WOMEN			MEN		
	APNEA-HYPOPNEA SCORE			APNEA-HYPOPNEA SCORE		
	≥5	≥10	≥15	≥5	≥10	≥15
	<i>percent of subjects (95% confidence interval)</i>					
30-39	6.5 (1.4-11)	4.9 (0.6-9.8)	4.4 (1.1-7.3)	17 (9.6-25)	12 (5.4-19)	6.2 (1.9-10)
40-49	8.7 (4.2-13)	4.9 (1.7-8.1)	3.7 (1.0-6.5)	25 (18-32)	18 (11-24)	11 (6.7-16)
50-60	16 (5.2-26)	5.9 (0.0-12)	4.0 (0.0-10)	31 (21-40)	14 (7.5-20)	9.1 (5.1-13)
30-60*	9.0 (5.6-12)	5.0 (2.4-7.8)	4.0 (1.5-6.6)	24 (19-28)	15 (12-19)	9.1 (6.4-11)

*Values are adjusted to the age distribution of the survey population.

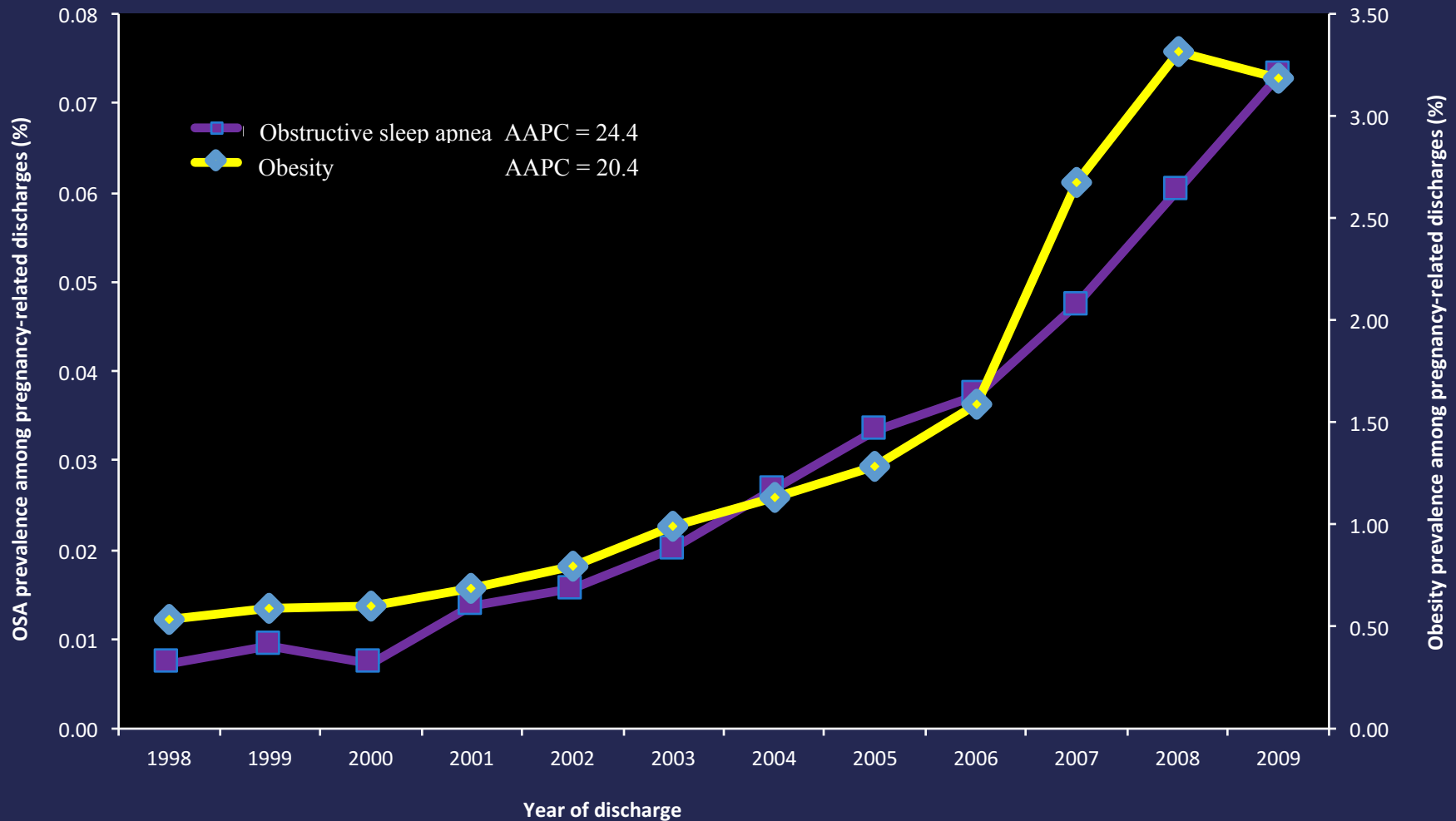
SDB-Prevalence

	Definition	N	Prevalence (%)	Site
Bourjeilly 2010	Questionnaire	1000	35	US
O' Brien 2013	Habitual snoring	1673	35	US
Ko 2013	Questionnaire	276	23	Korea
Fung 2013	Questionnaire	371	29	US
Ugur 2011	Questionnaire	465	14	Turkey
Higgins 2011	Questionnaire	4074	32	US

OSA - Pregnancy prevalence

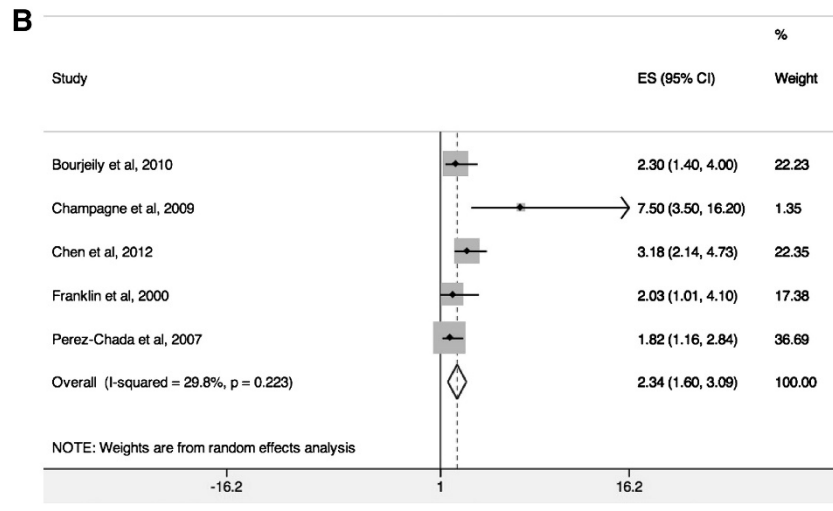
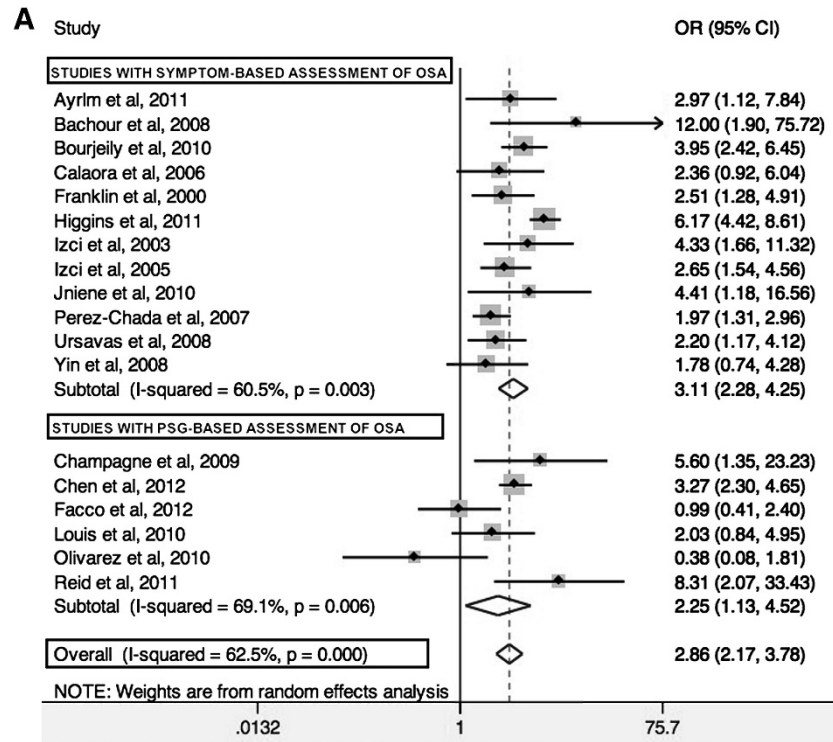
	Setting	Number of Subjects	Prevalence (%)
Olivarez 2010	In hospital	100	20
Louis 2012	Portable	182	15
Facco 2012	Portable	114	24
Pien 2013	In laboratory	105	10-26

OSA and obesity increased over time

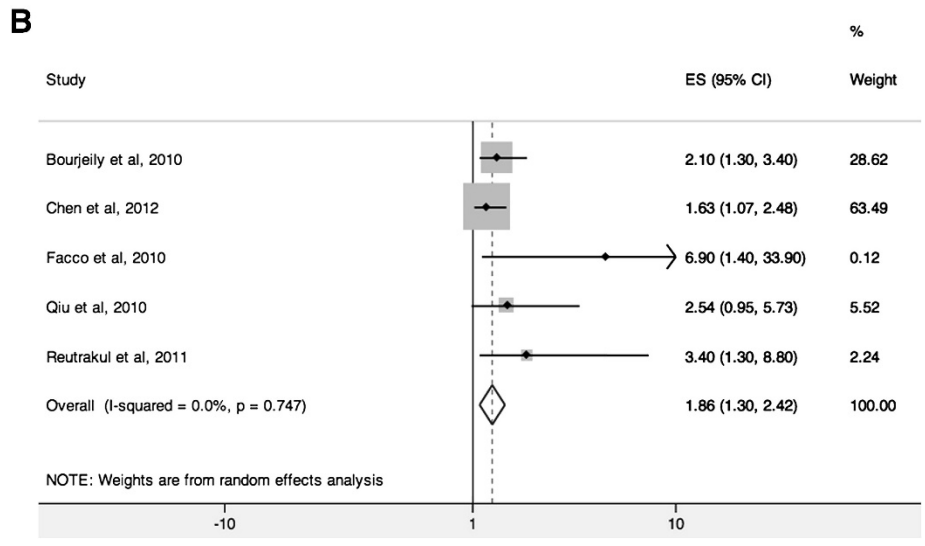
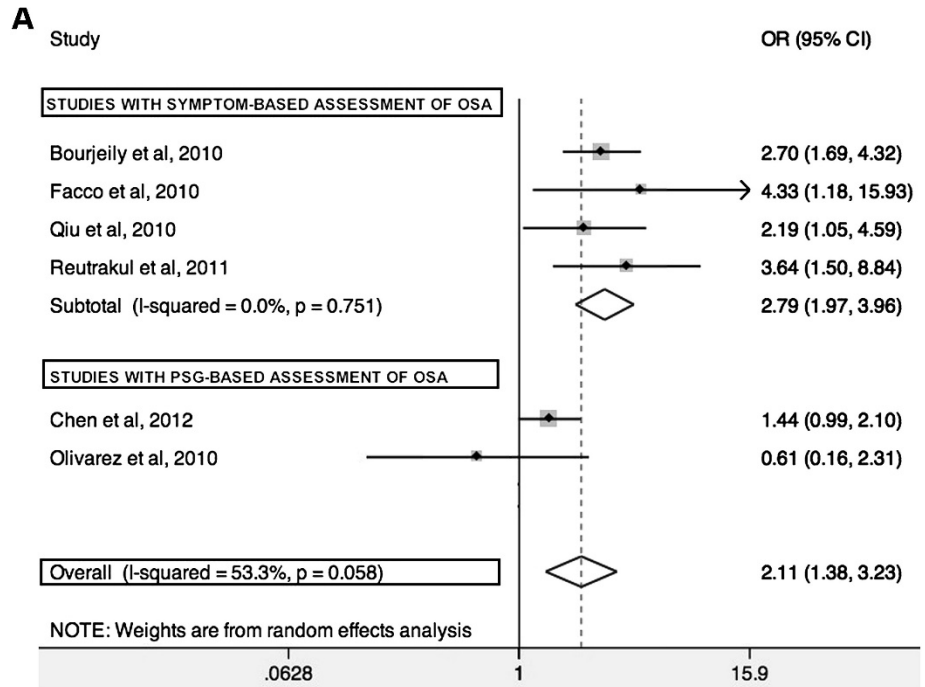


Why do we care about
OSA?

Preeclampsia



Gestational diabetes



Data from the SAPSS Study- SDB

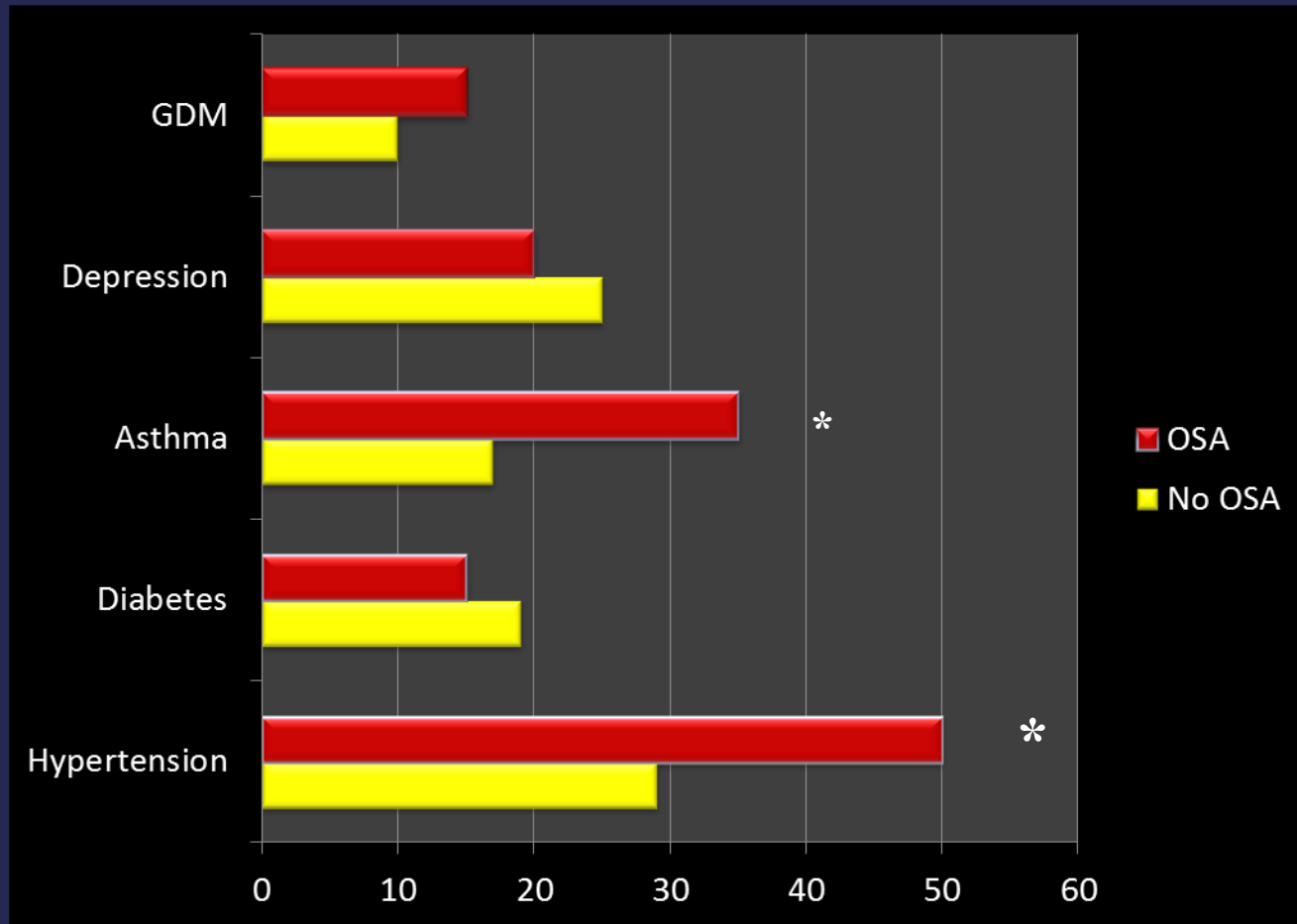
Symptoms

- **Overall Cohort** **N=175**
- -OSA Prevalence: Overall group: 15%
- Age >30 yrs: 23%
- **Abnormal Sleep Symptoms[¥]**
- -Poor sleep Quality: 48%
- -Abnormal Fatigue Score 35%
- -Abnormal Berlin Score 90%

•¥Did not differ by study group

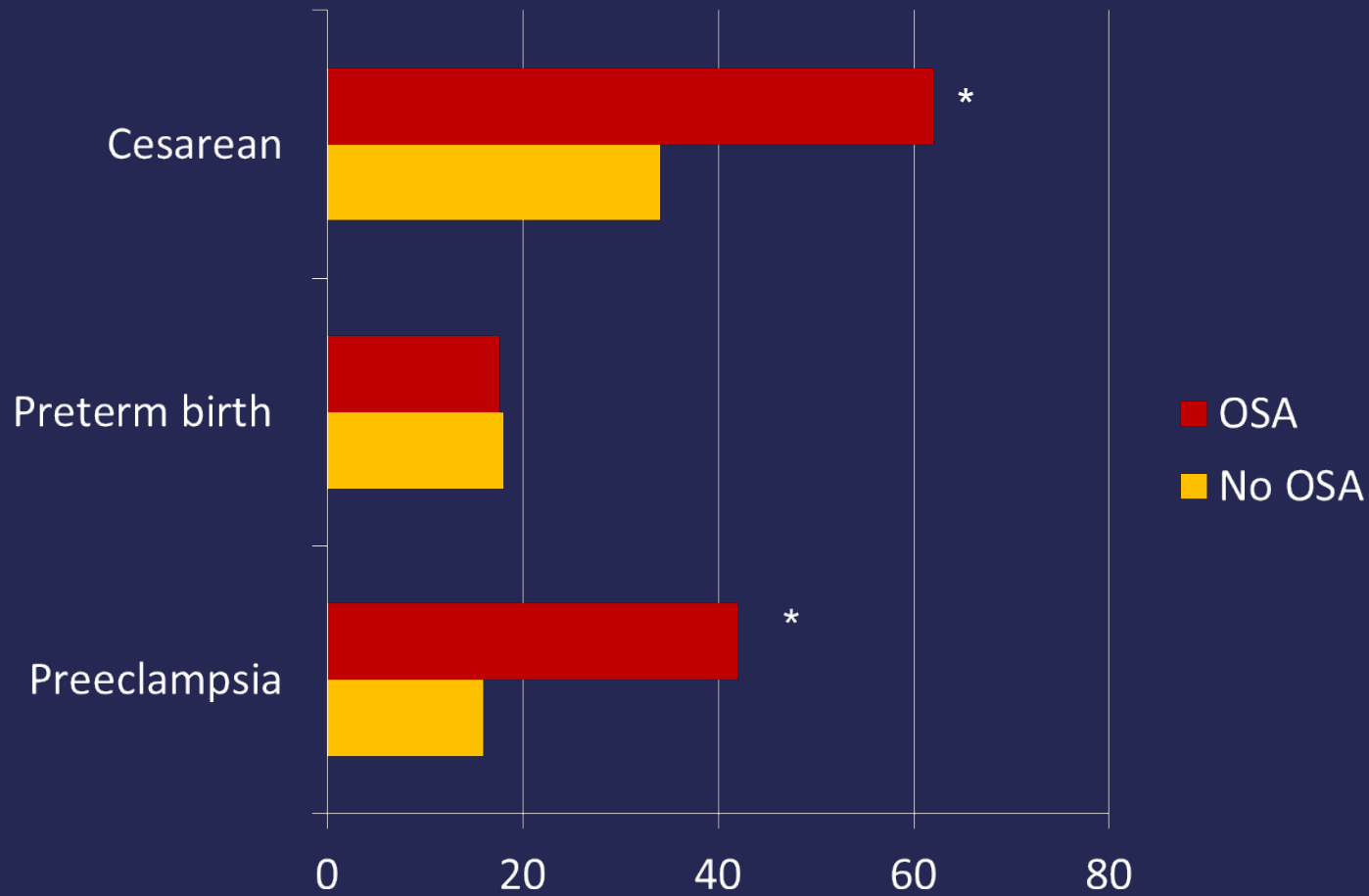
Results from the SAPSS study

Pregnant women with OSA have more hypertension and asthma



*P<0.05

Outcomes



*p<0.05

Severe Maternal Morbidity

- Maternal Death: 1 in the No OSA group
- Intrapartum Cardiac Arrest: 1 in OSA group

OSA is associated with Severe Morbidity

Outcomes	OSA	
	With obesity	Without obesity
	OR (95% CI)	OR (95% CI)
Cesarean section	2.08 (1.8 – 2.3)	2.09 (1.8 – 2.3)
Gestational diabetes	4.13 (3.54 – 4.82)	3.35 (2.90 – 3.88)
Gestational hypertension	2.83 (2.24 – 3.58)	2.01 (1.58 – 2.56)
Pre-eclampsia	5.32 (4.43 – 6.37)	3.41 (2.84 – 4.10)
Eclampsia	2.93 (0.68 – 12.66)	10.41 (6.20 – 17.50)
Pulmonary embolism	14.06 (6.10 – 32.40)	8.07 (2.61 – 24.92)
Cardiomyopathy	19.12 (15.12 – 24.18)	15.86 (12.45 – 20.19)
Hospital stay > 5 days	6.1 (5.3 – 7.2)	7.5 (6.7 – 8.4)

Adjusted odds ratios for the interaction between OSA and obesity on selected fetal outcomes

	OSA	
	With obesity	Without obesity
	OR (95% CI)	OR (95% CI)
Early onset delivery	1.46 (1.20 – 1.77)	1.49 (1.27 – 1.76)
Poor fetal growth	1.17 (0.79 – 1.73)	1.43 (1.05 – 1.96)
Stillbirth	0.75 (0.38 – 1.51)	1.42 (0.83 – 2.40)

Other Considerations

- Cesarean delivery rates are high
 - Up to 50% in morbidly obese women
- 94% are performed under regional anesthesia
- In morbidly obese women up to 8% will be converted to general anesthesia
- Increased maternal mortality largely related to general anesthesia

The case that changed my perception

- 37 y.o. G3P0020 at 36 weeks – restrained driver MVA
- Femur fracture-Underwent ORIF
- Hypertension- preeclampsia ruled out
- Tylenol 3 at 1 am – Found dead at 3 a.m.

Review of case

- Untreated sleep apnea
- Fell asleep at the wheel
- Pulse ox 84% in OR- improved with 4L O2 nasal cannula
- No oxygen monitoring
- Autopsy: pulmonary hypertension consistent with severe sleep apnea and respiratory suppression

Breaches in Care

- Treatment of OSA
- Full review of her vitals
- Communication with OB regarding intraoperative events
- Appropriate postoperative care of a patient with OSA

Recommendations-Known Sleep Apnea

- F/U with sleep medicine provider
- CPAP use
- Bring CPAP to delivery
- Extended observation with continuous pulse ox for 12-24 hours after delivery
- No standing order for narcotics

Recommendations

- Consider Sleep Apnea evaluation if:
 - BMI >40 kg/m²
 - Arrhythmia
 - Cardiomyopathy
 - MI or stroke
 - Hypertension + Diabetes
 - Excessive daytime sleepiness
 - * Especially if there is a family history of OSA

Evaluation

- Key Features of the History and Exam
 - History
 - Personal or family history
 - Symptoms
 - Excessive daytime sleepiness
 - Apnea reported by bed partner
 - Awakes with choking
 - Habitual snoring

Goals of Protocols

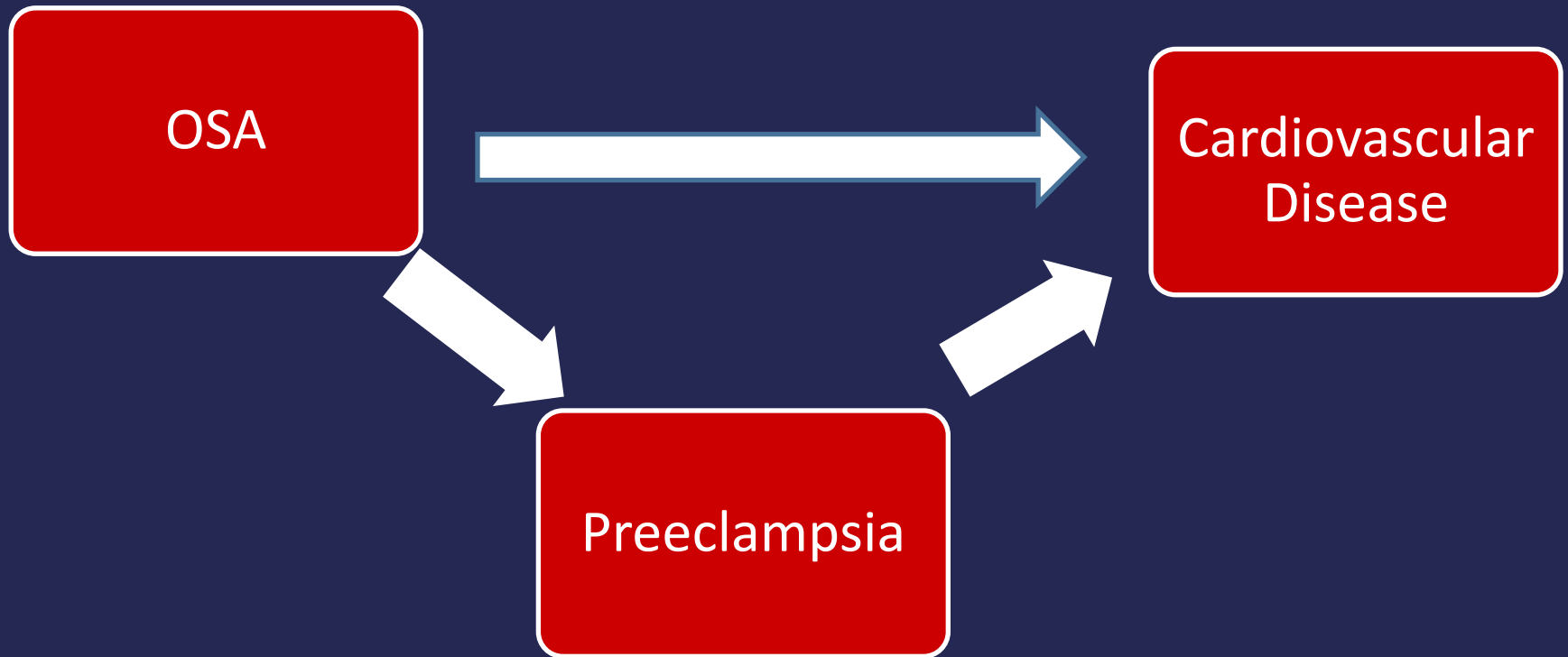
- Identify patients at risk for OSA
- Anticipate the difficult Airway
- Prevent respiratory suppression
- If present, identify it early
- Avoid death of the patient

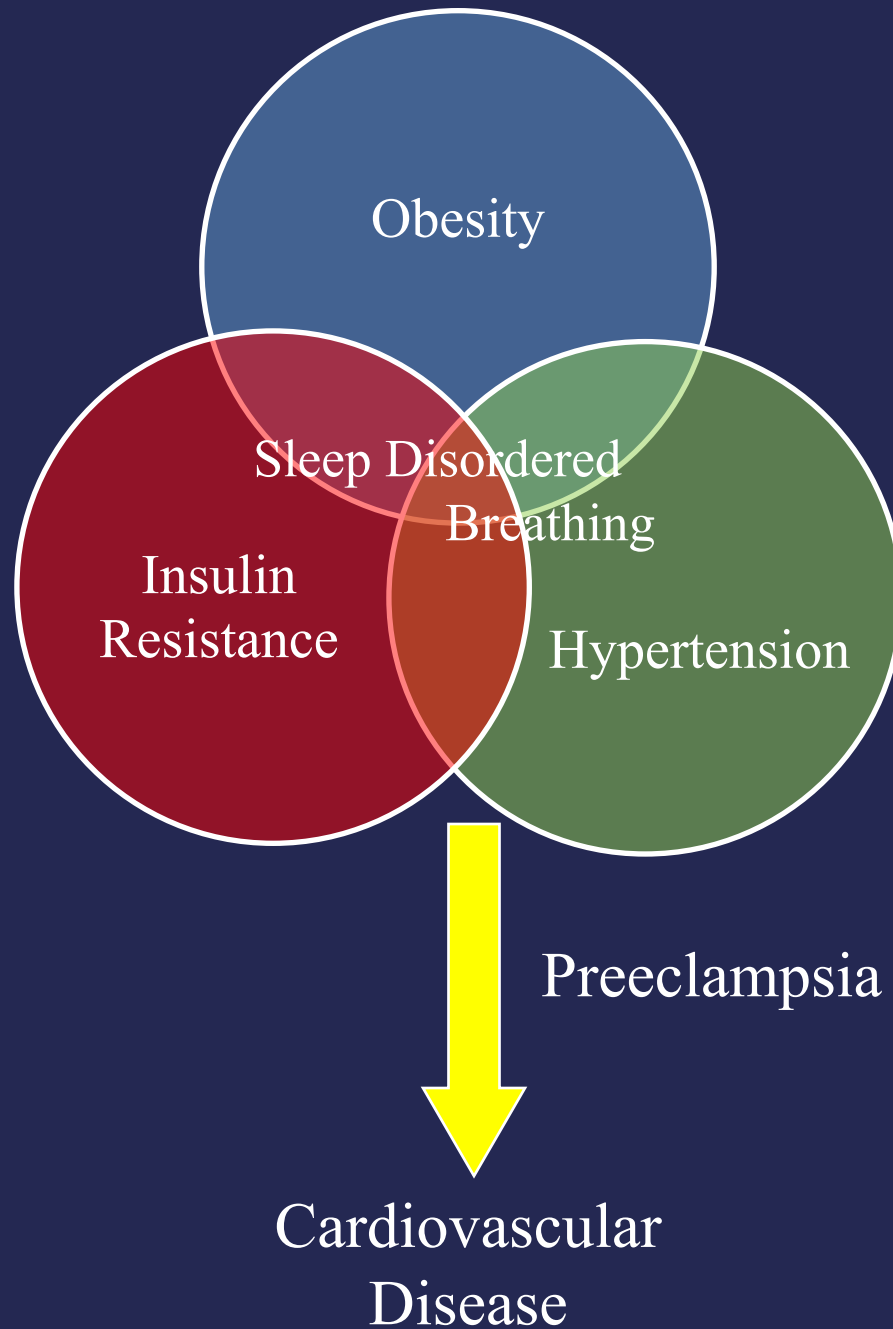
Long-term Consequences

Summary of Knowledge

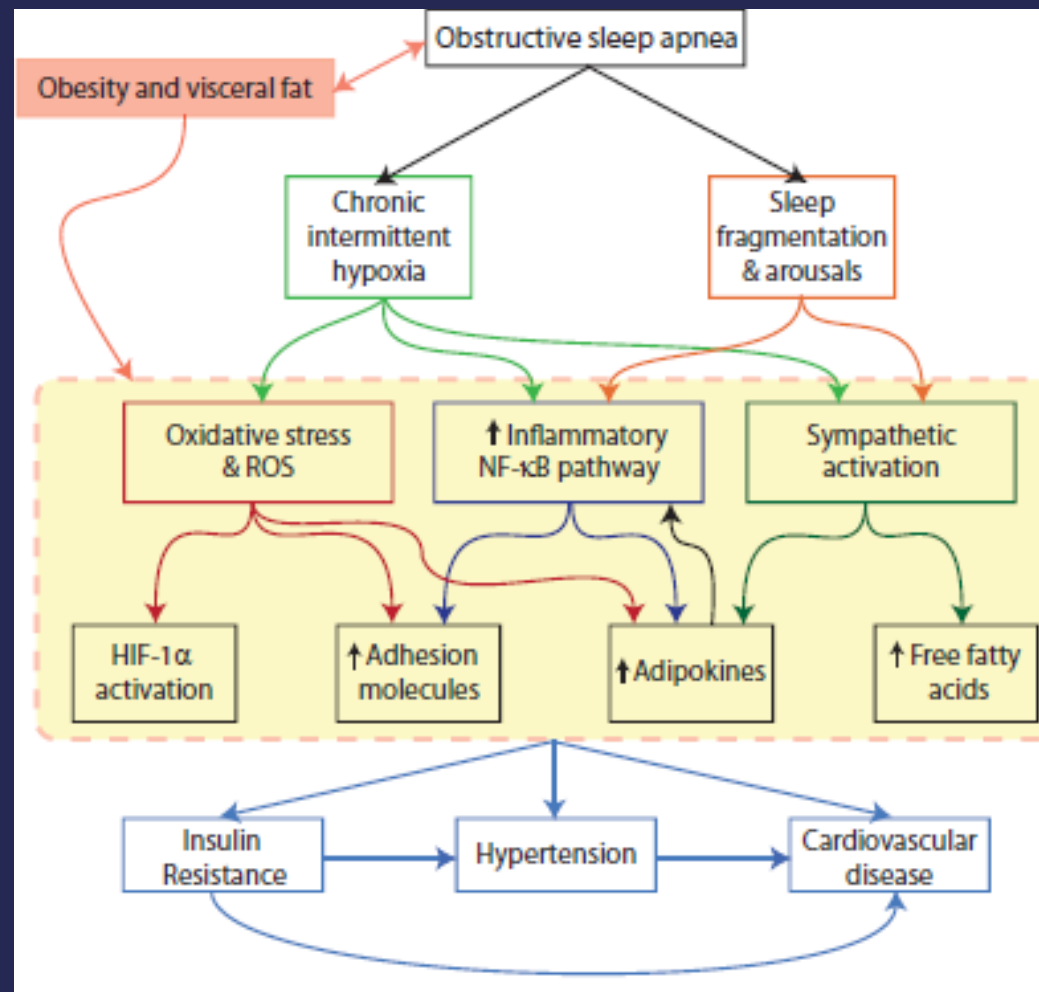
- OSA can precede HTN
- OSA is associated with drug resistant hypertension
- CPAP treatment may acutely improve hypertension
- OSA is associated with cardiovascular disease
- OSA is associated with increased mortality

Pregnancy is a window to future health





Pathogenetic Mechanisms for the Consequences of OSA



Thank you

Questions?