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Pro: CPAP Improves CV Outcomes in OSA

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JAMA | **Original Investigation**

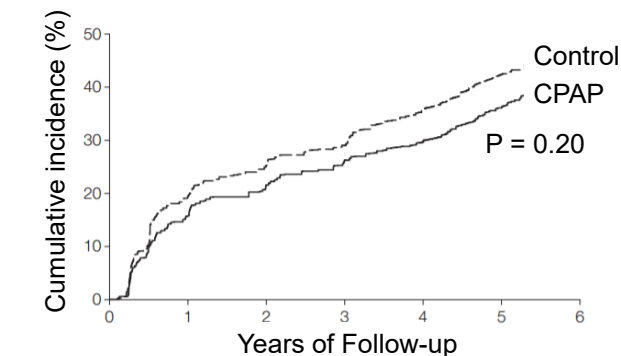
Association of Positive Airway Pressure With Cardiovascular Events and Death in Adults With Sleep Apnea

A Systematic Review and Meta-analysis

CONCLUSIONS AND RELEVANCE The use of PAP, compared with no treatment or sham, was not associated with reduced risks of cardiovascular outcomes or death for patients with sleep apnea. Although there are other benefits of treatment with PAP for sleep apnea, these findings do not support treatment with PAP with a goal of prevention of these outcomes.

Yu et al. JAMA 2017;318(2):156-166

Effect of CPAP on incidence of HTN and CV events in nonsleepy patients with OSA

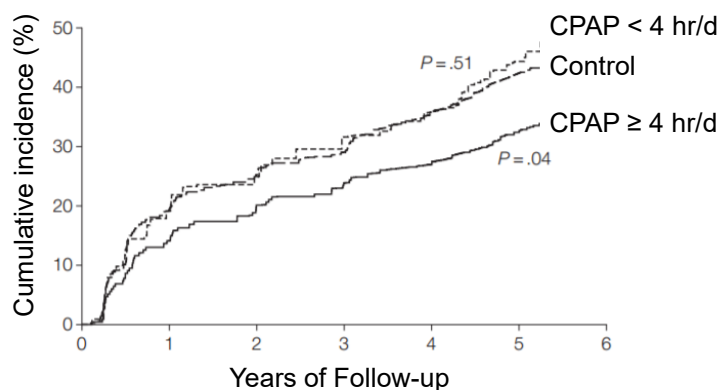


No. at risk	0	1	2	3	4	5	6
Control	366	264	234	206	134	10	
CPAP	357	271	247	217	148	16	

Mean CPAP use ranged from 0 to 8.76 hr/day
Median use = 5.0 hr/day (IQR, 2.18-6.35)

Barbé et al. *JAMA* 2012; 307:2161-2168

Cumulative incidence of hypertension or cardiovascular events during follow-up

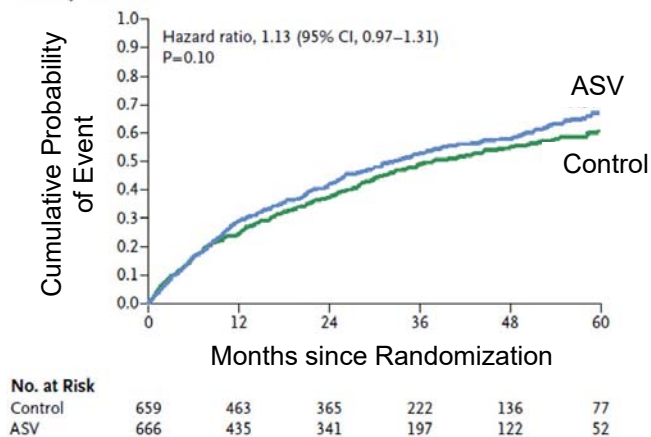


No. at risk	0	1	2	3	4	5	6
Control	366	264	234	206	134	10	
CPAP <4 h/night	127	79	72	56	41	3	
CPAP ≥4 h/night	230	192	175	161	107	13	

Barbé et al. *JAMA* 2012; 307:2161-2168

ASV for central sleep apnea in systolic heart failure – Serve-HF trial

Primary End Point



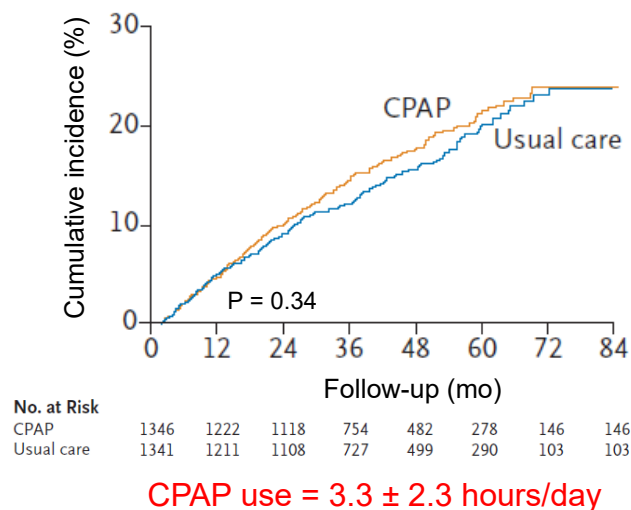
Cowie MR et al. *NEJM* 2015;373:1095-1105

Average ASV device usage over time Serve-HF trial

Follow-up	Proportion of patients with average nightly usage – %						Average usage (h/night)
	<1 h	1-2 h	2-3 h	3-4 h	4-5 h	≥ 5 h	
2 weeks	16.8	6.8	6.8	10.5	12.4	46.8	4.1
3 months	21.7	6.5	8.0	8.8	11.1	43.9	3.9
12 months	29.4	7.3	7.9	7.7	9.4	38.3	3.4
24 months	31.4	7.2	4.9	5.4	11.4	39.8	3.5
36 months	40.1	6.6	3.9	6.6	6.2	36.6	3.2
48 months	38.6	5.9	5.9	5.9	8.5	35.3	3.2
60 months	33.3	2.8	5.6	6.9	11.1	40.3	3.7
Total	26.7	6.7	6.6	8.0	10.5	41.5	3.7

Cowie MR et al. *NEJM* 2015;373:1095-1105

CPAP for prevention of cardiovascular events in OSA (SAVE)



McEvoy RD et al. *NEJM* 2016;375:919-31

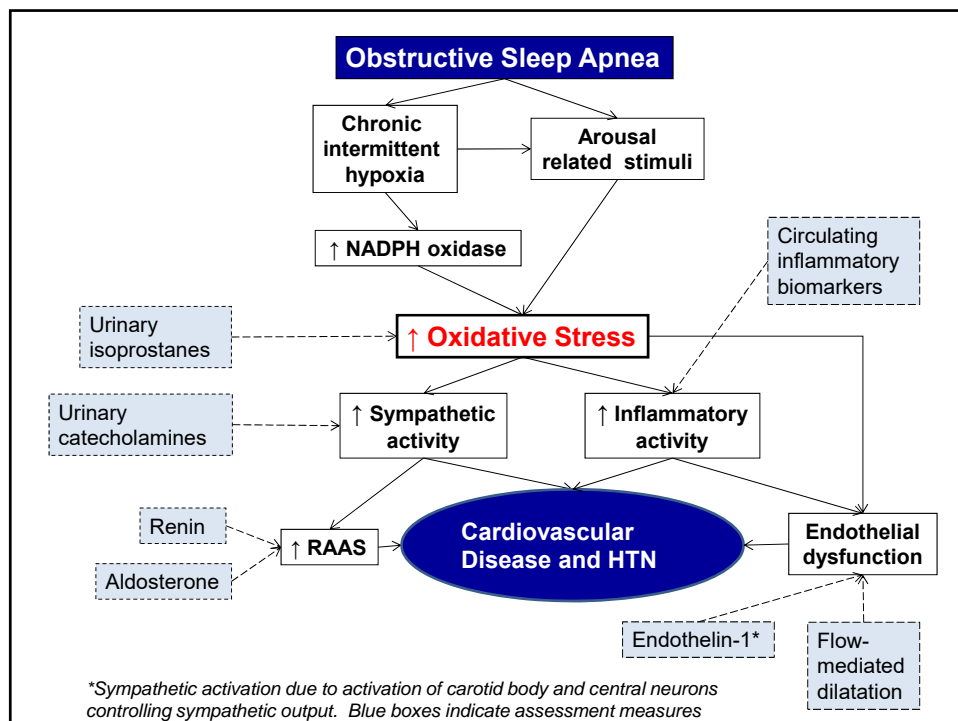
CPAP for prevention of cardiovascular events in OSA – SAVE trial

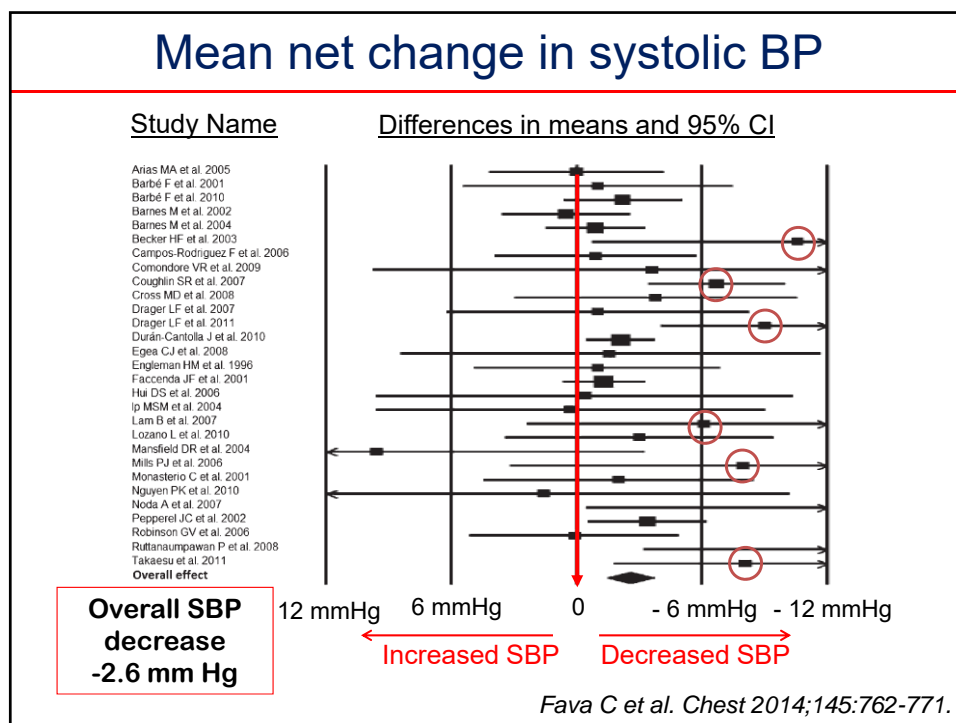
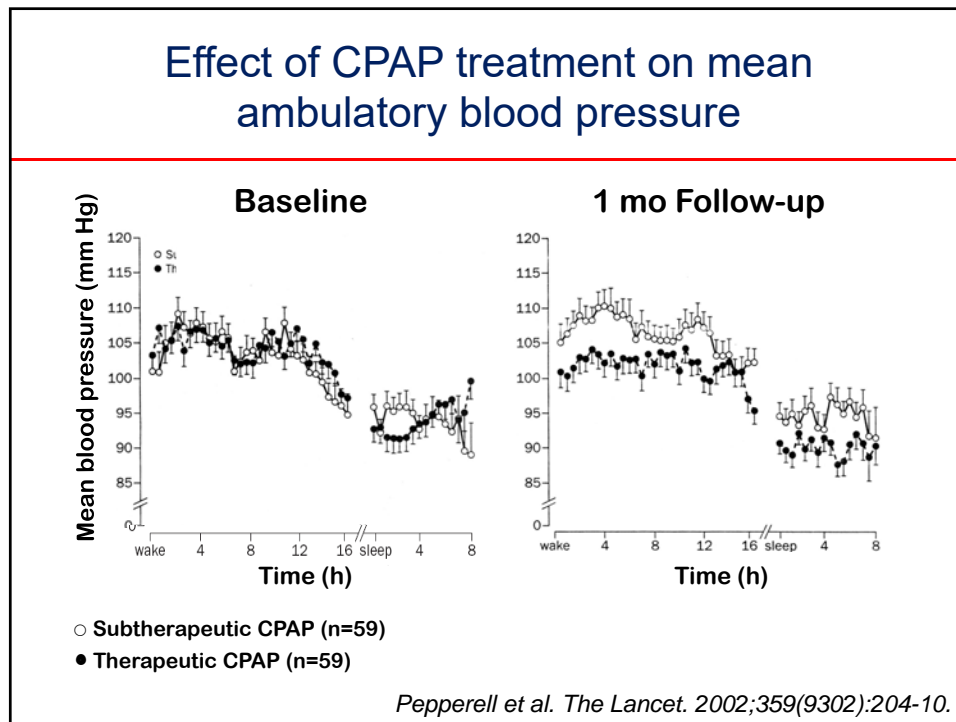
- In a pre-specified analysis of propensity-score matched patients, those using CPAP > 4 hr/day had a statistically significantly lower risk of a cerebrovascular event compared to those with adherence < 4 hr/day
- Although propensity matching has become popular in observational studies to control for confounding by indication, its ability to control for confounding by a post-randomization factor such as adherence is uncertain.

Assess lifestyle behavior to control for healthy user bias

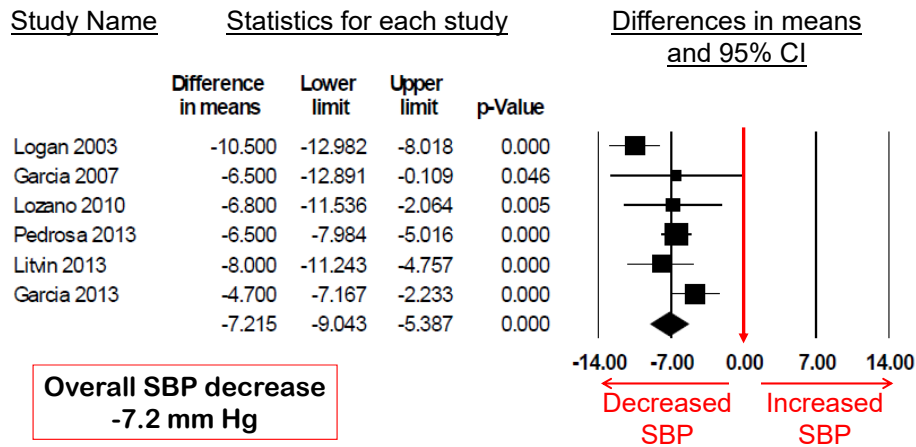
In addition to the usual covariates (age, gender, race, prescribed meds, alcohol consumption, smoking) should we also be measuring:

Lifestyle factor	Measurement
• Medication adherence	Medication possession rate
• Clinic attendance	Clinic appointment show rate
• Physical activity	Waist accelerometry
• Diet	Questionnaire?





Effects of CPAP on BP in patients with resistant HTN and OSA: A meta-analysis



Iftikahar IH et al. J Hypertens 2014;32:234-50.

Does CPAP Improve CV Outcomes in OSA? The Jury is Still Out!

- The RCTs reporting no improvement in CV outcomes following PAP treatment are flawed:
 - Inadequate PAP adherence
 - Inadequately powered
 - Exclusion of patient with severe OSA
- Strong evidence that CPAP treatment reduces blood pressure in hypertensive OSA patients
- Strong evidence that CPAP treatment improves sympathetic activity and other known intermediary factors associated with CV disease