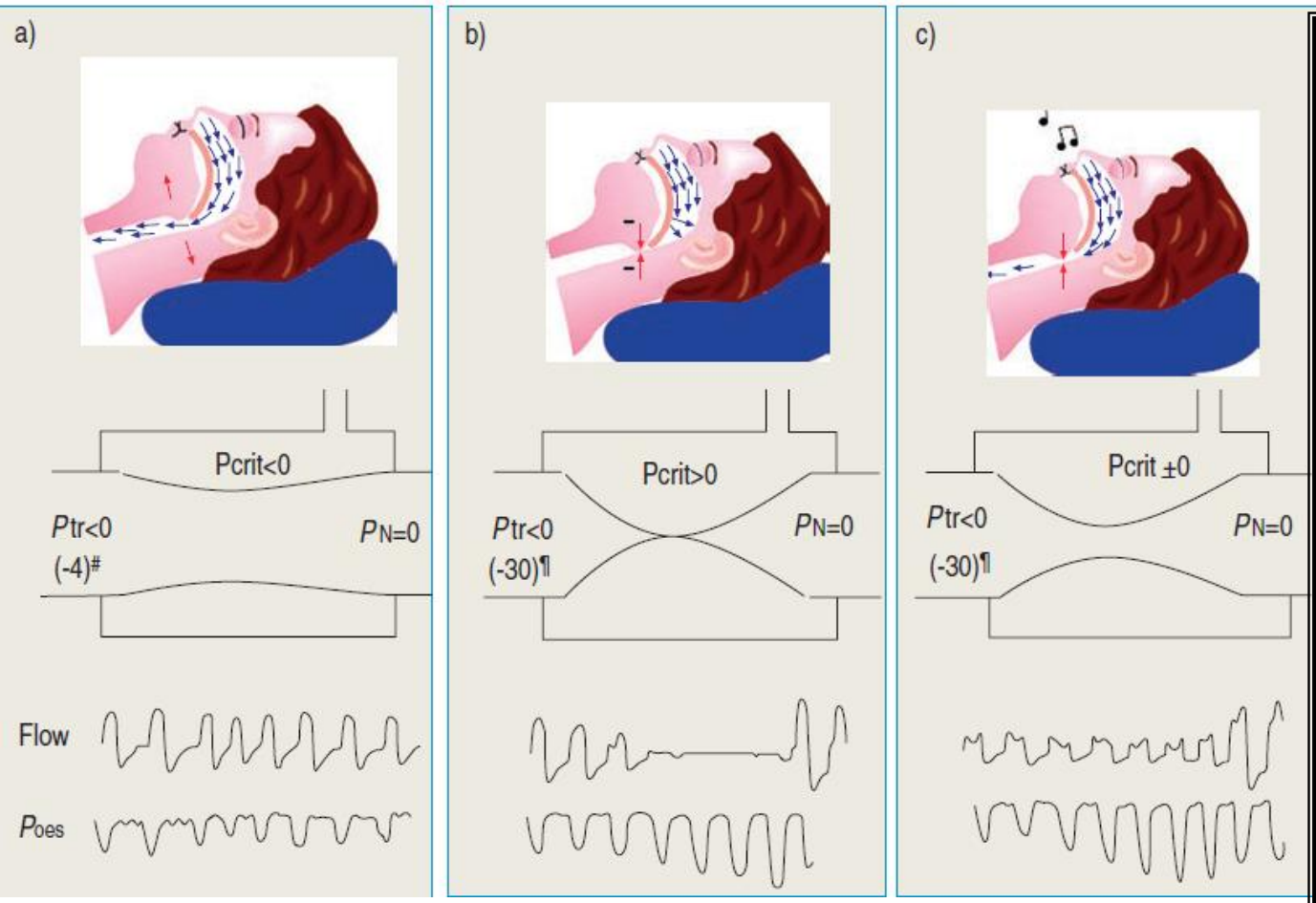
Τι νεότερα λένε οι Κατευθυντήριες Οδηγίες AASM: Treatment of Adult Obstructive sleep apnoea with positive airway pressure Clinical Practice Guideline, 2019

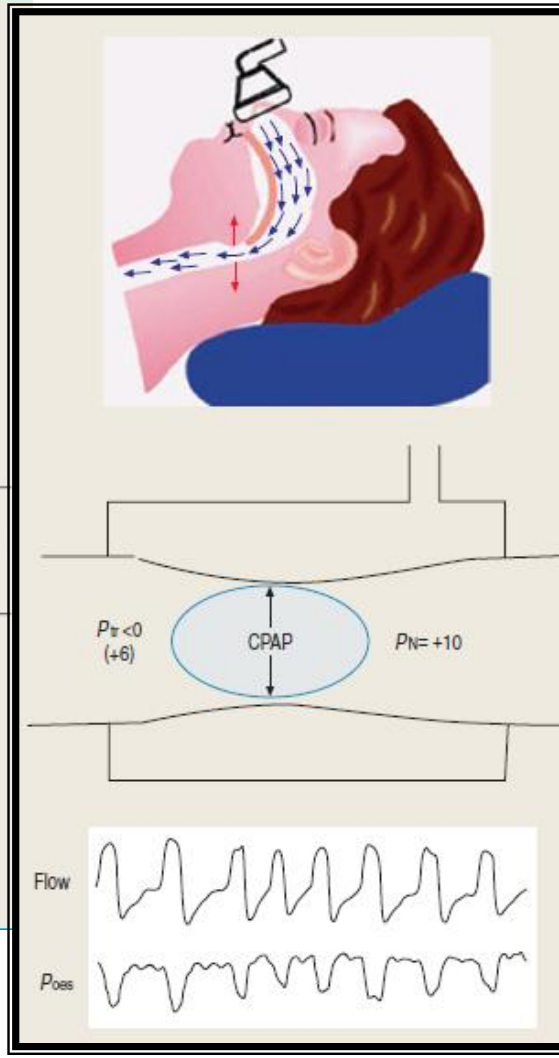
Αθανασία Πατάκα
Επικ. Καθηγήτρια Πνευμονολογίας ΑΠΘ
Κλινική Αναπνευστικής Ανεπάρκειας
ΓΠΘ Γ Παπανικολάου

- Η CPAP(Continuous Positive Airway Pressure) αποτελεί το gold standard της θεραπείας του ΣΑΑΥ.

- Εφαρμόσθηκε πρώτα το 1981 από τον SULLIVAN et al., και αποτέλεσε επανάσταση στη θεραπεία του ΣΑΑΥ που μέχρι τότε αποτελούσε η τραχειοστομία

Lancet 1981; 1: 862–865



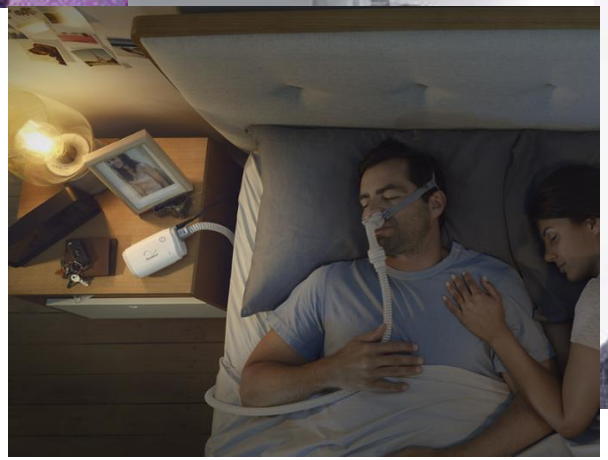


Η CPAP ΔΕΝ θεραπεύει τις αιτίες που προκαλούν την απόφραξη του ανώτερου αεραγωγού, αλλά αποτελεί παρηγορητική θεραπεία διατηρώντας των ανώτερο αεραγωγό ανοιχτό.

Eur Respir Mon 2010. 50, 244–266.








- Αντλία συνεχούς θετικής πίεσης
- Μάσκα εφαρμογής και κεφαλοδέτης
- Κύκλωμα

JCSM
Journal of Clinical Sleep Medicine

SPECIAL ARTICLES

Treatment of Adult Obstructive Sleep Apnea with Positive Airway Pressure: An American Academy of Sleep Medicine Clinical Practice Guideline

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]

J Clin Sleep Med. 2019;15(2):335–343.

- Scientific literature has expanded regarding the effects of PAP on adults with OSA
- Research on improving PAP adherence and advancements in device technology have continued to evolve
- Research questions designed to identify optimum device modalities and configurations
- Objective: to combine and update information from prior guideline documents regarding the treatment of adults with OSA with PAP

Kushida CA, Littner MR, Hirshkowitz M, et al. Practice parameters for the use of continuous and bilevel positive airway pressure devices to treat adult patients with sleep-related breathing disorders. *Sleep*. 2006;29(3):375–380.

Kushida CA, Chediak A, Berry RB, et al. Clinical guidelines for the manual titration of positive airway pressure in patients with obstructive sleep apnea. *J Clin Sleep Med*. 2008;4(2):157–171.

Morgenthaler TI, Aurora RN, Brown T, et al. Practice parameters for the use of autotitrating continuous positive airway pressure devices for titrating pressures and treating adult patients with obstructive sleep apnea syndrome: an update for 2007. An American Academy of Sleep Medicine report. *Sleep*. 2008;31(1):141–147.

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Journal of Clinical Sleep Medicine

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]

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J Clin Sleep Med. 2019;15(2):301–334.

Table 1—PICO questions.

1. In adult patients with OSA, does CPAP versus no treatment improve AHI/RDI/REI, daytime sleepiness, neurocognitive function, quality of life, sleep quality, mood, and motor vehicle crashes?
2. In adult patients with OSA, does PAP versus no therapy improve left ventricular ejection fraction, blood pressure control, and glucose control (hemoglobin A1c; fasting glucose)?
3. In adult patients with OSA, does PAP versus no therapy reduce cardiovascular event rates (incident hypertension, myocardial infarction, coronary revascularization procedures, stroke, atrial fibrillation, sudden death, hospitalization for heart failure, and cardiovascular mortality), all-cause hospitalization, and all-cause mortality?
4. In adult patients with OSA, does initiation of PAP based on an in-laboratory versus ambulatory APAP-based strategy improve AHI/RDI, adherence to PAP therapy, sleepiness, and quality of life?
5. In adult patients with OSA, does APAP versus CPAP improve AHI/RDI, adherence, sleepiness, neurocognitive function, and quality of life, and reduce side effects?
6. In adult patients with OSA, does BPAP or auto-BPAP versus CPAP improve AHI/RDI, adherence to PAP therapy, sleepiness, neurocognitive function, and quality of life, and reduce side effects?
7. In adult patients with OSA, does the addition of modified pressure profile PAP to PAP therapy improve adherence to PAP therapy, sleepiness, and quality of life, and reduce side effects?
8. In adult patients with OSA, does oral CPAP versus nasal (nasal mask versus intranasal) CPAP versus oronasal CPAP improve AHI/RDI, adherence to PAP therapy, sleepiness, and quality of life, and reduce side effects?
9. In adult patients with OSA, does humidified PAP versus standard PAP improve adherence to PAP therapy, sleepiness, quality of life, and reduce side effects?
10. In adult patients with OSA, do educational or behavioral interventions versus no intervention prior to or during PAP treatment improve adherence to PAP therapy, sleepiness, and quality of life?
11. In adult patients with OSA, do interventions guided by monitoring of OSA and PAP parameters during PAP treatment versus no monitoring improve adherence to PAP therapy, sleepiness, and quality of life, and reduce side effects?

AHI = apnea-hypopnea index, APAP = auto-adjusting positive airway pressure, BPAP = bilevel positive airway pressure, CPAP = continuous positive airway pressure, OSA = obstructive sleep apnea, PAP = positive airway pressure, PICO = Patient, Population or Problem, Intervention, Comparison, and Outcomes, RDI = respiratory disturbance index, REI = respiratory event index.

Methodology

GRADE

QUALITY OF EVIDENCE

⊕⊕⊕⊕ High
⊕⊕⊕⊖ Moderate
⊕⊕⊖⊖ Low
⊕⊖⊖⊖ Very Low

BENEFITS VERSUS HARMS

B>h Benefits outweigh harms
B=H Benefits approximately equal harms
H>b Harms outweigh benefits

PATIENT VALUES AND PREFERENCES


Vast majority of patients would use


Majority of patients would use


Majority of patients would not use

Vast majority of patients would not use

Strong vs Conditional Recommendations

	IMPLICATIONS FOR CLINICIANS
STRONG	Almost all patients should receive the recommended course of action. Adherence to this recommendation could be used as a quality criterion or performance indicator.
CONDITIONAL	Different choices will be appropriate for different patients, and the clinician must help each patient arrive at a management decision consistent with her or his values and preferences.

Good Practice Statement #1

- Treatment of OSA with PAP therapy should be based on a diagnosis of OSA established using objective sleep apnea testing.

This good practice statement applies specifically to a new diagnosis of OSA, which should be established by either a home sleep apnea test or in-laboratory sleep testing prior to initiation of treatment for OSA. Patients with a previously established diagnosis of OSA who are currently on PAP therapy and have good symptom control should continue PAP therapy, even when prior testing results are not readily available.

Good Practice Statement #2

- Adequate follow-up, including troubleshooting and monitoring of objective efficacy and usage data to ensure adequate treatment and adherence, should occur following PAP therapy initiation and during treatment of OSA.

Recommendation 1

- We recommend that clinicians use positive airway pressure, compared to no therapy, to treat OSA in adults with excessive sleepiness. *(STRONG)*
  - 38 RCTs; critical outcome included sleepiness
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Figure S2. PAP Pre-treatment vs. Post-treatment (AHI, events/hr)

Study or Subgroup	Posttreatment Mean	SD	Total	Pretreatment Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Amaro 2012	8	6	12	38	14	12	8.8%	-30.00 [-38.62, -21.38]
Barnes 2004	4.8	4.7	89	21.3	12.3	89	9.7%	-16.50 [-19.24, -13.76]
Becker 2003	3.4	3.1	16	62.5	8	16	9.5%	-59.10 [-63.30, -54.90]
Hoyos 2012	3.8	12.4	28	38.5	14.7	34	9.2%	-34.70 [-41.45, -27.95]
Ip 2006	1.7	1.8	14	47.7	15.3	14	8.9%	-46.00 [-54.07, -37.93]
Lam 2007	2.8	6.4	34	23.8	11.1	34	9.5%	-21.00 [-25.31, -16.69]
Montasterio 2001	6	8	66	20	6	66	9.7%	-14.00 [-16.41, -11.59]
Nguyen 2010	2.2	1.5	10	38.8	21.4	10	7.8%	-36.60 [-49.90, -23.30]
Phillips 2011	6.8	14.8	16	41.2	23.9	16	7.7%	-34.40 [-48.17, -20.63]
Weaver 2012	0.9	1.3	113	12.8	6.4	121	9.7%	-11.90 [-13.07, -10.73]
Woodson 2003	4.6	2.7	26	19.8	9.9	27	9.6%	-15.20 [-19.08, -11.32]
Total (95% CI)			**424**			**439**	**100.0%**	**-28.59 [-36.78, -20.40]**

Heterogeneity: Tau² = 178.76; Chi² = 567.06, df = 10 (P < 0.00001); I² = 98%
Test for overall effect: Z = 6.84 (P < 0.00001)

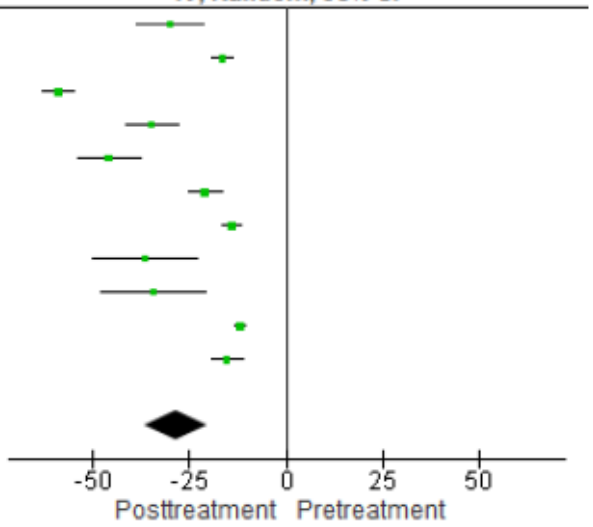
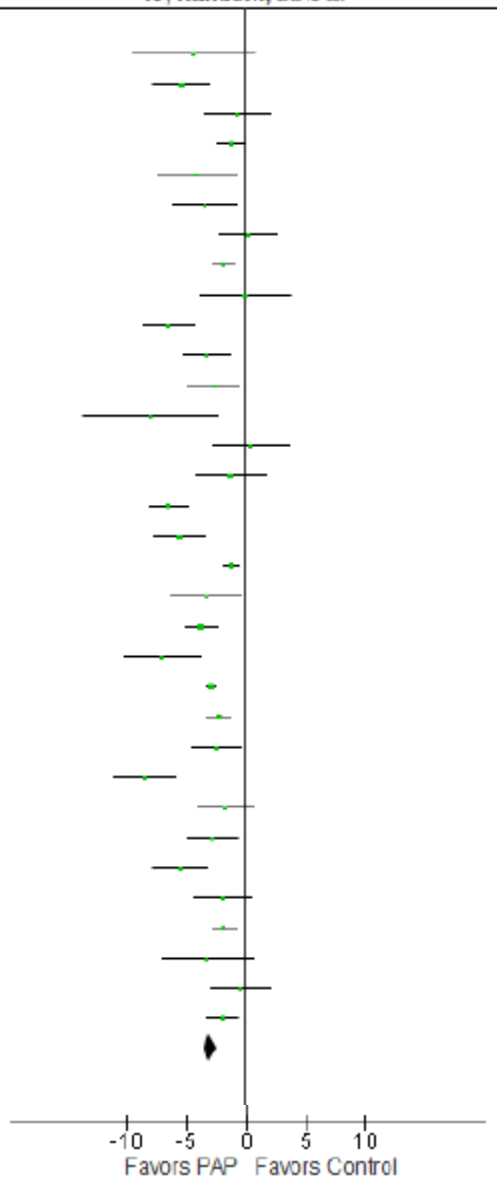


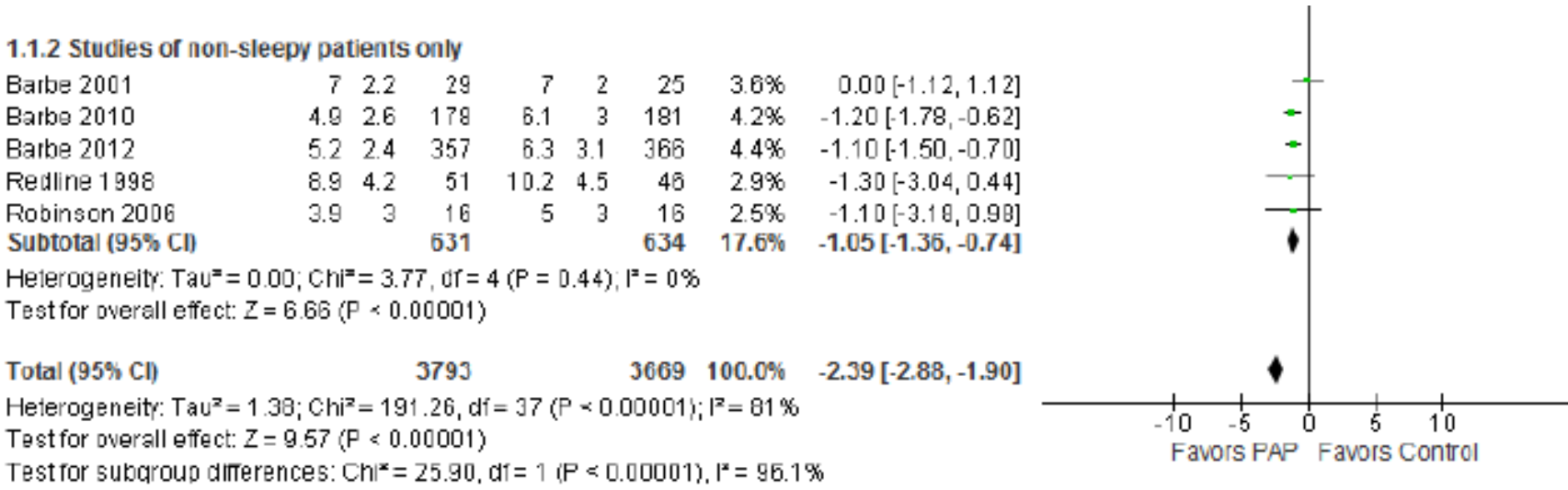
Figure S3. PAP vs. Control Conditions (ESS)

Study or Subgroup	PAP Mean	PAP SD	PAP Total	Control Mean	Control SD	Control Total	Weight	Mean Difference IV, Random, 95% CI
1.1.1 All studies (studies of non-sleepy patients excluded)								
Amaro 2012	5	5	12	9	7	12	0.8%	-4.00 [-8.87, 0.87]
Ballester 1999	5.6	4.1	68	10.6	6.1	37	2.4%	-5.00 [-7.19, -2.81]
Barnes 2002	8.5	5	28	9.1	5	28	2.0%	-0.60 [-3.22, 2.02]
Barnes 2004	9.2	3.8	89	10.2	3.8	90	3.7%	-1.00 [-2.11, 0.11]
Becker 2003	5.1	3.8	16	8.9	5	16	1.6%	-3.80 [-6.88, -0.72]
Coughlin 2007	9.4	5.2	34	12.5	5.2	34	2.1%	-3.10 [-5.57, -0.63]
Dalmases 2015	6.4	3.8	16	6.1	2.8	15	2.2%	0.30 [-2.04, 2.64]
Duran-Cantolla 2010	7.2	3.7	169	8.8	4.2	171	4.0%	-1.60 [-2.44, -0.76]
Engleman 1997	10.1	5.6	16	10	4.8	16	1.3%	0.10 [-3.51, 3.71]
Engleman 1998	6	3	23	12	4	23	2.5%	-6.00 [-8.04, -3.96]
Engleman 1999	8	4	34	11	4	34	2.7%	-3.00 [-4.90, -1.10]
Faccenda 2001	10.1	5.8	68	12.5	6.6	68	2.5%	-2.40 [-4.49, -0.31]
Hack 2000	5.5	9.2	33	13	11	26	0.7%	-7.50 [-12.77, -2.23]
Hoyos 2012	6.6	4.4	26	6.1	5.6	20	1.7%	0.50 [-2.48, 3.48]
Hui 2006	7	4.8	23	8.1	4.8	23	1.8%	-1.10 [-3.87, 1.67]
Jenkinson 1999	7	4	52	13	3.8	49	3.1%	-6.00 [-7.52, -4.48]
Kohler 2008	6.8	4.1	50	11.9	5.9	49	2.6%	-5.10 [-7.11, -3.09]
Kushida 2012	7.4	4.2	443	8.4	4.2	403	4.2%	-1.00 [-1.57, -0.43]
Lam 2007	7	5.8	34	10	5.7	33	1.9%	-3.00 [-5.75, -0.25]
Martinez-Garcia 2013	5.5	4.1	87	9	4.5	87	3.4%	-3.50 [-4.78, -2.22]
McArdle 2001	6	4.4	22	12.5	5.7	22	1.7%	-6.50 [-9.51, -3.49]
McEvoy 2016	4.2	3.5	1221	6.8	4.4	1188	4.4%	-2.60 [-2.92, -2.28]
McMillan 2014	7.2	3.5	140	9.2	4	138	3.9%	-2.00 [-2.88, -1.12]
Montasterio 2001	9.6	5.5	59	11.8	5.2	59	2.6%	-2.20 [-4.13, -0.27]
Montserrat 2001	6.65	3.3	23	14.59	5.1	22	2.0%	-7.94 [-10.46, -5.42]
Phillips 2011	8.1	3.2	16	9.6	2.9	13	2.3%	-1.50 [-3.72, 0.72]
Salord 2016	5	3.6	42	7.5	5	38	2.6%	-2.50 [-4.46, -0.54]
Siccoli 2008	6.8	5.1	50	11.9	5.9	49	2.4%	-5.10 [-7.27, -2.93]
Sivam 2012	7.7	4.4	27	9.4	4.2	27	2.3%	-1.70 [-3.99, 0.59]
Weaver 2012	12.6	3.9	113	14.2	3.2	110	3.9%	-1.60 [-2.54, -0.66]
West 2007	8.1	5.7	19	11	6	21	1.3%	-2.90 [-6.53, 0.73]
Woodson 2003	10.3	5.1	26	10.6	3.3	28	2.2%	-0.30 [-2.61, 2.01]
Zhao 2017	6	4	83	7.7	4	86	3.5%	-1.70 [-2.91, -0.49]
Subtotal (95% CI)			**3162**			**3035**	**82.4%**	**-2.71 [-3.27, -2.15]**

Heterogeneity: Tau² = 1.56; Chi² = 142.36, df = 32 (P < 0.00001); I² = 78%

Test for overall effect: Z = 9.49 (P < 0.00001)





ESS reduction of −1.0 points (95% CI: −0.7 to −1.4 points) that the TF judged to **not be clinically significant**

Figure S4. PAP vs. Control Conditions (Osler & MWT, min)

Study or Subgroup	PAP Mean	PAP SD	PAP Total	Control Mean	Control SD	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Barnes 2004	30	8	80	28	8	80	16.6%	0.25 [-0.06, 0.56]
Engleman 1999	16.2	10.6	34	14.4	8.5	34	13.5%	0.19 [-0.29, 0.66]
Hack 2000	33.5	6.9	26	24.2	8.1	33	12.0%	1.21 [0.65, 1.78]
Jenkinson 1999	32.9	7.1	52	23.5	8.2	49	14.5%	1.22 [0.79, 1.65]
Kohler 2008	40	5.2	50	38	7.6	49	15.0%	0.31 [-0.09, 0.70]
McMillan 2014	27.8	11.6	110	23.8	13.4	115	17.5%	0.32 [0.05, 0.58]
West 2007	32.5	13	19	27.3	11	21	10.9%	0.43 [-0.20, 1.05]
Total (95% CI)			**371**			**381**	**100.0%**	**0.54 [0.23, 0.84]**

Heterogeneity: Tau² = 0.12; Chi² = 23.87, df = 6 (P = 0.0006); I² = 75%

Test for overall effect: Z = 3.41 (P = 0.0006)

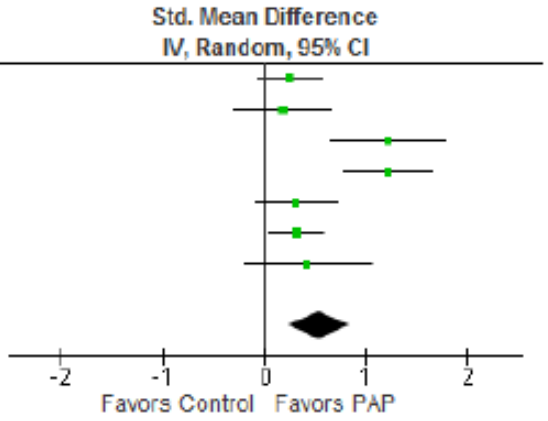
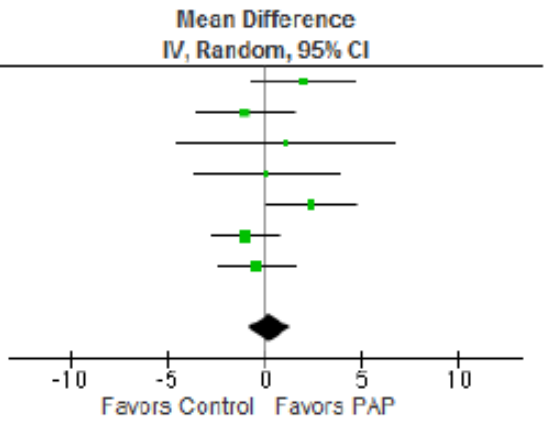


Figure S5. PAP vs. Control Conditions (MSLT, min)

Study or Subgroup	PAP Mean	PAP SD	PAP Total	Control conditions Mean	Control conditions SD	Control conditions Total	Weight	Mean Difference IV, Random, 95% CI
Barbe 2001	13	5	29	11	5	25	13.7%	2.00 [-0.67, 4.67]
Barnes 2002	10.7	4.8	28	11.7	4.8	28	15.0%	-1.00 [-3.51, 1.51]
Engleman 1994	7.2	9.1	17	6.1	9.1	15	3.8%	1.10 [-4.52, 6.72]
Engleman 1997	10	4.8	16	9.9	6	16	7.8%	0.10 [-3.66, 3.86]
Engleman 1998	9.2	3.9	23	6.8	4.3	23	16.3%	2.40 [0.03, 4.77]
Montasterio 2001	10	5	66	11	5	59	24.0%	-1.00 [-2.76, 0.76]
Redline 1998	10.9	5	51	11.3	5.4	46	19.5%	-0.40 [-2.48, 1.68]
Total (95% CI)			**230**			**212**	**100.0%**	**0.25 [-0.89, 1.38]**

Heterogeneity: Tau² = 0.60; Chi² = 8.12, df = 6 (P = 0.23); I² = 26%

Test for overall effect: Z = 0.42 (P = 0.67)



treatment of OSA with CPAP results in clinically significant improvements in self reported sleepiness and the ability to maintain wakefulness, particularly in **sleepy patients with OSA**.

Recommendation 2

- We suggest that clinicians use positive airway pressure, compared to no therapy, to treat OSA in adults with impaired sleep-related quality of life. *(CONDITIONAL)*

  Remark: Sleep-related quality of life (QOL) in adult patients with OSA may be adversely affected by OSA-related symptoms. Examples of such symptoms include: snoring, sleep-related choking, insomnia, disruption of bedpartner's sleep, morning headaches, nocturia, impairments in productivity or social functioning, and daytime fatigue.

  - 19 RCTs; critical outcome included sleep-related QOL
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Figure S7. PAP vs. Control Conditions (SF-36 PCS)

Study or Subgroup	PAP Mean	PAP SD	PAP Total	Control Mean	Control SD	Control Total	Weight	Mean Difference IV, Random, 95% CI
Barbe 2001	51	5.4	29	50	5.4	25	4.0%	1.00 [-1.89, 3.89]
Barnes 2002	75.6	27.2	28	77	27.2	28	0.2%	-1.40 [-15.65, 12.85]
Engleman 1999	79	22.8	34	72.2	26	34	0.2%	6.80 [-4.82, 18.42]
Jenkinson 1999	49.4	10.1	52	45.5	10.4	49	2.1%	3.90 [-0.10, 7.90]
Lam 2007	77.5	18.6	34	67.7	26.3	33	0.3%	9.80 [-0.86, 20.46]
Lewis 2017	44.6	10.2	99	42.9	9.3	99	4.6%	1.70 [-1.02, 4.42]
McEvoy 2016	46.9	8	1218	45.9	8.1	1189	81.5%	1.00 [0.36, 1.64]
Montserrat 2001	50.7	36.9	23	47.2	41.7	22	0.1%	3.50 [-19.54, 26.54]
Siccoli 2008	70.8	18.5	50	70	18.9	49	0.6%	0
Woodson 2003	50.8	7	28	51.4	7.9	26	2.1%	-0
Zhao 2017	46.2	9.6	81	42.9	8.7	85	4.3%	
Total (95% CI)			**1676**			**1639**	**100.0%**	

Heterogeneity: Tau² = 0.00; Chi² = 8.79, df = 10 (P = 0.55); I² = 0%
Test for overall effect: Z = 4.04 (P < 0.0001)

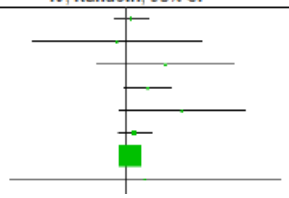


Figure S6. PAP vs. Control Conditions (FOSQ & SAQLI)

Study or Subgroup	PAP Mean	PAP SD	PAP Total	Control Mean	Control SD	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Barbe 2001	108	10.8	29	110	10	25	6.0%	-0.19 [-0.73, 0.35]
Barnes 2004	3.3	0.94	89	3.3	0.95	90	9.6%	0.00 [-0.29, 0.29]
Craig 2012	4.9	1.1	167	4.8	1.2	163	11.2%	0.09 [-0.13, 0.30]
Faccenda 2001	12.4	4.1	60	11.6	5.9	60	9.0%	0.16 [-0.18, 0.50]
Lam 2007	5.9	0.6	34	5	0.6	33	5.9%	1.48 [0.94, 2.03]
McMillan 2014	5.5	1.1	121	5.1	1.1	119	10.5%	0.36 [0.11, 0.62]
Montasterio 2001	106	20	66	102	21	59	8.8%	0.19 [-0.16, 0.55]
Montserrat 2001	100.4	12.5	23	100.7	20.6	22	5.4%	0.50 [-0.09, 1.10]
Phillips 2011	16	2.8	16	16.7	2.8	13	4.1%	-0.24 [-0.98, 0.49]
Siccoli 2008	4.4	1.1	50	3.8	1.6	49	8.0%	0.43 [0.04, 0.83]
Weaver 2012	14.9	3	113	14.3	2.7	110	10.3%	0.21 [-0.05, 0.47]
West 2007	5.1	1	19	4.4	1	21	4.9%	0.69 [0.05, 1.33]
Woodson 2003	17.5	2.4	26	17.2	2	28	6.1%	0.13 [-0.40, 0.67]
Total (95% CI)			**821**			**800**	**100.0%**	**0.27 [0.09, 0.45]**

Heterogeneity: Tau² = 0.06; Chi² = 33.50, df = 12 (P = 0.0008); I² = 64%
Test for overall effect: Z = 2.99 (P = 0.003)

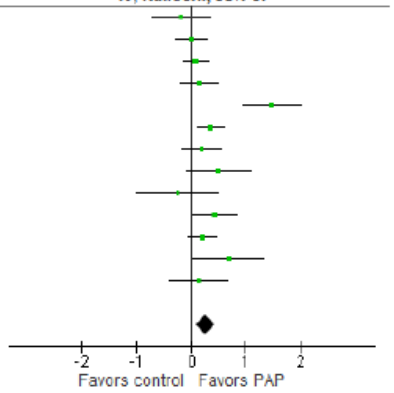


Figure S8. PAP vs. Control Conditions (SF-36 MCS)

Study or Subgroup	PAP Mean	PAP SD	PAP Total	Control Mean	Control SD	Control Total	Weight	Mean Difference IV, Random, 95% CI
Barbe 2001	51	10.8	29	52	10	25	6.7%	-1
Barnes 2002	77	26.5	28	80.3	26.5	28	1.5%	-3.3
Craig 2012	52	9.8	165	48.5	11	158	14.3%	
Engleman 1999	74	21.2	34	68.2	23.8	34	2.5%	5
Jenkinson 1999	55.4	7	52	47.8	10.1	49	11.2%	7
Lam 2007	73.8	21.6	34	71.5	24.7	33	2.3%	2
Lewis 2017	52.6	10	99	49.7	11	99	12.5%	2
McEvoy 2016	53.6	8	1218	52.4	8.8	1189	18.1%	
Montserrat 2001	49.5	11.5	23	53.6	7.5	22	6.6%	-4
Siccoli 2008	76.8	16.2	50	70.6	22.6	49	4.2%	6
Woodson 2003	49.2	8.6	28	47.1	8.3	26	8.6%	2
Zhao 2017	51.3	9.7	81	54	11.5	85	11.6%	-2
Total (95% CI)			**1841**			**1797**	**100.0%**	**1.86 [0.06, 3.66]**

Heterogeneity: Tau² = 4.55; Chi² = 30.52, df = 11 (P = 0.001); I² = 64%
Test for overall effect: Z = 2.02 (P = 0.04)

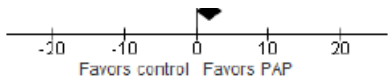
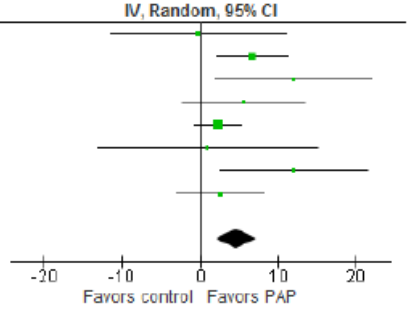


Figure S9. PAP vs. Control Conditions (SF-36 VS)

Study or Subgroup	PAP Mean	PAP SD	PAP Total	Control Mean	Control SD	Control Total	Weight	Mean Difference IV, Random, 95% CI
Barnes 2002	61.2	21.5	28	61.4	21.5	28	4.9%	-0.20 [-11.46, 11.06]
Craig 2012	60.6	20.9	171	53.9	22.5	168	20.4%	6.70 [2.08, 11.32]
Engleman 1999	58	19	34	46	23	34	6.0%	12.00 [1.97, 22.03]
Lam 2007	62.6	16.9	34	57	16.1	33	9.1%	5.60 [-2.30, 13.50]
Lewis 2017	51.8	11.1	99	49.5	9.4	100	33.9%	2.30 [-0.56, 5.16]
Montserrat 2001	69.4	27.3	23	68.4	20.6	22	3.2%	1.00 [-13.09, 15.09]
Siccoli 2008	64.7	20.4	50	52.6	26.7	49	6.8%	12.10 [2.73, 21.47]
Zhao 2017	63.5	18.8	81	60.9	18.1	85	15.6%	2.60 [-3.02, 8.22]
Total (95% CI)			**520**			**519**	**100.0%**	**4.63 [2.03, 7.23]**

Heterogeneity: Tau² = 3.06; Chi² = 9.08, df = 7 (P = 0.25); I² = 23%
Test for overall effect: Z = 3.49 (P = 0.0005)



Recommendation 3

- We suggest that clinicians use positive airway pressure, A in adults with *NAL)*

pressure

Figure S30. PAP vs. control conditions (change in nighttime SBP) [Normotensive patients]

Study or Subgroup	PAP Mean	PAP SD	PAP Total	control conditions Mean	control conditions SD	control conditions Total	Weight	Mean Difference IV, Random, 95% CI
Arias 2005	-1	14.1	25	-1	12	25	52.3%	0.00 [-7.26, 7.26]
Drager 2007	-3	9.5	12	1	9.5	12	47.7%	-4.00 [-11.60, 3.60]
Total (95% CI)			37			37	100.0%	**-1.91 [-7.16, 3.34]**

Heterogeneity: Tau² = 0.00; Chi² = 0.56, df = 1 (P = 0.46); I² = 0%
Test for overall effect: Z = 0.71 (P = 0.48)

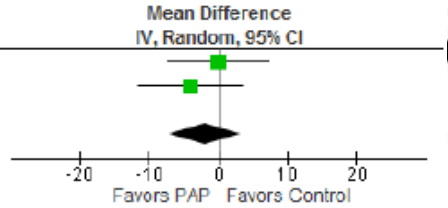


Figure S31. PAP vs. control conditions (change in nighttime DBP) [Normotensive patients]

Study or Subgroup	PAP Mean	PAP SD	PAP Total	control conditions Mean	control conditions SD	control conditions Total	Weight	Mean Difference IV, Random, 95% CI
Arias 2005	-2	9	25	-1	6	25	74.2%	-1.00 [-4.92, 2.92]
Drager 2007	-4	8	12	-3	8.6	12	25.8%	-1.00 [-7.65, 5.65]
Total (95% CI)			37			37	100.0%	**-1.00 [-4.38, 2.38]**

Heterogeneity: Tau² = 0.00; Chi² = 0.00, df = 1 (P = 1.00); I² = 0%
Test for overall effect: Z = 0.58 (P = 0.56)

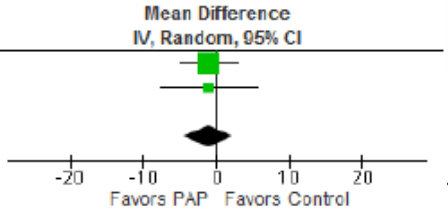


Figure S32. PAP vs. control conditions (change in daytime SBP) [Normotensive patients]

Study or Subgroup	PAP Mean	PAP SD	PAP Total	control conditions Mean	control conditions SD	control conditions Total	Weight	Mean Difference IV, Random, 95% CI
Arias 2005	0	9	25	0	11	25	61.3%	0.00 [-5.57, 5.57]
Drager 2007	-3	7.3	12	-2	10	12	38.7%	-1.00 [-8.01, 6.01]
Total (95% CI)			37			37	100.0%	**-0.39 [-4.75, 3.97]**

Heterogeneity: Tau² = 0.00; Chi² = 0.05, df = 1 (P = 0.83); I² = 0%
Test for overall effect: Z = 0.17 (P = 0.86)

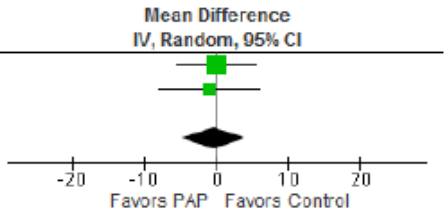
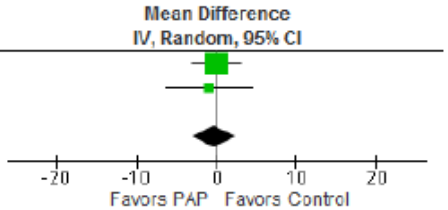


Figure S33. PAP vs. control conditions (change in daytime DBP) [Normotensive patients]

Study or Subgroup	PAP Mean	PAP SD	PAP Total	control conditions Mean	control conditions SD	control conditions Total	Weight	Mean Difference IV, Random, 95% CI
Arias 2005	-1	5	25	-1	6	25	75.5%	0.00 [-3.06, 3.06]
Drager 2007	-4	5.7	12	-3	7.6	12	24.5%	-1.00 [-6.38, 4.38]
Total (95% CI)			37			37	100.0%	**-0.24 [-2.91, 2.42]**

Heterogeneity: Tau² = 0.00; Chi² = 0.10, df = 1 (P = 0.75); I² = 0%
Test for overall effect: Z = 0.18 (P = 0.86)



Recommendation 3

A total of 26 RCTs measured BP before and after PAP

- ❖studied mixed populations of normotensives and hypertensives, many treated with antihypertensive drugs
- ❖Most RCTs did not specify sleepiness status a priori
- ❖Several control conditions were utilized, ranging from sham PAP, to usual care, to an oral placebo tablet to no treatment while maintaining antihypertensive medications for comparison to PAP.
- ❖. Many studies utilized 24-hour (or 48-hour) ambulatory BP measurements Some studies utilized office or lab-based measurements
- ❖Nightly PAP adherence was variable
- ❖Some trials used fixed CPAP titrated during PSG in the sleep laboratory and some used APAP, while others used CPAP derived from a night on APAP

> Overall, the analyses suggest that PAP use reduces BP in adults with OSA, particularly in participants with moderate to severe OSA. The quality of evidence for BP in all participant types with OSA ranged from moderate to high, depending on the time and type of BP measured, and was downgraded due to imprecision.

No Recommendation

- There is insufficient and inconclusive evidence to either recommend or withhold PAP to treat non-sleepy adults with OSA as a means to reduce cardiovascular events or mortality.
  - Critical outcomes included cardiovascular events and all-cause mortality risk
  - 17 studies (11 observational, 6 RCTs) reported on cardiovascular events
  - 13 studies (9 observational, 4 RCTs) reported on all-cause mortality risk
  - ⊕⊖⊖⊖ to ⊕⊕⊕⊖
  - Patient and clinician should have a balanced discussion about the current state of the evidence about CV risk reduction with PAP therapy

No Recommendation

Figure S36. PAP vs. control conditions (All-cause mortality) [RCTs]

Study or Subgroup	PAP Events	PAP Total	Control Events	Control Total	Weight	Risk Ratio M-H, Random, 95% CI
Barbe 2012	8	357	3	366	6.9%	2.73 [0.73, 10.22]
McEvoy 2016	40	1346	43	1341	67.1%	0.93 [0.61, 1.42]
Parra 2015	6	57	9	69	12.8%	0.81 [0.31, 2.13]
Peker 2016	7	122	9	122	13.2%	0.78 [0.30, 2.02]
Total (95% CI)		**1882**		**1898**	**100.0%**	**0.96 [0.68, 1.36]**
Total events	61		64			

Heterogeneity: Tau² = 0.00; Chi² = 2.76, df = 3 (P = 0.43); I² = 0%
Test for overall effect: Z = 0.24 (P = 0.81)

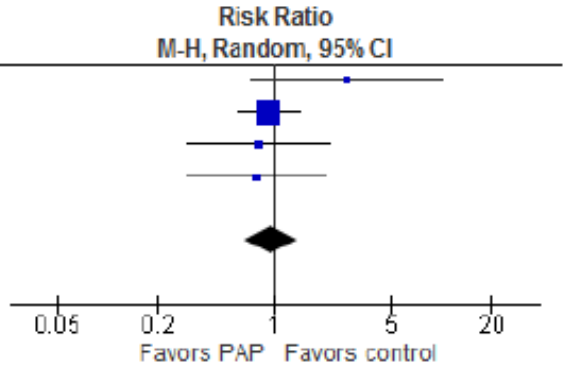
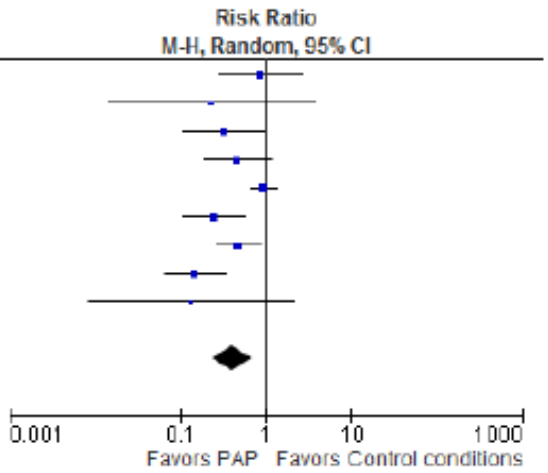


Figure S37. PAP vs. control conditions (All-cause mortality) [non-RCTs, all patients]

Study or Subgroup	PAP Events	PAP Total	Control conditions Events	Control conditions Total	Weight	Risk Ratio M-H, Random, 95% CI
Campos-Rodriguez 2012	9	576	5	278	10.7%	0.87 [0.29, 2.57]
Capodanno 2014	0	17	13	112	3.1%	0.23 [0.01, 3.74]
Cassar 2007	4	175	14	196	10.7%	0.32 [0.11, 0.95]
Doherty 2005	8	114	9	60	12.6%	0.47 [0.19, 1.15]
Holmqvist 2015	68	937	54	687	18.0%	0.92 [0.65, 1.30]
Kasai 2008	7	65	10	23	13.1%	0.25 [0.11, 0.57]
Marin 2005	13	372	47	638	15.6%	0.47 [0.26, 0.87]
Marti 2002	6	100	30	73	13.3%	0.15 [0.06, 0.33]
Wang 2007	0	14	9	37	3.1%	0.13 [0.01, 2.15]
Total (95% CI)		**2370**		**2104**	**100.0%**	**0.40 [0.24, 0.69]**
Total events	115		191			

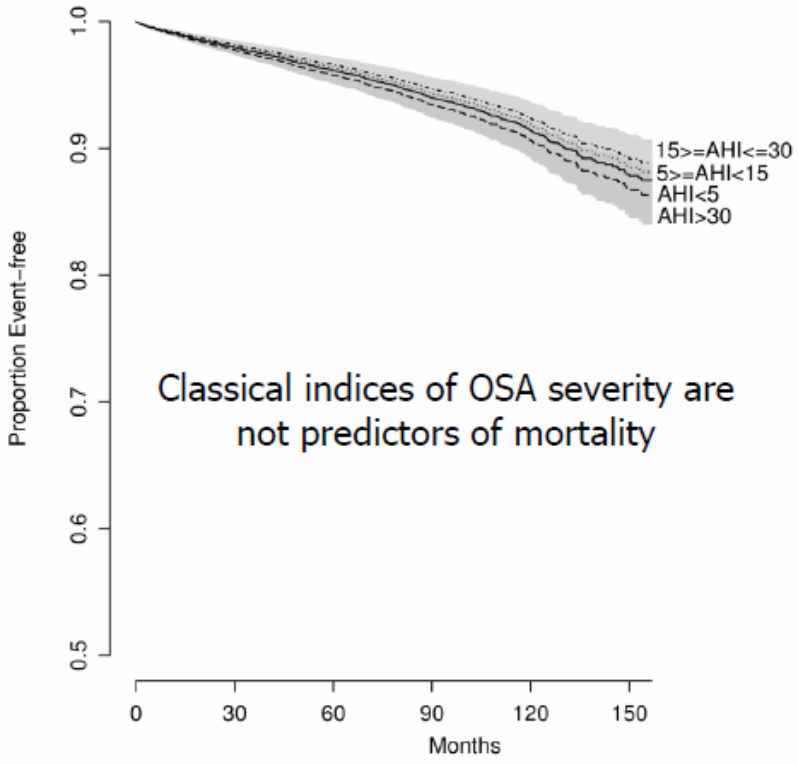
Heterogeneity: Tau² = 0.37; Chi² = 25.67, df = 8 (P = 0.001); I² = 69%
Test for overall effect: Z = 3.36 (P = 0.0008)



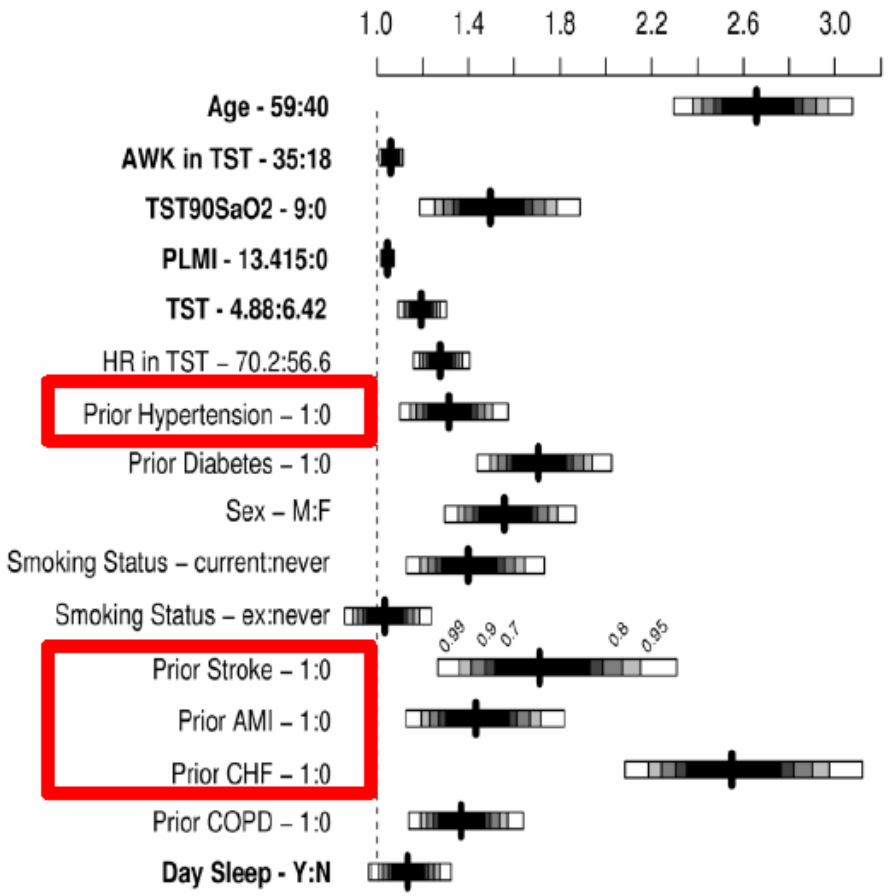
non-randomized studies and RCTs

- In many instances, the control groups were comprised of participants who refused PAP therapy
- Impact interim advances in cardiovascular disease therapies may have on the benefit of treating OSA with PAP
- PAP adherence was lower in the RCTs than in the nonrandomized studies: in RCTs inclusion of less symptomatic/sleepy participants and exclusion of participants with the most severe disease given that symptoms and OSA severity are predictors of PAP adherence.
- In addition, the benefits of PAP on cardiovascular event risk may be greater in more symptomatic and more severe disease, which are the groups that were excluded from the RCTs
- Co morbidities among study cases and controls are often imbalanced and may be difficult to control for.

co-morbidities are the main predictors for mortality



Classical indices of OSA severity are not predictors of mortality



10,149 participants, median follow-up of 68 months

PLoS Med 2014;11:e1001599

Recommendation 4

- We recommend positive airway pressure therapy be initiated using either APAP at home or in-laboratory PAP titration in adults with OSA and no significant comorbidities. *(STRONG)*

  Remarks: Recommendation based on studies that excluded patients with the following comorbidities or conditions: congestive heart failure, chronic opiate use, significant lung disease such as chronic obstructive pulmonary disease, neuromuscular disease, history of uvulopalatopharyngoplasty, sleep-related oxygen requirements, or expectation for nocturnal arterial oxyhemoglobin desaturation due to conditions other than OSA, including hypoventilation syndromes and central sleep apnea syndromes.

Recommendation based on the clinical trials reviewed, in which mask fittings and education on PAP use at a sleep center and/or close follow-up by trained staff during the treatment period were provided to the home APAP group. In some studies, daytime acclimatization to PAP was included.

Recommendation 4

- We recommend positive airway pressure therapy be initiated using either APAP at home or in-laboratory PAP titration in adults with OSA and no significant comorbidities. *(STRONG)*
  - 10 RCTs; critical outcomes included PAP adherence, sleepiness, and QOL
  - ⊕⊕⊕⊕
  - B>h
  - 

Figure S58. APAP-intiated PAP vs. In-lab-intiated PAP (AHI, events/hr)

Study or Subgroup	PAP+ambulatory Mean	SD	Total	PAP+lab Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Berry 2008	3.5	1.9	40	5.3	4.4	39	77.3%	-1.80 [-3.30, -0.30]
Mulgrew 2007	2.5	6.8	31	3.2	5	30	19.5%	-0.70 [-3.69, 2.29]
Planes 2003	7.6	6.9	16	10.4	12.6	14	3.2%	-2.80 [-10.17, 4.57]
Total (95% CI)			87			83	100.0%	-1.62 [-2.94, -0.30]

Heterogeneity: Tau² = 0.00; Chi² = 0.52, df = 2 (P = 0.77); I² = 0%
Test for overall effect: Z = 2.40 (P = 0.02)

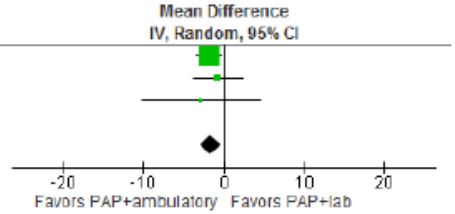
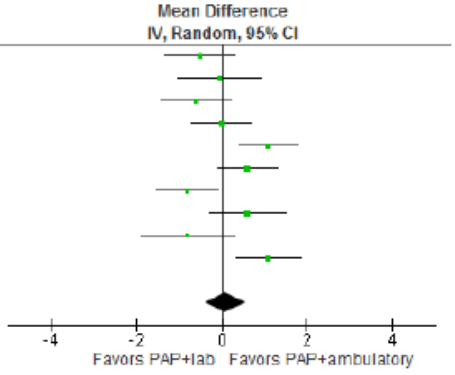


Figure S59. APAP-intiated PAP vs. In-lab-intiated PAP (Adherence, hrs/night)

Study or Subgroup	PAP+ambulatory Mean	SD	Total	PAP+lab Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Antic 2009	4.1	2.9	94	4.6	3.7	83	9.9%	-0.50 [-1.33, 0.33]
Berry 2008	5.2	1.9	40	5.25	2.5	39	8.8%	-0.05 [-1.03, 0.93]
Chai-Coetzer 2013	4.8	2.1	51	5.4	2	44	9.9%	-0.60 [-1.43, 0.23]
Cross 2006	4.4	2.5	100	4.4	2.5	98	10.9%	0.00 [-0.70, 0.70]
Hui 2017	5	2	62	3.9	2.1	69	10.9%	1.10 [0.40, 1.80]
Kuna 2011	3.5	2.4	95	2.9	2.3	84	11.0%	0.60 [-0.09, 1.29]
McArdle 2010	4.4	2.2	61	5.2	1.9	65	10.7%	-0.80 [-1.52, -0.08]
Mulgrew 2007	6	1.5	31	5.4	2	30	9.5%	0.60 [-0.29, 1.49]
Planes 2003	4.5	1.7	16	5.3	1.4	14	8.0%	-0.80 [-1.91, 0.31]
Rosen 2012	4.7	2.1	74	3.6	2.4	61	10.4%	1.10 [0.33, 1.87]
Total (95% CI)			624			587	100.0%	0.09 [-0.38, 0.56]

Heterogeneity: Tau² = 0.40; Chi² = 30.90, df = 9 (P = 0.0003); I² = 71%
Test for overall effect: Z = 0.39 (P = 0.70)



Recommendation 5

APAP vs. CPAP for the treatment of obstructive sleep apnea in adults

Figure S62. APAP vs. CPAP (AHI, events/hr)

Study or Subgroup	APAP Mean	APAP SD	APAP Total	CPAP Mean	CPAP SD	CPAP Total	Weight	Mean Difference IV, Random, 95% CI
Berry 2014	5.5	4.7	66	4.9	4.9	59	6.0%	0.60 [-1.09, 2.29]
d'Ortho 2000	10.6	9.3	25	9.7	1.9	25	2.2%	0.90 [-2.82, 4.62]
Fietze 2007	4.4	3.4	10	3.9	4.3	11	2.7%	0.50 [-2.80, 3.80]
Galetke 2008	5.6	3.6	20	4.6	2.9	20	5.1%	1.00 [-1.03, 3.03]
Hussain 2004	13.1	8.3	10	9.6	5.4	10	0.9%	3.50 [-2.64, 9.64]
Konermann 1998	2.4	1.6	25	3.6	4.4	23	5.4%	-1.20 [-3.10, 0.70]
Kushida 2011	1.3	2.9	46	1	1.3	47	8.8%	0.30 [-0.62, 1.22]
Massie 2003	9.6	5.3	44	10.7	6.6	44	4.0%	-1.10 [-3.60, 1.40]
Meurice 1996	1.7	1.2	9	2.6	3	8	4.5%	-0.90 [-3.14, 1.34]
Meurice 2007	5.5	6.3	51	2.4	3.4	14	4.0%	3.10 [0.62, 5.58]
Nolan 2007	2.7	2.1	29	3.5	3.5	29	6.7%	-0.80 [-2.29, 0.69]
Nussbaumer 2006	4.6	3.8	30	5.4	6.6	30	3.5%	-0.80 [-3.53, 1.93]
Patruno 2007	6	2.3	15	2	1.6	16	7.0%	4.00 [2.60, 5.40]
Planes 2003	7.6	6.9	16	10.4	12.5	14	0.7%	-2.80 [-10.17, 4.57]
Randerath 2001	5	5.2	47	4.3	6.3	47	4.3%	0.70 [-1.64, 3.04]
Resta 2004	8.3	2	10	8.4	3.6	10	3.9%	-0.10 [-2.65, 2.45]
Senn 2003	6.8	1.3	58	5.3	1	29	10.1%	1.50 [1.01, 1.99]
Series 2001	3.3	1.8	11	3.7	4.6	10	3.0%	-0.40 [-3.44, 2.64]
Teschler 2000	4	1	10	3.7	1	10	8.9%	0.30 [-0.58, 1.18]
Vennelle 2010	6.7	5.4	181	6.3	5.4	181	8.0%	0.40 [-0.71, 1.51]
West 2006	5.2	16.1	29	3.8	35	29	0.2%	1.40 [-12.62, 15.42]
Total (95% CI)			**741**			**666**	**100.0%**	**0.56 [-0.07, 1.19]**

Heterogeneity: Tau² = 0.95; Chi² = 50.93, df = 20 (P = 0.0002); I² = 61%

Test for overall effect: Z = 1.76 (P = 0.08)

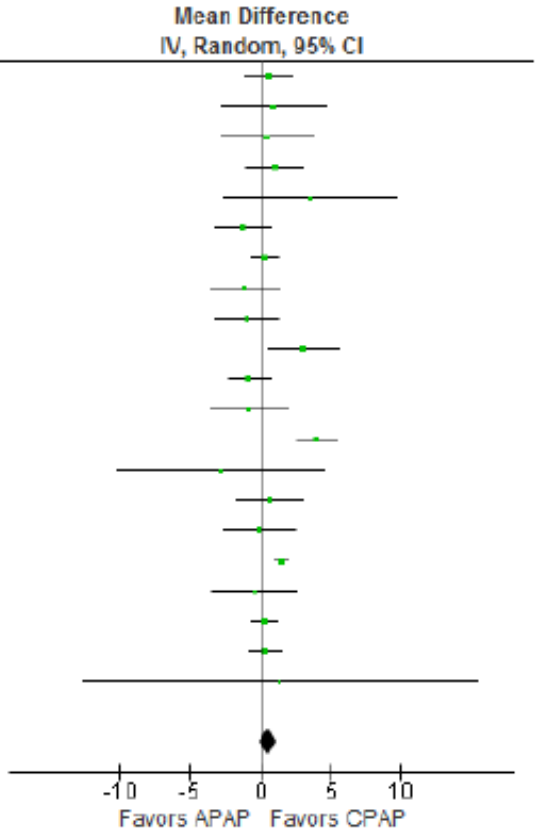


Figure S63. APAP vs. CPAP (Adherence; hrs/night)

Study or Subgroup	APAP Mean	APAP SD	APAP Total	CPAP Mean	CPAP SD	CPAP Total	Weight	Mean Difference IV, Random, 95% CI
Berry 2014	4.45	2.3	66	4	2.3	59	5.3%	0.45 [-0.36, 1.26]
d'Ortho 2000	4.1	1.8	25	4.7	1.8	25	3.5%	-0.60 [-1.60, 0.40]
Fietze 2007	5	1.6	10	4.2	2.2	11	1.3%	0.80 [-0.84, 2.44]
Galetke 2008	6.4	1.8	20	6.4	1.9	20	2.6%	0.00 [-1.15, 1.15]
Hudgel 2000	6	1.8	14	5.5	1.8	19	2.2%	0.50 [-0.74, 1.74]
Hukins 2004	5.1	2.4	27	4.7	2.7	19	1.5%	0.40 [-1.11, 1.91]
Hussain 2004	4.3	1.9	10	3.7	2.6	10	0.9%	0.60 [-1.40, 2.60]
Konermann 1998	5.9	1.6	25	5.6	2.5	23	2.4%	0.30 [-0.90, 1.50]
Kushida 2011	4.4	2	54	4.4	2	57	6.3%	0.00 [-0.74, 0.74]
Marrone 2004	4.9	1.7	22	4.4	1.9	22	3.1%	0.50 [-0.57, 1.57]
Massie 2003	5.1	1.9	44	4.5	1.9	44	5.5%	0.60 [-0.19, 1.39]
Maurice 2007	5.9	1.6	51	6.5	1.8	14	3.2%	-0.60 [-1.64, 0.44]
Nolan 2007	4.9	2.1	29	4.9	1.9	29	3.3%	0.00 [-1.03, 1.03]
Noseda 2004	5.3	1.9	24	5.5	1.5	24	3.7%	-0.20 [-1.17, 0.77]
Nussbaumer 2006	5.1	1.6	30	4.8	1.6	30	5.3%	0.30 [-0.51, 1.11]
Patruno 2007	6.2	0.8	15	6	1	16	6.6%	0.20 [-0.44, 0.84]
Planes 2003	4.5	1.7	16	5.3	1.4	14	2.8%	-0.80 [-1.91, 0.31]
Randerath 2001	5.3	1.6	47	5.3	1.6	47	6.3%	0.00 [-0.65, 0.65]
Resta 2004	5.2	1.4	10	5.3	1.8	10	1.7%	-0.10 [-1.51, 1.31]
Senn 2003	5.5	1.5	58	5.6	1.1	29	11.2%	-0.10 [-0.66, 0.46]
Teschler 2000	6.3	1.3	10	6.1	1.6	10	2.1%	0.20 [-1.08, 1.48]
To 2008	4.4	2.3	41	3.8	2	41	4.0%	0.60 [-0.33, 1.53]
Vennelle 2010	4.2	2.7	181	4	2.7	181	11.2%	0.20 [-0.36, 0.76]
Total (95% CI)			**829**			**754**	**100.0%**	**0.11 [-0.07, 0.30]**

Heterogeneity: Tau² = 0.00; Chi² = 13.27, df = 22 (P = 0.93); I² = 0%
Test for overall effect: Z = 1.19 (P = 0.23)

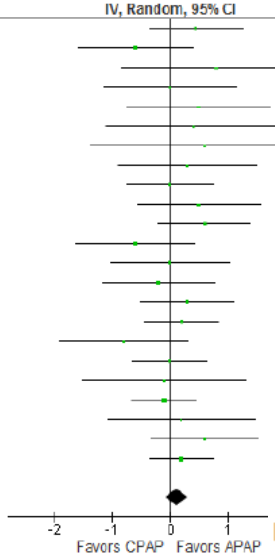


Figure S67. APAP vs. CPAP (Osler & MWT)

Study or Subgroup	APAP Mean	APAP SD	APAP Total	CPAP Mean	CPAP SD	CPAP Total	Weight	Std. Mean Difference IV, Random, 95% CI
Maurice 1995	26.9	12	8	26.1	14.6	8	2.7%	0.06 [-0.92, 1.04]
Nussbaumer 2006	37.2	6	30	34.4	9.3	30	10.0%	0.35 [-0.16, 0.86]
Senn 2003	35	8.3	29	35.8	5.9	29	9.8%	-0.11 [-0.62, 0.41]
Series 2001a	28.1	11.6	6	22.1	13	6	2.0%	0.45 [-0.70, 1.60]
Series 2001b	26.1	9.2	10	27	10.8	10	3.4%	-0.09 [-0.96, 0.79]
Vennelle 2010	35.7	9.1	181	35.3	8.1	181	61.2%	0.05 [-0.16, 0.26]
West 2006	40	7.1	31	40	9.4	34	11.0%	0.00 [-0.49, 0.49]
Total (95% CI)			**295**			**298**	**100.0%**	**0.06 [-0.10, 0.22]**

Heterogeneity: Tau² = 0.00; Chi² = 2.30, df = 6 (P = 0.89); I² = 0%
Test for overall effect: Z = 0.76 (P = 0.45)

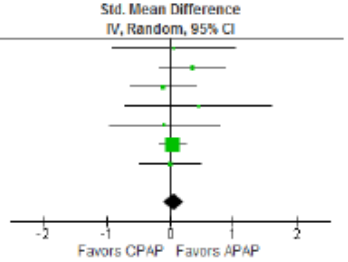


Figure S68. APAP vs. CPAP (FOSQ & SAQLI)

Study or Subgroup	APAP Mean	APAP SD	APAP Total	CPAP Mean	CPAP SD	CPAP Total	Weight	Std. Mean Difference IV, Random, 95% CI
Berry 2014	15.2	3.2	66	15.6	3.4	59	34.8%	-0.09 [-0.44, 0.26]
Kushida 2011	17.1	2.2	47	16.7	3.3	47	26.2%	0.14 [-0.26, 0.55]
To 2008	4.8	1.3	41	4.8	1.3	41	22.9%	0.00 [-0.43, 0.43]
West 2006	5.5	6.9	29	4.9	5.6	29	16.2%	0.09 [-0.43, 0.60]
Total (95% CI)			**183**			**176**	**100.0%**	**0.02 [-0.19, 0.23]**

Heterogeneity: Tau² = 0.00; Chi² = 0.80, df = 3 (P = 0.85); I² = 0%
Test for overall effect: Z = 0.19 (P = 0.85)

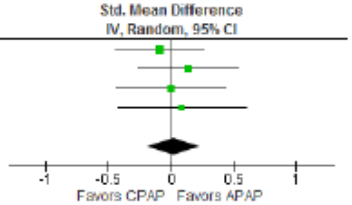
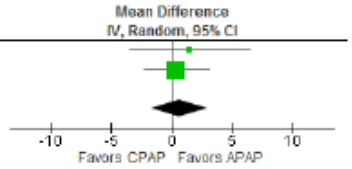


Figure S69. APAP vs. CPAP (SF-36 PCS)

Study or Subgroup	APAP Mean	APAP SD	APAP Total	CPAP Mean	CPAP SD	CPAP Total	Weight	Mean Difference IV, Random, 95% CI
Maurice 2007	49	6.3	51	47.5	9	14	21.7%	1.50 [-3.52, 6.52]
Vennelle 2010	42.5	12.1	181	42.1	13.5	181	78.3%	0.40 [-2.24, 3.04]
Total (95% CI)			**232**			**195**	**100.0%**	**0.64 [-1.70, 2.98]**

Heterogeneity: Tau² = 0.00; Chi² = 0.14, df = 1 (P = 0.70); I² = 0%
Test for overall effect: Z = 0.54 (P = 0.59)



Fixed-pressure CPAP versus auto-adjusting CPAP: comparison of efficacy on blood pressure in obstructive sleep apnoea, a randomised clinical trial

Pépin JL, *et al*. *Thorax* 2016;**71**:726–733.

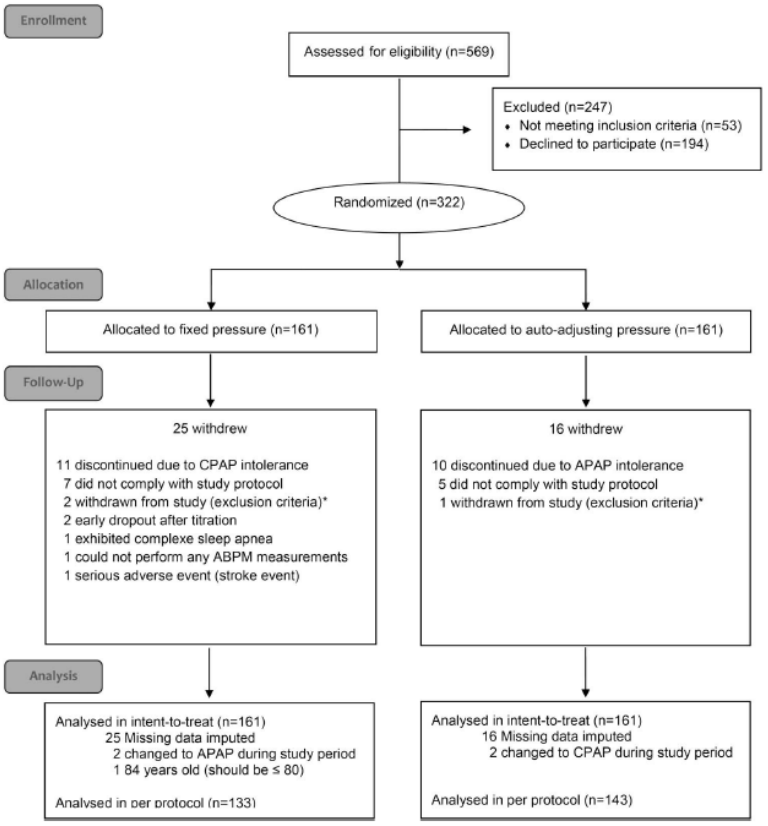


Table 4 Effect of CPAP treatments on BP levels in the per-protocol population

	FP-CPAP (n=133)			AutoCPAP (n=143)			Intergroup raw		Intergroup adjusted*	
BP, mm Hg	Baseline	Follow-up	p Value	Baseline	Follow-up	p Value	Differences (95% CI)	p Value	Differences (95% CI)	p Value
Office SBP	136.0±15.4	132.9±14.2	0.007	134.6±17.1	133.9±16.7	0.52	−2.4 (−5.5 to 0.7)	0.13	−1.8 (−4.6 to 1.0)	0.20
Office DBP	79.5±9.6	76.1±9.3	<0.001	80.5±9.7	78.0±8.9	0.001	−1.0 (−3.0 to 1.0)	0.35	−1.4 (−3.2 to 0.3)	0.11
24 h SBP	129.0±12.6	126.8±11.4	0.012	127.8±13.5	127.6±12.9	0.82	−2.0 (−4.4 to 0.3)	0.09	−1.7 (−3.9 to 0.5)	0.13
24 h DBP	78.8±8.2	76.7±7.5	<0.001	78.6±8.2	77.8±7.5	0.08	−1.3 (−2.6 to −0.03)	0.046	−1.3 (−2.4 to −0.1)	0.032
24 h mean BP	95.4±8.2	93.4±7.5	<0.001	94.8±8.8	94.1±7.9	0.24	−1.4 (−2.9 to 0.2)	0.08	−1.2 (−2.5 to 0.2)	0.09
Daytime SBP	134.4±13.8	131.8±11.9	0.001	132.5±13.6	132.5±12.9	0.94	−2.5 (−5.2 to 0.2)	0.07	−1.8 (−4.2 to 0.5)	0.13
Daytime DBP	82.8±9.0	80.3±8.3	<0.001	82.5±8.5	81.3±8.1	0.031	−1.4 (−2.8 to 0.1)	0.07	−1.3 (−2.6 to 0.1)	0.07
Daytime mean BP	99.6±9.2	97.0±8.2	<0.001	98.6±8.9	97.9±8.2	0.28	−1.9 (−3.6 to −0.1)	0.041	−1.6 (−3.1 to −0.01)	0.049
Nighttime SBP	119.3±12.6	117.7±12.6	0.12	119.3±15.3	118.8±14.3	0.58	−1.0 (−3.6 to 1.6)	0.45	−1.0 (−3.4 to 1.4)	0.40
Nighttime DBP	71.4±7.9	70.3±7.4	0.040	71.5±9.0	71.3±7.8	0.81	−1.0 (−2.6 to 0.5)	0.19	−1.0 (−2.4 to 0.3)	0.13
Nighttime mean BP	87.6±8.1	86.6±8.0	0.12	87.8±10.1	87.4±8.9	0.49	−0.6 (−2.3 to 1.2)	0.52	−0.6 (−2.2 to 0.9)	0.43

Data are presented as mean±SD.
*Adjusted by baseline BP values.
AutoCPAP, auto-adjusted CPAP; BP, blood pressure; DBP, diastolic blood pressure; FP-CPAP, fixed-pressure CPAP; SBP, systolic blood pressure.

What is the bottom line?

- In this double-blind, randomised clinical trial of parallel groups involving 322 patients with OSA indicated for CPAP treatment, although fixed pressure and auto-adjusting CPAP had similar impact on clinical blood pressure (primary outcome), fixed pressure CPAP was more effective than auto-adjusting CPAP in reducing 24 h diastolic blood pressure (secondary outcome).

Recommendation 6

Figure S75. BPAP vs. CPAP (AHI, events/hr)

Study or Subgroup	BPAP Mean	BPAP SD	BPAP Total	CPAP Mean	CPAP SD	CPAP Total	Weight	Mean Difference IV, Random, 95% CI
Blau 2011	2.5	3.8	15	4.3	5.3	17	80.9%	-1.80 [-4.97, 1.37]
Gay 2003	3.7	4.4	12	7.6	11.9	15	19.1%	-3.90 [-10.42, 2.62]
Total (95% CI)			27			32	100.0%	-2.20 [-5.05, 0.65]

Heterogeneity: Tau² = 0.00; Chi² = 0.32, df = 1 (P = 0.57); I² = 0%
Test for overall effect: Z = 1.51 (P = 0.13)

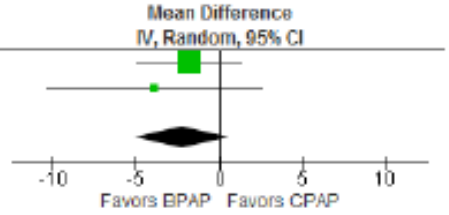
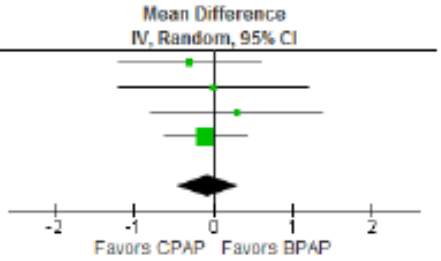


Figure S76. BPAP vs. CPAP (Adherence, hrs/night)*

Study or Subgroup	BPAP Mean	BPAP SD	BPAP Total	CPAP Mean	CPAP SD	CPAP Total	Weight	Mean Difference IV, Random, 95% CI
Blau 2011	5.3	1.5	15	5.6	1	17	19.1%	-0.30 [-1.20, 0.60]
Gay 2003	5.6	1.7	12	5.6	1.4	15	10.7%	0.00 [-1.19, 1.19]
Powell 2012	4.7	1.8	26	4.4	2	22	13.0%	0.30 [-0.78, 1.38]
Reeves-Hoche 1995	4.9	1.2	26	5	0.72	36	57.2%	-0.10 [-0.62, 0.42]
Total (95% CI)			79			90	100.0%	-0.08 [-0.47, 0.32]

Heterogeneity: Tau² = 0.00; Chi² = 0.73, df = 3 (P = 0.87); I² = 0%
Test for overall effect: Z = 0.39 (P = 0.71)

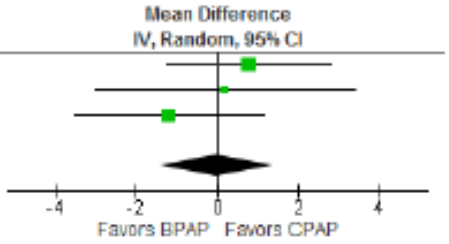


*Studies included patients who were previously untreated with PAP

Figure S77. BPAP vs. CPAP (ESS)*

Study or Subgroup	BPAP Mean	BPAP SD	BPAP Total	CPAP Mean	CPAP SD	CPAP Total	Weight	Mean Difference IV, Random, 95% CI
Blau 2011	7.6	2	15	6.8	3.7	17	46.8%	0.80 [-1.23, 2.83]
Gay 2003	8	4.8	15	7.8	3.6	12	18.3%	0.20 [-3.04, 3.44]
Powell 2012	6.9	4.4	22	8.1	3.8	26	34.9%	-1.20 [-3.55, 1.15]
Total (95% CI)			52			55	100.0%	-0.01 [-1.40, 1.38]

Heterogeneity: Tau² = 0.00; Chi² = 1.61, df = 2 (P = 0.45); I² = 0%
Test for overall effect: Z = 0.01 (P = 0.99)



*Studies included patients who were previously untreated with PAP

Recommendation 6

- We suggest that clinicians use CPAP or APAP over BPAP in the routine treatment of OSA in adults. *(CONDITIONAL)*

  Remarks: The decision to use BPAP should be based on the clinician's judgement and needs of the individual patient.

  This recommendation is for the initial treatment of OSA and does not address management of patients who have previously failed CPAP or APAP.

  The treatment of other forms of sleep-related breathing disorders associated with hypercapnia, which may require the use of BPAP, are covered in other AASM guidelines.

Recommendation 7

- We recommend that educational interventions be given prior to initiation of PAP therapy in adults with OSA. *(STRONG)*

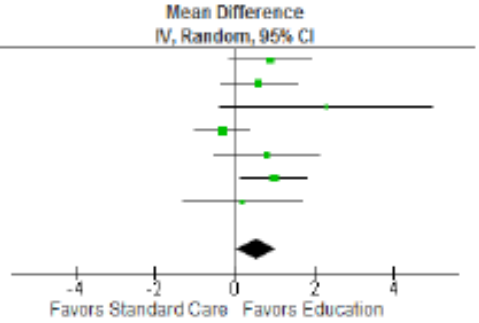
  Remark: Educational interventions include those focused primarily on providing information prior to initiation of PAP about what OSA is, its downstream consequences, what PAP therapy is, and the potential benefits of PAP therapy.

  - 7 RCTs; critical outcomes included adherence
  - ⊕⊕⊕⊖
  - B>h
  - 

Figure S78. Education + PAP vs. Usual Care + PAP (Adherence, hrs/night)

Study or Subgroup	Education Mean	SD	Total	Standard care Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Aloia 2007	4.4	2.6	47	3.5	2.4	41	15.3%	0.90 [-0.15, 1.95]
Aloia 2013	4.3	2.4	53	3.7	2.5	49	17.2%	0.60 [-0.35, 1.55]
Chervin 1997	6.7	2.3	26	4.4	3.4	7	3.4%	2.30 [-0.37, 4.97]
Guralnick 2017	3.1	2.6	99	3.4	2.5	113	24.1%	-0.30 [-0.99, 0.39]
Maurice 2007b	6.3	2.2	22	5.5	2.4	25	11.1%	0.80 [-0.52, 2.12]
Sarac 2017	5.2	2.1	52	4.2	2.5	63	19.8%	1.00 [0.16, 1.84]
Wang 2012	3.9	2.3	23	3.7	2.5	18	9.2%	0.20 [-1.29, 1.69]
Total (95% CI)			**322**			**316**	**100.0%**	**0.55 [0.04, 1.06]**

Heterogeneity: Tau² = 0.16; Chi² = 9.22, df = 6 (P = 0.16); I² = 35%
Test for overall effect: Z = 2.12 (P = 0.03)



Recommendation 8

- We suggest that behavioral and/or troubleshooting interventions be given during the initial period of PAP therapy in adults with OSA. *(CONDITIONAL)*

  Remarks: Behavioral interventions include those focused on behavior change prior to and during the initiation and subsequent use of PAP therapy using strategies such as cognitive behavioral therapy or motivational enhancement.

  Troubleshooting interventions include those focused on close patient communication to identify PAP-related problems and to initiate potential solutions during the initial period of PAP therapy.

  The intervention period may include interactions prior to, during, and after PAP titration and follow-up.

  - 15 RCTs; critical outcomes included adherence
  - ⊕⊕⊕⊖
  - B>h
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Recommendation 9

- We suggest that clinicians use telemonitoring-guided interventions during the initial period of PAP therapy in adults with OSA. *(CONDITIONAL)*

  Remark: Telemonitoring includes the remote monitoring of PAP parameters such as PAP use, residual OSA severity, unintentional mask leaks, and PAP settings during treatment initiation and follow-up.

  - 5 RCTs; critical outcomes include adherence, sleepiness, and side effects
  - ⊕⊕⊕⊖
  - B>h
  - 

Figure S83. Telemonitoring + PAP vs. Usual Care + PAP (adherence, hrs/day)

Study or Subgroup	PAP+telemonitoring Mean	SD	Total	PAP Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Fox 2012	3.2	2.4	28	1.8	2	26	12.9%	1.40 [0.22, 2.58]
Hoet 2017	5.7	1.6	17	4.2	1.9	20	13.9%	1.50 [0.37, 2.63]
Hwang 2018	4.9	2.3	138	3.9	2.6	129	39.1%	1.00 [0.42, 1.58]
Stepnowsky 2007	4.1	1.6	20	2.8	2.2	20	11.6%	1.30 [0.05, 2.55]
Turino 2017	5.1	2.1	50	4.8	2.2	50	22.6%	0.20 [-0.64, 1.04]
Total (95% CI)			253			245	100.0%	0.98 [0.53, 1.42]

Heterogeneity: Tau² = 0.05; Chi² = 4.85, df = 4 (P = 0.30); I² = 17%
Test for overall effect: Z = 4.26 (P < 0.0001)

Mean Difference IV, Random, 95% CI

-4 -2 0 2 4
Favors Standard Care Favors Telemonitoring

Figure S84. Telemonitoring + PAP vs. Usual Care + PAP (ESS)

Study or Subgroup	PAP+telemonitoring Mean	SD	Total	PAP Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Fox 2012	8.3	5	28	9	5	26	16.6%	-0.70 [-3.37, 1.97]
Hwang 2018	-3	3.7	93	-3.7	4.7	83	74.6%	0.70 [-0.56, 1.96]
Stepnowsky 2007	9.2	6.6	20	9.9	5.2	20	8.7%	-0.70 [-4.38, 2.98]
Total (95% CI)			141			129	100.0%	0.34 [-0.74, 1.43]

Heterogeneity: Tau² = 0.00; Chi² = 1.20, df = 2 (P = 0.55); I² = 0%
Test for overall effect: Z = 0.62 (P = 0.53)

Mean Difference IV, Random, 95% CI

-4 -2 0 2 4
Favors Standard Care Favors Telemonitoring

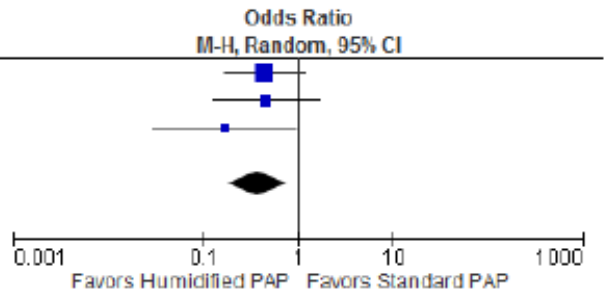
Additional Considerations

- Clinicians should also consider:
  - Modified pressure profile PAP
  - Mask selection
  - Humidified PAP

Figure S106. Humidified PAP vs. Standard PAP (Dry Mouth/Throat, incidence)

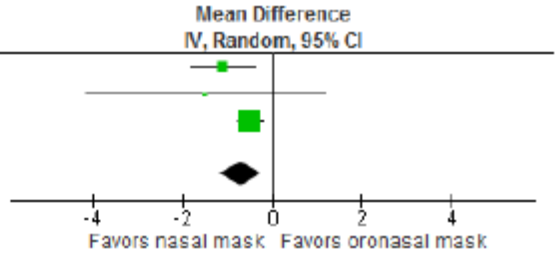
Study or Subgroup	Humidified PAP Events	Total	Standard PAP Events	Total	Weight	Odds Ratio M-H, Random, 95% CI
Neill 2003	10	37	17	37	53.2%	0.44 [0.16, 1.15]
Salgado 2008	6	17	12	22	28.7%	0.45 [0.12, 1.67]
Sommer 2014	2	20	8	20	17.1%	0.17 [0.03, 0.92]
Total (95% CI)		**74**		**79**	**100.0%**	**0.37 [0.18, 0.76]**
Total events	18		37			

Heterogeneity: Tau² = 0.00; Chi² = 1.04, df = 2 (P = 0.59); I² = 0%
Test for overall effect: Z = 2.72 (P = 0.007)



Study or Subgroup	Oronasal Mask Mean	SD	Total	Nasal Mask Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Bachour 2013	4.7	2.8	69	5.8	2.8	572	29.0%	-1.10 [-1.80, -0.40]
Beecroft 2003	4	2.3	3	5.5	1.8	41	2.9%	-1.50 [-4.16, 1.16]
Borel 2013	5	2.7	605	5.5	3.4	1443	68.1%	-0.50 [-0.78, -0.22]
Total (95% CI)			**676**			**2056**	**100.0%**	**-0.70 [-1.16, -0.24]**

Heterogeneity: Tau² = 0.06; Chi² = 2.87, df = 2 (P = 0.24); I² = 30%
Test for overall effect: Z = 3.00 (P = 0.003)



Summary

- Four recommendations are strongly suggested and include:
  - Using PAP to treat excessive sleepiness
  - Initiating PAP therapy with either APAP at home or an in-laboratory CPAP titration
  - Continuing PAP therapy for OSA with either CPAP or APAP
  - Using educational interventions to initiate PAP therapy in adults with OSA.

- All other recommendations were conditional and include using PAP to treat impaired sleep-related QOL or concomitant hypertension; implementing CPAP or APAP over BPAP in the routine treatment of OSA; and utilizing behavioral, troubleshooting, and telemonitoring interventions during the initial period of PAP therapy.
- Providers should consider additional strategies that will maximize the individual patient's comfort and adherence such as nasal/intranasal over oronasal mask interface and heated humidification.

Difference between the current guideline and the previous guideline?

- the current guideline recognizes that in OSA with adults that APAP in the home is non-inferior to in-lab PAP titration strategies when initiating therapy
- there is recognition that continued treatment of adults with OSA with either APAP or CPAP results in similar outcomes.
- the new guidelines attempt to focus clinicians on implementing strategies to optimize adherence to PAP, which many patients struggle with.
- educational interventions, behavioral and/or troubleshooting interventions are either recommended or suggested to be given prior to and during the initiation of PAP therapy.
- telemonitoring-guided interventions may have a role in optimizing PAP adherence.

ΕΛΛΗΝΙΚΗ ΠΝΕΥΜΟΝΟΛΟΓΙΚΗ ΕΤΑΙΡΕΙΑ
ΝΟΣΟΚΟΜΕΙΟ ΝΟΣΗΜΑΤΩΝ ΘΩΡΑΚΟΣ ΑΘΗΝΩΝ "Η ΣΩΤΗΡΙΑ" Λ.ΜΕΣΟΓΕΙΩΝ 152 Τ.Κ. 115 27
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ΘΕΡΑΠΕΥΤΙΚΗ ΑΝΤΙΜΕΤΩΠΙΣΗ ΑΠΟΦΡΑΚΤΙΚΟΥ ΣΥΝΔΡΟΜΟΥ ΑΠΝΟΙΩΝ-ΥΠΟΠΝΟΙΩΝ ΚΑΤΑ ΤΟΝ ΥΠΝΟ (ΣΑΥΥ) ΜΕ CPAP. ΑΠΑΙΤΟΥΜΕΝΟΣ ΚΛΙΝΙΚΟΣ-ΕΡΓΑΣΤΗΡΙΑΚΟΣ ΕΛΕΓΧΟΣ/ ΕΜΠΛΕΚΟΜΕΝΟΙ ΦΟΡΕΙΣ /ΠΡΟΫΠΟΘΕΣΕΙΣ ΣΥΝΤΑΓΟΓΡΑΦΗΣΗΣ ΣΥΣΚΕΥΩΝ CPAP/ΤΥΠΟΙ ΣΥΣΚΕΥΩΝ/ΠΑΡΑΚΟΛΟΥΘΗΣΗ ΑΣΘΕΝΩΝ.

Χ. Μερμίγκης , Σ. Σχίζα, Ε. Βαγιάκης

ΟΜΑΔΑ ΔΙΑΤΑΡΑΧΩΝ ΥΠΝΟΥ ΕΛΛΗΝΙΚΗΣ ΠΝΕΥΜΟΝΟΛΟΓΙΚΗΣ ΕΤΑΙΡΕΙΑΣ

3. Καθορισμός αναγκαιότητας ή μη θεραπείας με CPAP.

Μετά την διενέργεια πολυσωματοκαταγραφικής μελέτης ύπνου και τον σαφή καθορισμό του AHI η απόφαση για έναρξη θεραπευτικής αντιμετώπισης με CPAP (μετά από νέα μελέτη τιτλοποίησης πιέσεων υπό CPAP) θα τεθεί εάν :

Ο δείκτης απνοιών-υποπνοιών ανά ώρα ύπνου (AHI) είναι μεγαλύτερος ή ίσος του 15 (AHI ≥ 15 αναπνευστικών επεισοδίων ανά ώρα ύπνου) ή

AHI > 5 και < 15 αναπνευστικά επεισόδια ανά ώρα ύπνου και παρουσία ενός ή περισσοτέρων εκ των κατωτέρω

α. Ημερήσια υπνηλία

β.Γνωσιακές διαταραχές (διαταραχή μνήμης, προσοχής, εκμάθησης, συγκέντρωσης κλπ)

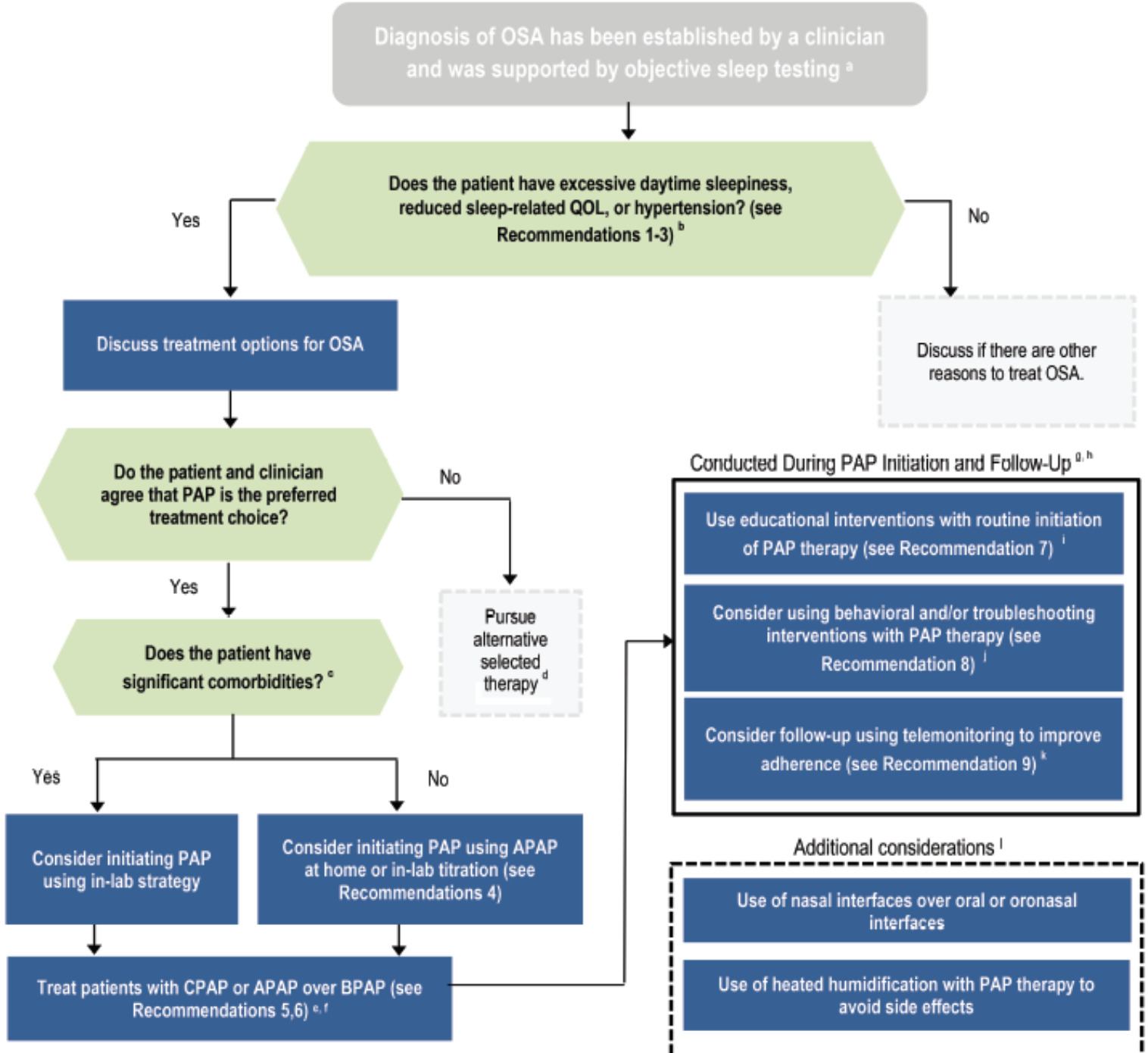
γ. Διαταρχή συναισθήματος ή αϋπνία

δ. Αρτηριακή Υπέρταση

ε. Ισχαιμική καρδιοπάθεια

στ. Ιστορικό εγκεφαλικού επεισοδίου

Figure 1—Flow chart for implementation of clinical practice guideline.



Ευχαριστώ!!!!