Τα οφέλη από τη διακοπή καπνίσματος στο ΣΑΑΥ

Βιβή Παστάκα
Διευθ/ρια ΕΣΥ ΠΓΝΛάρισας

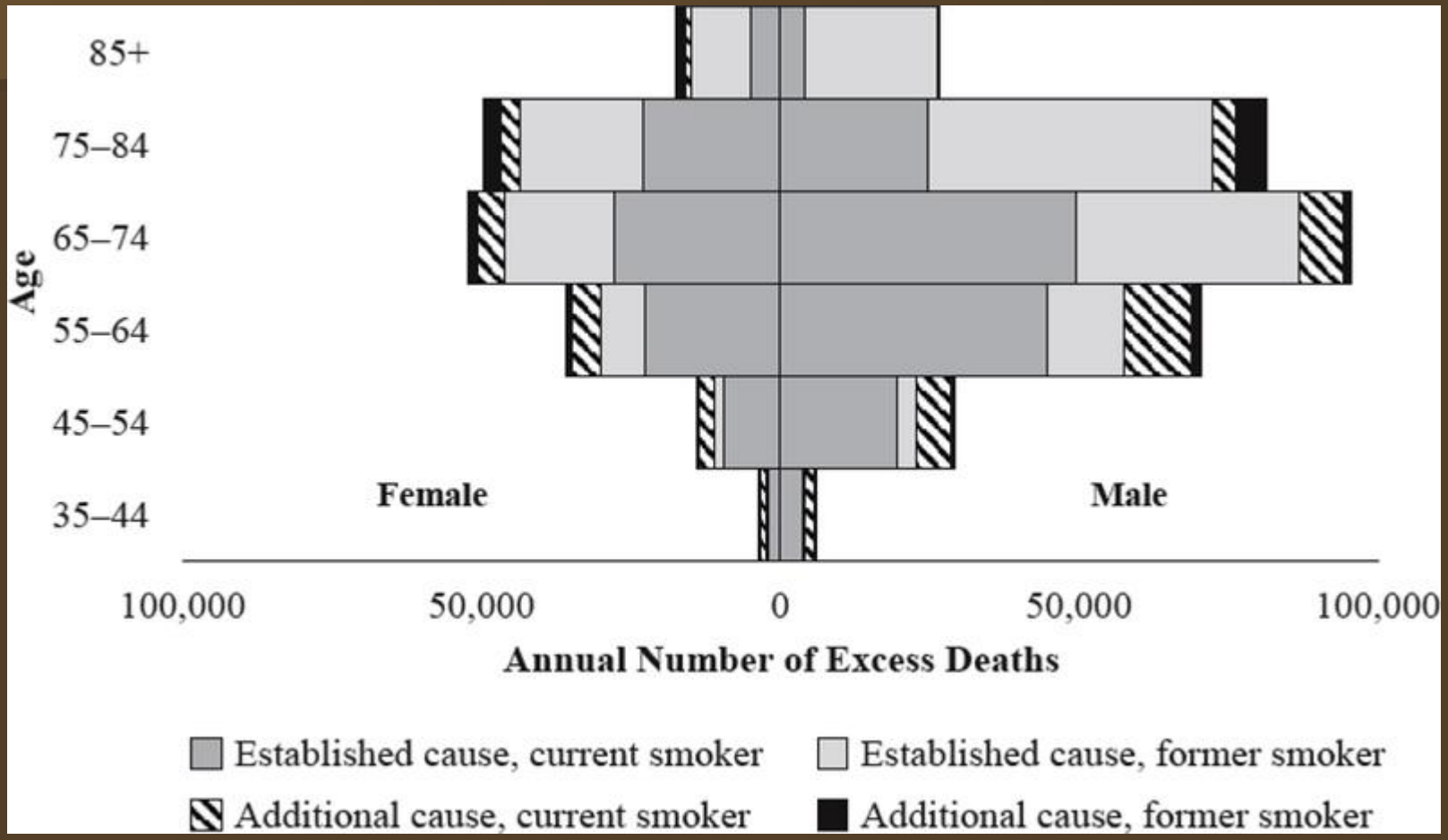

STOP

Cigarette smoking

- the leading cause of preventable mortality in the United States and is a major factor in cardiovascular disease.
- The all-cause mortality rate among smokers is almost 3 times that of those who have never smoked.
- Worldwide, 5 to 6 million people die annually due to the effects of smoking.

JAMA . 2014 ; 311 (2): 141 - 143 .

Cigarette Smoking and All-Cause and Cause-Specific Adult Mortality in the United States



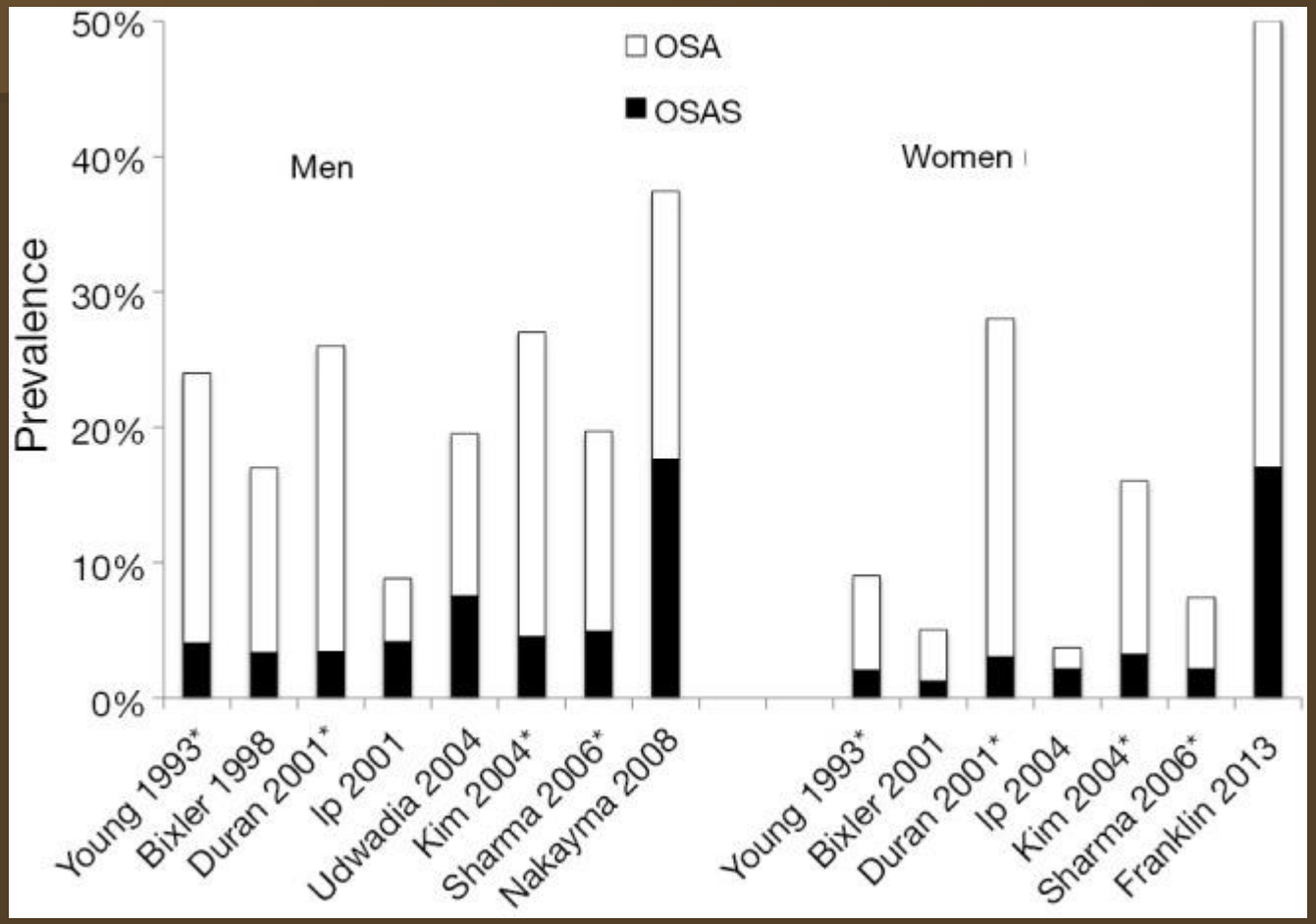
Demography 2018 Oct;55(5):1855-1885

Epidemiological aspects of obstructive sleep apnea

- Obstructive sleep apnea (OSA) is probably the most common respiratory disorder
- 14% and 49% of middle-aged men have clinically significant OSA.

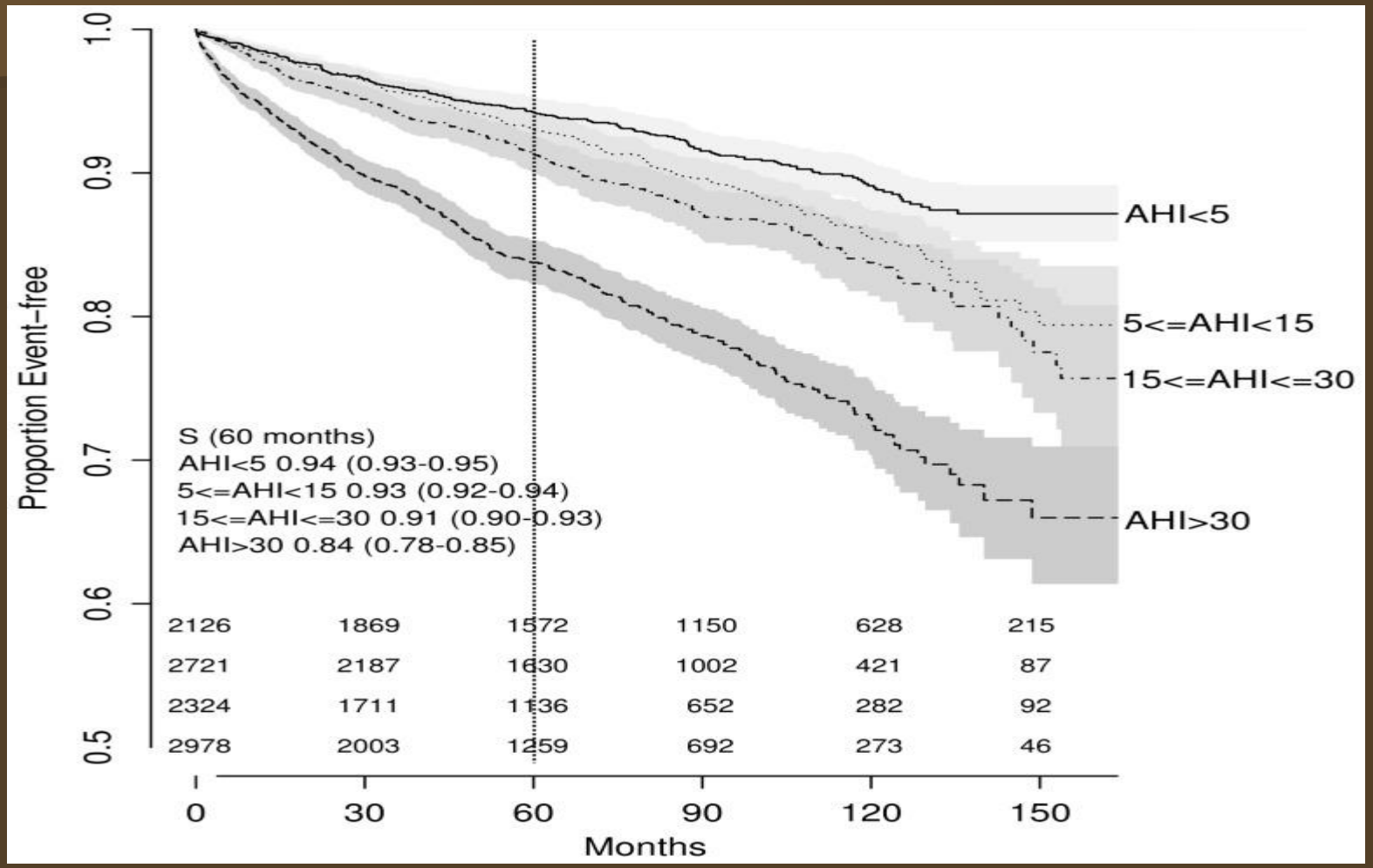
J Thorac Dis 2015 May; 7(5): 920–929.

Obstructive sleep apnea is a common disorder in the population



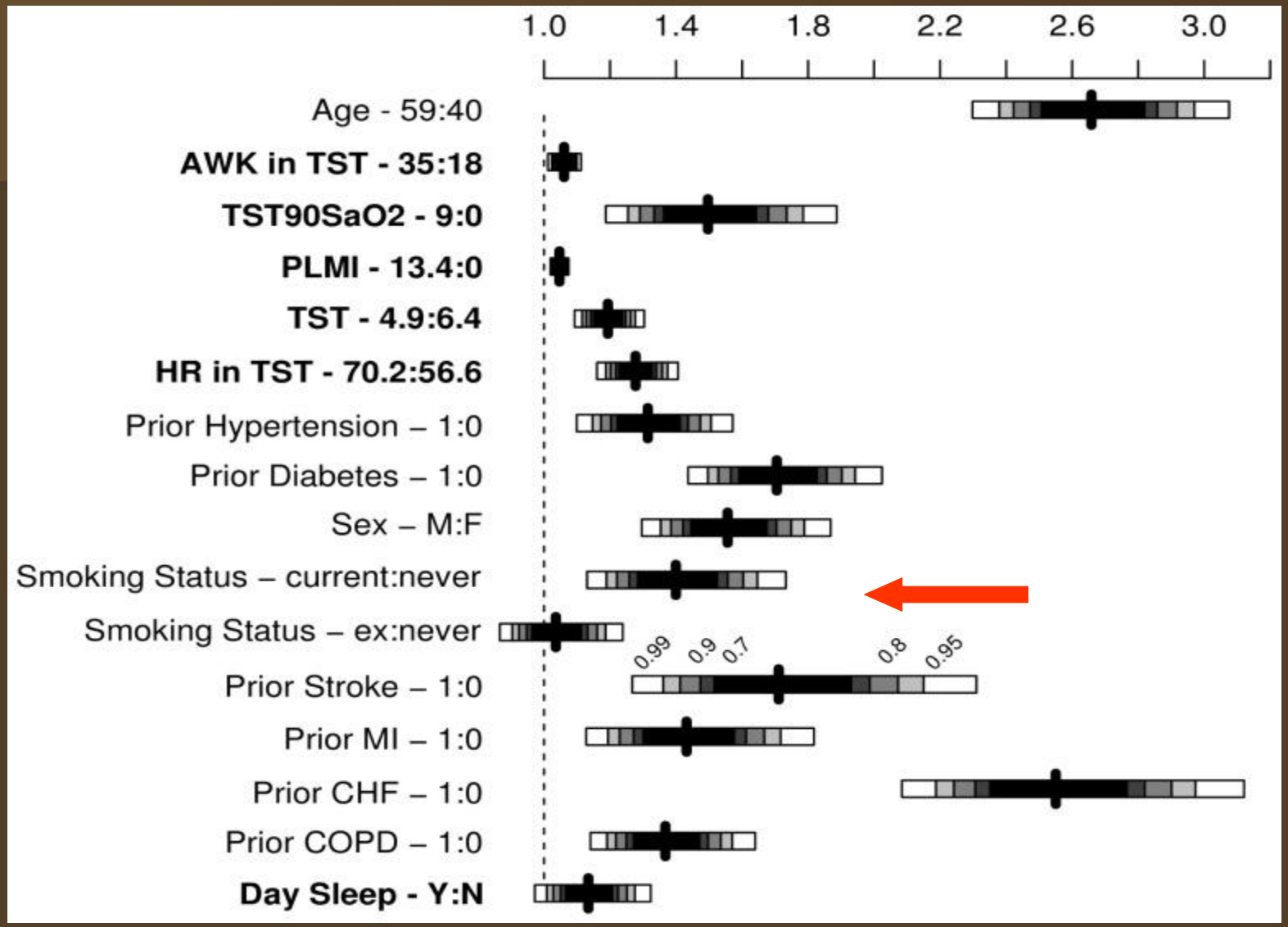
J Thorac Dis 2015 Aug;7(8):1311-22

Obstructive Sleep Apnea and Risk of Cardiovascular Events and All-Cause Mortality: A Decade-Long Historical Cohort Study



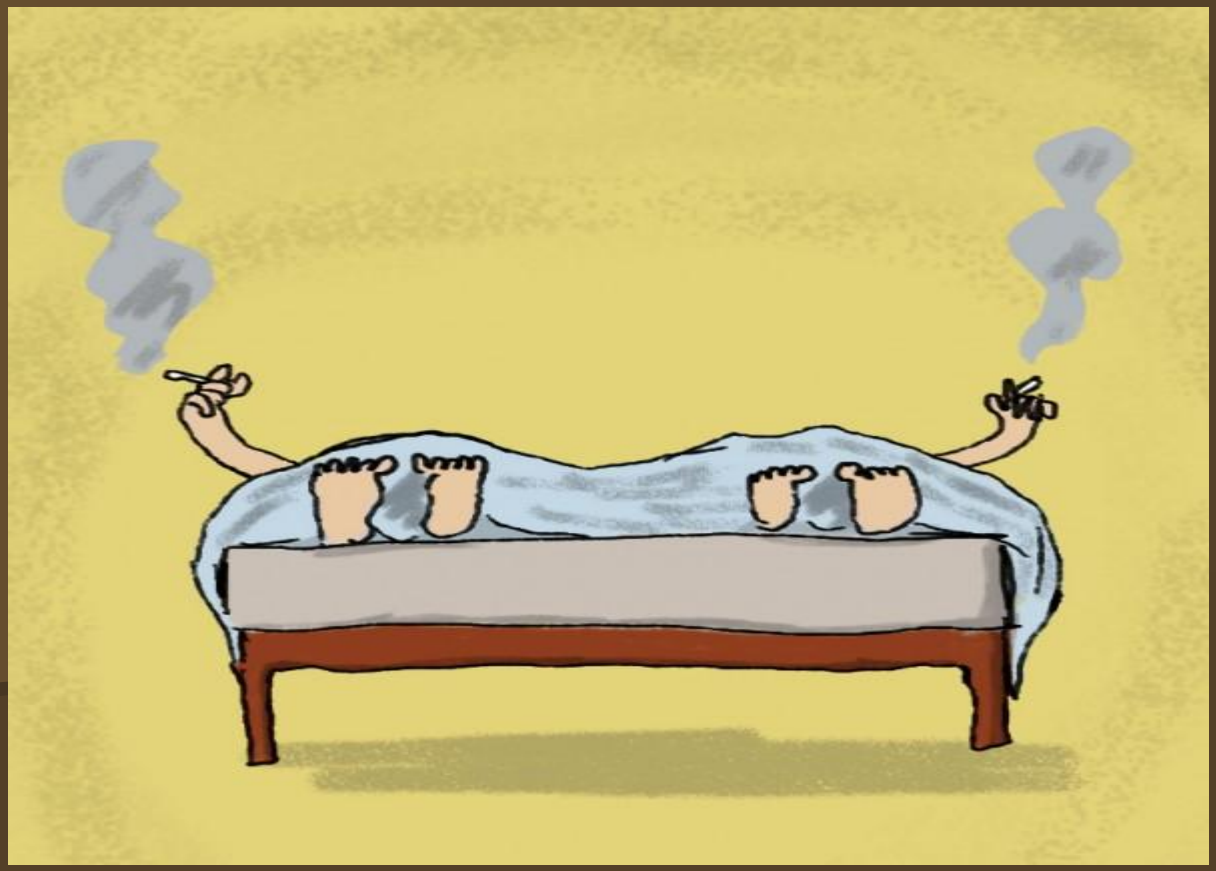
Plos One 2014 Feb; 11(2)

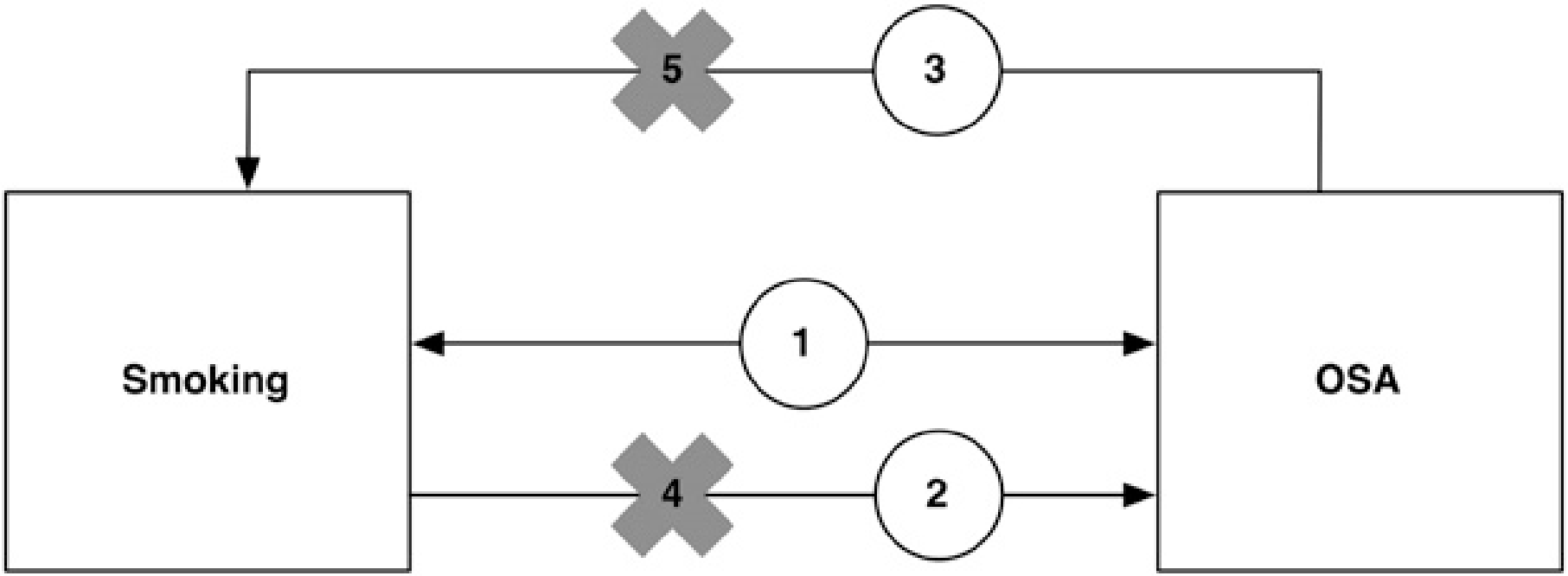
Results from multivariable Cox regression model presented as hazard ratios



Plos One 2014 Feb; 11(2)

Where There Is Smoke… There Is Sleep Apnea





Key Questions:

1. What is the evidence of an association between smoking and OSA?
2. Does smoking increase the risk of developing OSA or exacerbate existing OSA?
3. Does OSA predispose to smoking addiction?
4. Does smoking cessation improve OSA?
5. Does OSA treatment overcome the negative effects of smoking?

CHEST 2014; 146 (6): 1673 - 1680

Higher Prevalence of Smoking in Patients Diagnosed as Having Obstructive Sleep Apnea

- current smokers were found to be 2.5 times more likely to have OSA than former smokers and nonsmokers combined
- former smokers were not more likely than never smokers to have OSA
- cigarette smoke may be an independent risk factor for OSA

Sleep Breath .2001 ; 5 (4): 167 - 172 .

Association between obstructive sleep apnea and alcohol, caffeine and tobacco: **A meta-analysis**.

Among 3,442 identified studies, 14 were included. 11 studies were classified as moderate RoB and 3 as high RoB.

- Meta-analysis showed OSA has no association with tobacco and presented a positive association with alcohol.

J Oral Rehabil. 2018 Nov;45(11):890-902

The association between cigarette smoking and obstructive sleep apnea

- In total, 733 subjects were recruited; among these, 151 were smokers and 582 were non-smokers.
- (OR=1.02, 95% CI: 0.66–1.57).
- poor sleep quality and excessive daytime sleepiness among cigarette smokers
- any significant association between cigarette smoking and OSA after adjusting for age, sex, and BMI.

Tob. Induc. Dis. 2019; 17: 27.

The impact of smoking status on obstructive sleep apnea (OSA) severity.

- 3613 patients with OSA . (22%) were current smokers.
- active smokers may develop OSA **earlier** and OSA in current smokers may be **more severe**.

European Respiratory Journal 2018 52: Suppl. 62

How Does Smoking Affect Sleep?

Does Smoking Cause OSA?

- Smoking and Changes in Sleep Architecture
- Smoking and Upper Airway Neuromuscular Reflexes /and Arousal Threshold
- Smoking and Upper Airway Inflammation

Smoking and Changes in Sleep Architecture

Sleep disturbances associated with cigarette smoking.

Current smokers (CS) reported significantly

- less total sleep time,
- poorer sleep than nonsmokers
- longer sleep onset latency,
- increased difficulty falling asleep,
- maintaining sleep,
- and waking up earlier than desired
- Former smokers reported disturbances similar to NS

Psychol Health Med . 2014 ; 19 (4):410 - 419

How smoking affects sleep: a polysomnographical analysis.

- Plasma cotinine level correlated negatively with slow wave sleep in the smoking group.
- Smokers had a shorter sleep period time,
- longer sleep latency,
- higher arousal index,
- higher rapid eye movement sleep (REM) density,
- more sleep apneas and
- leg movements in sleep than non-smokers

Sleep Med .2012 ; 13 (10): 1286 - 1292 .

Power spectral analysis of EEG activity during sleep in cigarette smokers.

- smokers had a lower percentage of EEG power in the delta-bandwidth ($p < 0.04$) and higher percentage of EEG power in alpha-bandwidth ($p < 0.001$).
- Differences were greatest in the **early part of the sleep** period and decreased toward the end.
- Subjective complaints of lack of restful sleep were also more prevalent in smokers than in nonsmokers ($p < 0.02$)

Chest .2008 ; 133 (2): 427 - 432 .

second-hand smoke exposure

The association between sleep disturbance and second-hand smoke exposure:

a large-scale, nationwide, cross-sectional study of adolescents in Japan.

- **insomnia symptoms** such as difficulty initiating sleep (DIS), difficulty maintaining sleep (DMS) and early morning awakening (EMA),
- **sleep disturbance symptoms** such as subjectively insufficient sleep and short sleep duration (<6 h), tended to be higher both among never-smoking adolescents with SHS exposure and among smoking adolescents, as compared with never-smoking
- SHS exposure is associated with sleep disturbance.

Sleep Med 2018 Oct;50:29-35.

Smoking and Upper Airway Neuromuscular Reflexes

Effects of postnatal smoke exposure on laryngeal chemoreflexes in newborn lambs

exposure to cigarette smoke

- ⇩ respiratory response ($P < 0.05$)
- ⇩ cardiac and
- ⇩ decrease swallowing and
- ⇩ arousal during LCR ($P < 0.1$).

J Appl Physiol (1985) . 2010 ; 109 (6): 1820 - 1826 .

Cigarette smoke exposure effects on the brainstem expression of **nicotinic acetylcholine receptors (nAChRs),** and on cardiac, respiratory and sleep physiologies

- The major brainstem sites affected include those that play vital roles in cardiorespiration, chemosensation and arousal.
- Changes in nAChRs in the brainstem sites during development leads to disruption in the normal neural development and functions of these sites.

Respir Physiol Neurobiol. 2019 Jan;259:1-15.

Smoking and Arousal Threshold:

Effect of smoking habits on sleep

- current smokers exhibited a higher arousal index compared with nonsmokers and more total sleep time with oxyhemoglobin saturation < 90% (*P* , .05), there was no increase in AHI.

- current smoking may not induce upper airways collapse, but that once collapse occurs, the upper airways' reflexive mechanisms are not as effective in restoring airway patency.

Braz J Med Biol Res . 2008 ; 41 (8): 722 - 727 .

The impact of active and former smoking on the severity of obstructive sleep apnea.

- Desaturation time during sleep was found to be significantly longer in the group of former smokers in comparison to never smokers ($p = 0.005$).
- as the apnea hypopnea index increased AHI, the mean pack × years rose significantly ($p = 0.01$).
- cigarette smoking was associated with **early age disease**; heavy smokers had **more severe OSA**.

Sleep Breath. 2015 Dec;19(4):1279-84

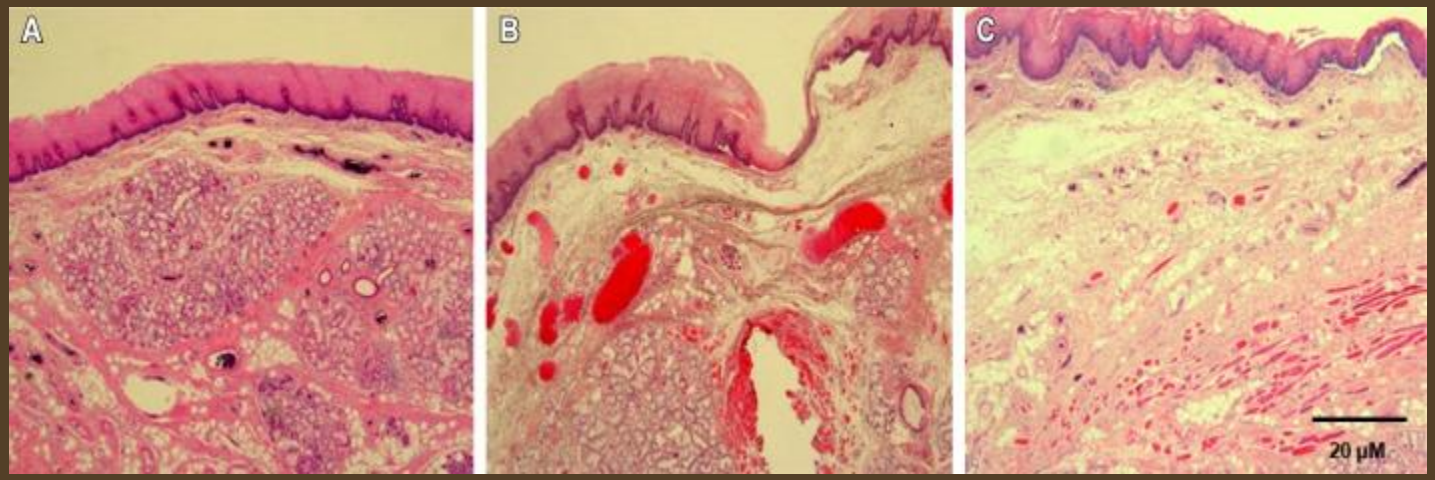
Smoking and Upper Airway Inflammation:

Smoking Induces **Oropharyngeal Narrowing** and Increases the Severity of Obstructive Sleep Apnea Syndrome

- all subjects with moderate to severe OSA exhibited increased thickness and edema of the uvular mucosa lamina propria.
- patients who smoked also showed increased CGRP calcitonin gene-related peptide (a neuroinflammatory marker) in the uvular mucosa, contributing to the upper airway inflammation in these patients.
- The finding of histologic changes to the upper airway mucosa with smoke exposure supports the theory that additional airway inflammation is caused by smoking

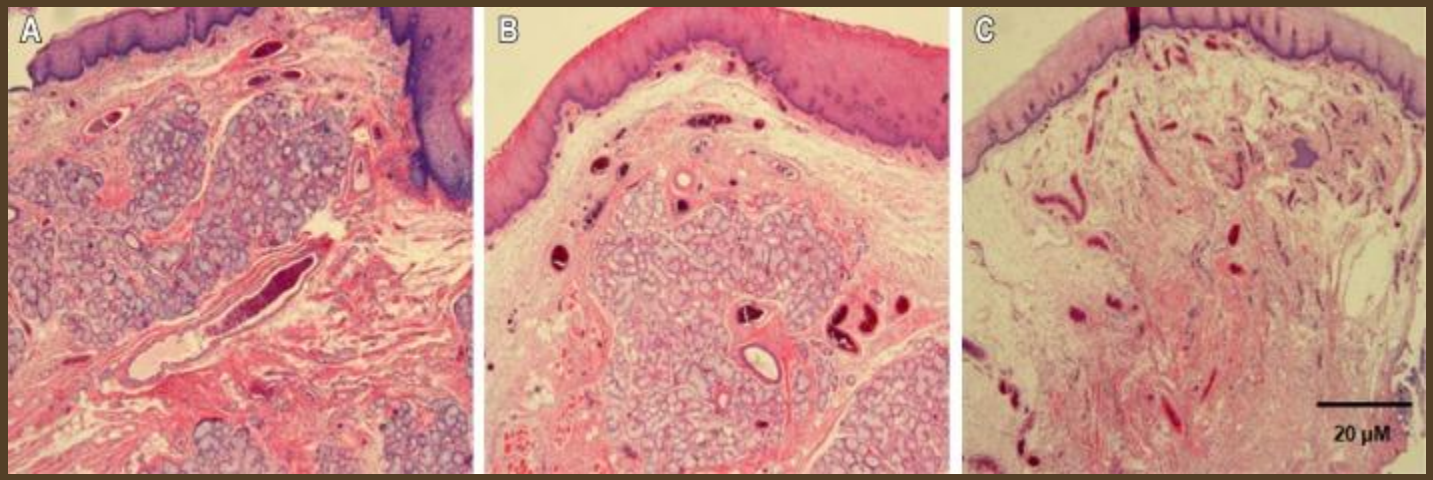
J Clin Sleep Med 2012;8(4):367-374

Histological changes in the lamina propria of the uvula mucosa in OSAS patients according to OSAS severity



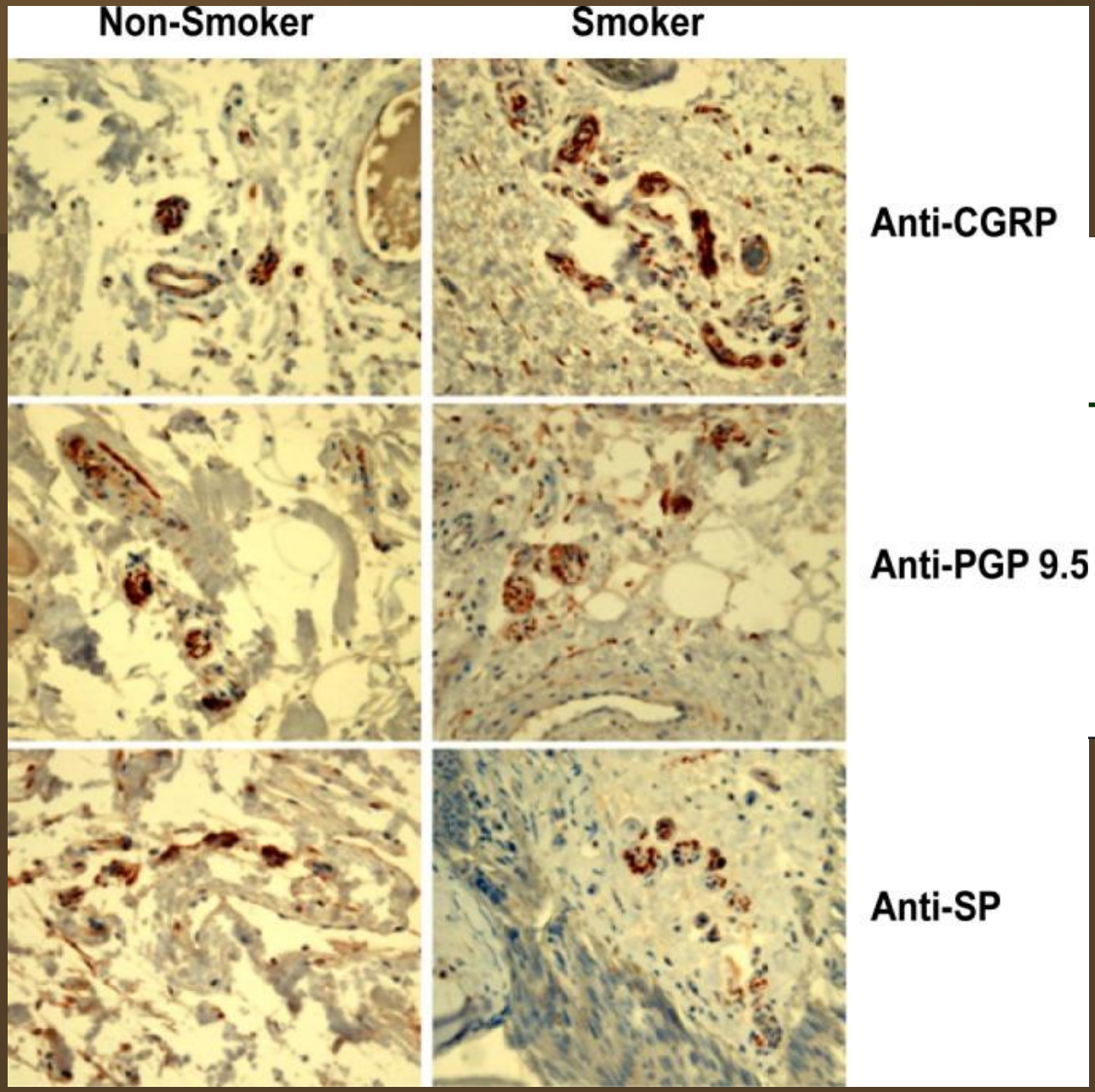
J Clin Sleep Med 2012;8(4):367-374.

Histological changes in the lamina propria of the upper airway mucosa in OSAS patients according to smoking history



J Clin Sleep Med 2012;8(4):367-374.

Immunohistochemical staining for CGRP, PGP 9.5, and SP by smoking history



	Smokers		
	≤ 10 PY	> 10 PY	p-value
CGRP	1.58 ± 0.90	2.31 ± 1.01	0.045*
SP	3.00 ± 1.48	3.50 ± 1.86	0.57
PGP 9.5	3.33 ± 1.96	3.81 ± 2.51	0.725

CGRP, calcitonin gene-related peptide; PGP 9.5, protein gene product 9.5; SP, substance P; PY, pack year; *$p < 0.05$.

J Clin Sleep Med 2012;8(4):367-374

Does OSA Predispose to Smoking?

OSA

- Non restorative sleep
- difficulty waking up
- daytime hypersomnolence

self-medicate through **smoking**

Schrand JR. Is sleep apnea a predisposing factor for tobacco use? Med Hypotheses. 2006

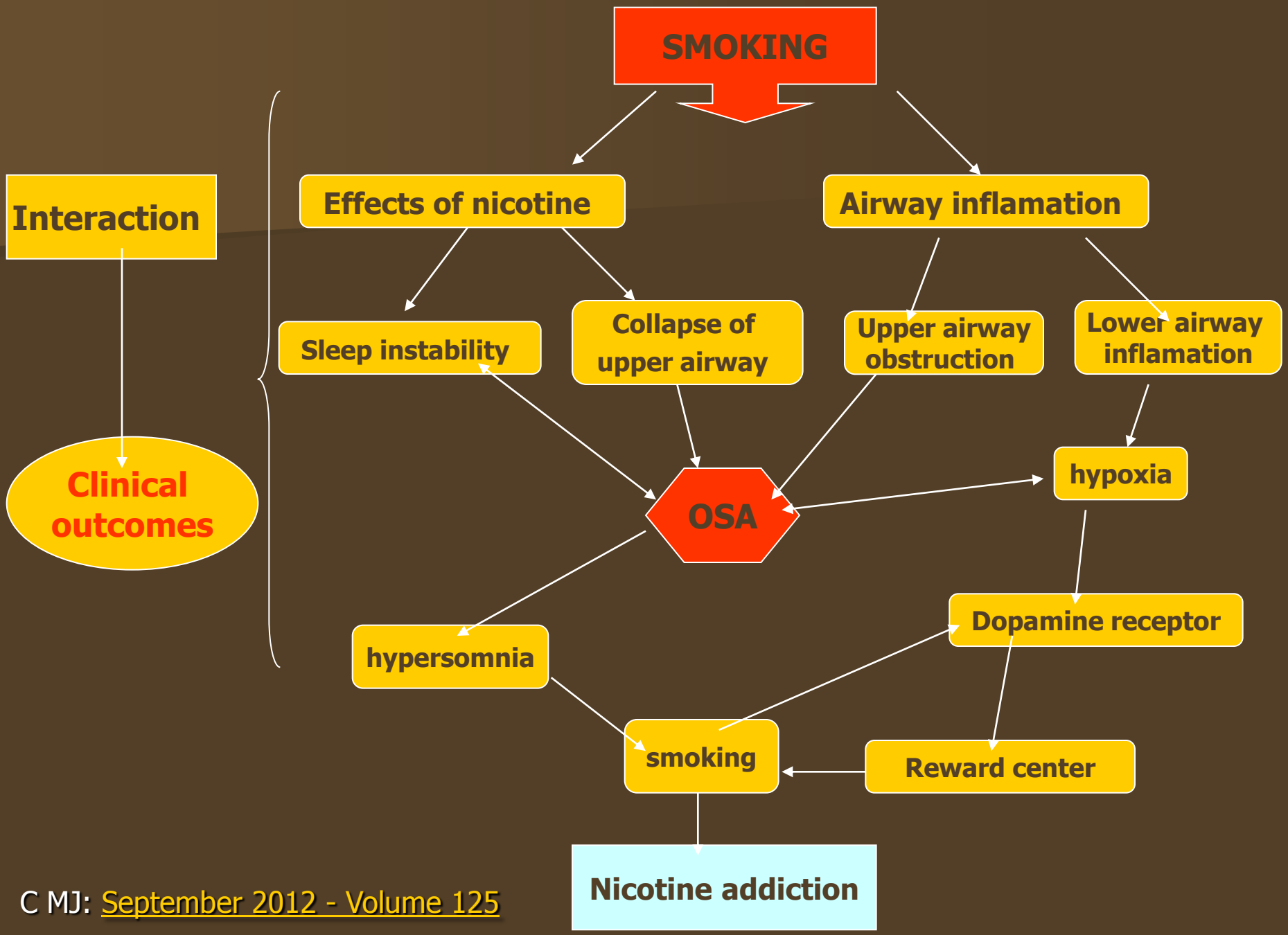
Neuroplasticity within the mesoaccumbens dopamine system and its role in tobacco dependence.

- **Nicotine** → **dopamine levels** in the nucleus accumbens.
- arousal and a sensation of reward, both of which have the potential to lead to addiction.

- **Hypoxia** → **dopamine levels** in the carotid body.
- long-term hypoxia (as observed in OSA) may be responsible for **more nicotine binding sites** observed in smokers. More available nicotine receptors could lead to an increase in smoking frequency

- societal pressures, such as the desire for mental alertness and a slender physique, may influence tobacco use in the obese, sleepy individual with OSA.

Curr Drug Targets CNS Neurol Disord. 2002;1(4):413-421



C MJ: September 2012 - Volume 125


Lowfat Milk
AL

Subcutaneous administration of nicotine changes dorsal raphe serotonergic neurons discharge rate during REM sleep.

- Nicotine can also induce stimulation of serotonergic neurons
- Stimulation of these neurons is responsible for **mood improvements** in patients with major depression who smoke.
- Both depression and mood disorders are common in patients with sleep apnea

Brain Res. 2001;888(2):321-325.

Does Smoking Cessation Improve OSA?

Smoking cessation can be considered by

- duration of the cessation
- by method of cessation (eg, without assistance, with nicotine replacement therapy, or with other pharmacologic aids)
- by the indirect effects of cessation.

In the first 1 to 2 days after smoking cessation

- increased **insomnia** and **irritability**,
- sleep quality is impaired, mimic OSA symptoms

but as these withdrawal symptoms subside,

- **sleep quality improves** and the risk of sleep-disordered breathing lessens.

CHEST 2014; 146 (6): 1673 - 1680

Transdermal Nicotine Patch Effects on EEG

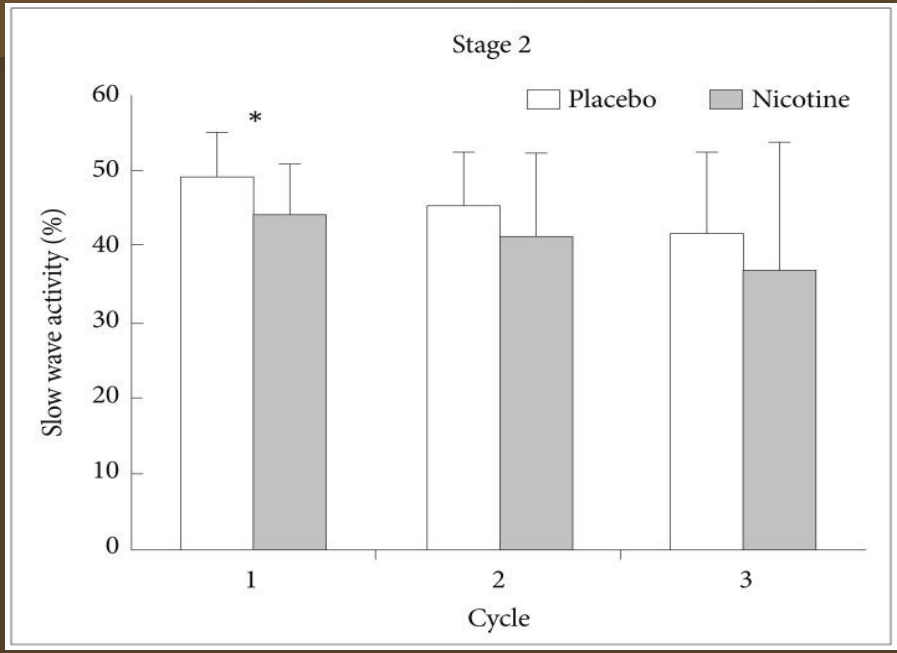
Power Spectra and Heart Rate Variability During Sleep of Healthy Male Adults.

Transdermal nicotine patch significantly disrupts

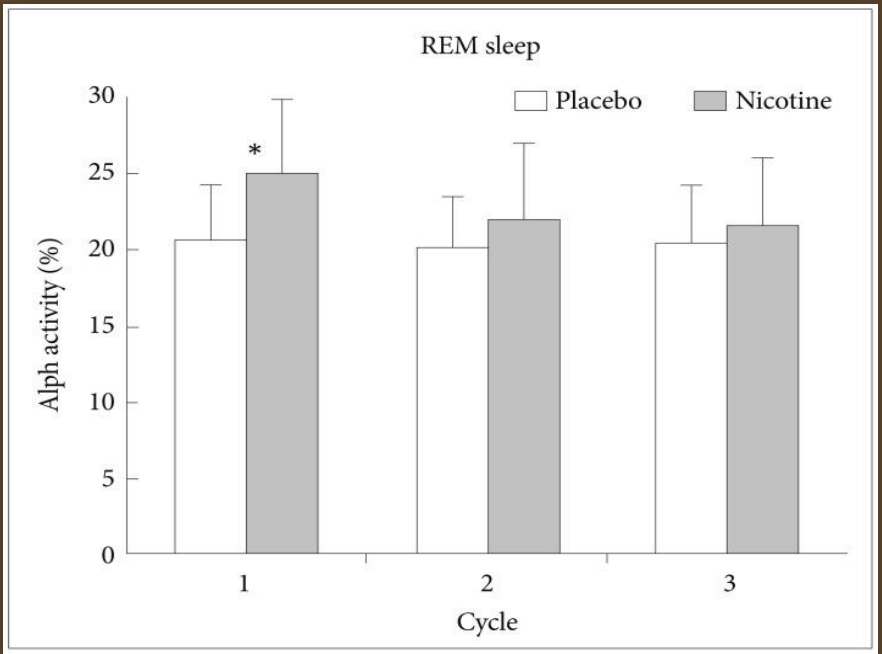
- sleep continuity,
- sleep architecture, and
- homeostatic sleep propensity.
- The overactivation of the sympathetic nervous system may be responsible for these changes.

Psychiatry Investig. 2017 Jul;14(4):499-505.

EEG power density of slow wave activity in stage 2 sleep



EEG power density of alpha activity in REM sleep



Psychiatry Investig. 2017 Jul;14(4):499-505

sleep disturbance caused by cigarette withdrawal does not seem to ameliorate with transdermal nicotine patch

and paradoxically may even be increased.

Psychiatry Investig. 2017 Jul;14(4):499-505.

REM sleep enhancement by **bupropion** in depressed men.

- a negative impact on **sleep continuity**.
- bupropion may even increase the **portion of REM** sleep and decrease REM latency, potentially leading to worsened symptoms, especially for those with increased apneic events in REM sleep.

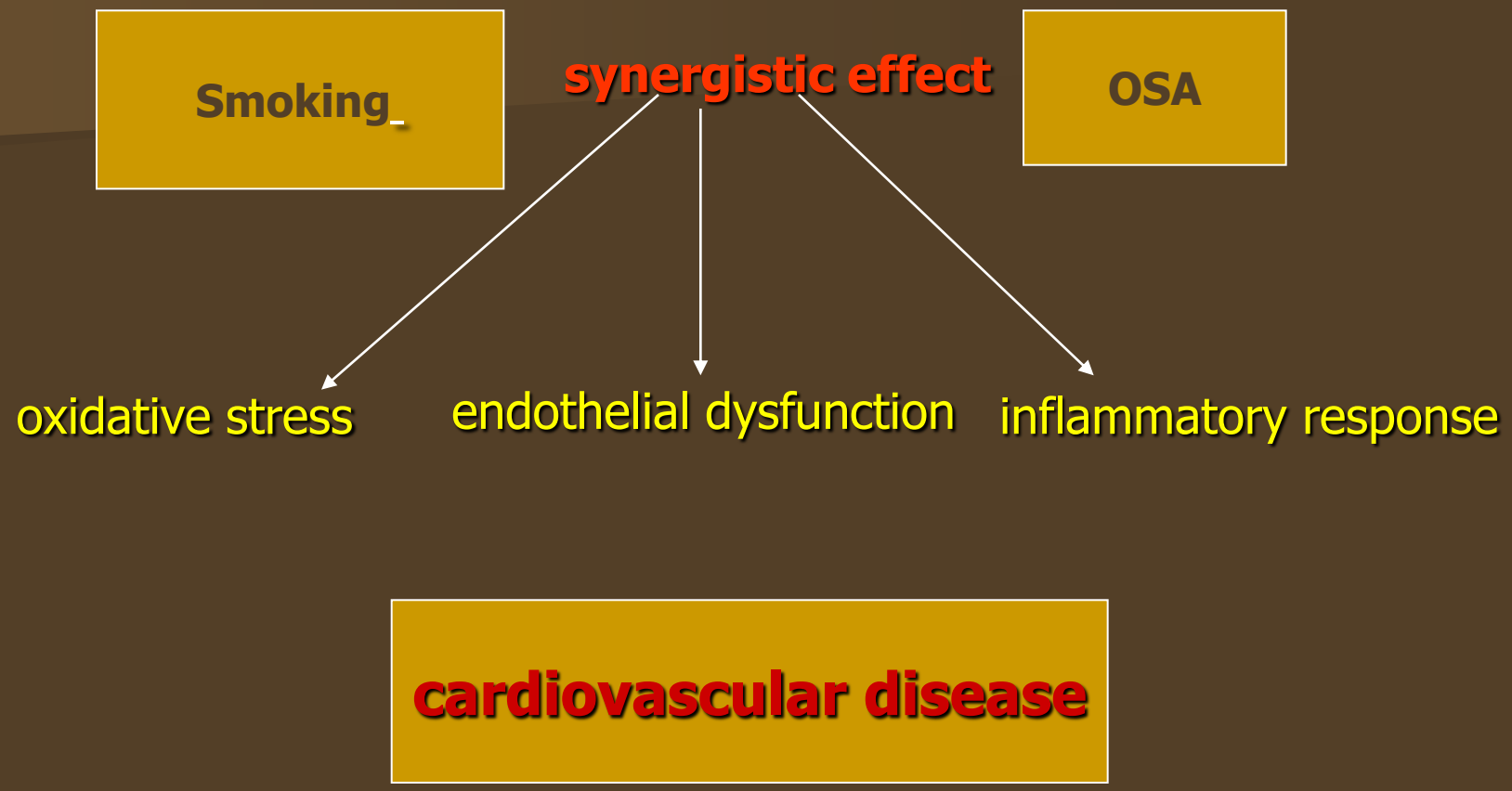
Am J Psychiatry. 1995;152(2):274-276

Median weight gain after cessation is about 2 kg. About 10% of quitters, however, experience a > 13 kg increase in weight.

Endocrin Pract 2018 Jan;24(1):91-120

Interaction between smoking and obstructive sleep apnea: not just participants

C MJ: September 2012 - Volume 125 - Issue 17 - p 3150–3156



Trenchea M et al. Pneumologia. 2013

Indirect Effects of Smoking Cessation on OSA:

decreased morbidity from

cardiopulmonary and

vascular disease.

CHEST 2014; 146 (6): 1673 - 1680

Obstructive Sleep Apnea and Smoking as a Risk Factor for Venous Thromboembolism Events:

Many coagulation disorders favoring thromboembolism have been identified in the case of OSA and smoking . They can be divided into two entities:

- endothelial dysfunction and
- hemostasis disorders.

- Interestingly OSA and smoking share common pathways to the prothrombotic state.

Obes. Surg. 2016 Mar;26(3):640-8

Smoking, obstructive sleep apnea syndrome and their combined effects on metabolic parameters:

Evidence from a large cross-sectional study

- An OSAS × smoking interaction was found in insulin resistance ($p = 0.025$).
- A **synergistic effect** was observed between smoking and OSAS on metabolic disorder parameters.
- Cessation of cigarette smoking may experience minor benefit for insulin resistance and lipid metabolism in patients with OSAS.

Sci Rep 2017; 7: 8851.

The Impact of Obstructive Sleep Apnea and Tobacco Smoking on Endothelial Function

- While OSA, in particular intermittent hypoxemia, and tobacco smoking were independent risk factors,

- the concurrence of **moderate-severe OSA** and **smoking** was associated with the most severe impairment in **endothelial function.**

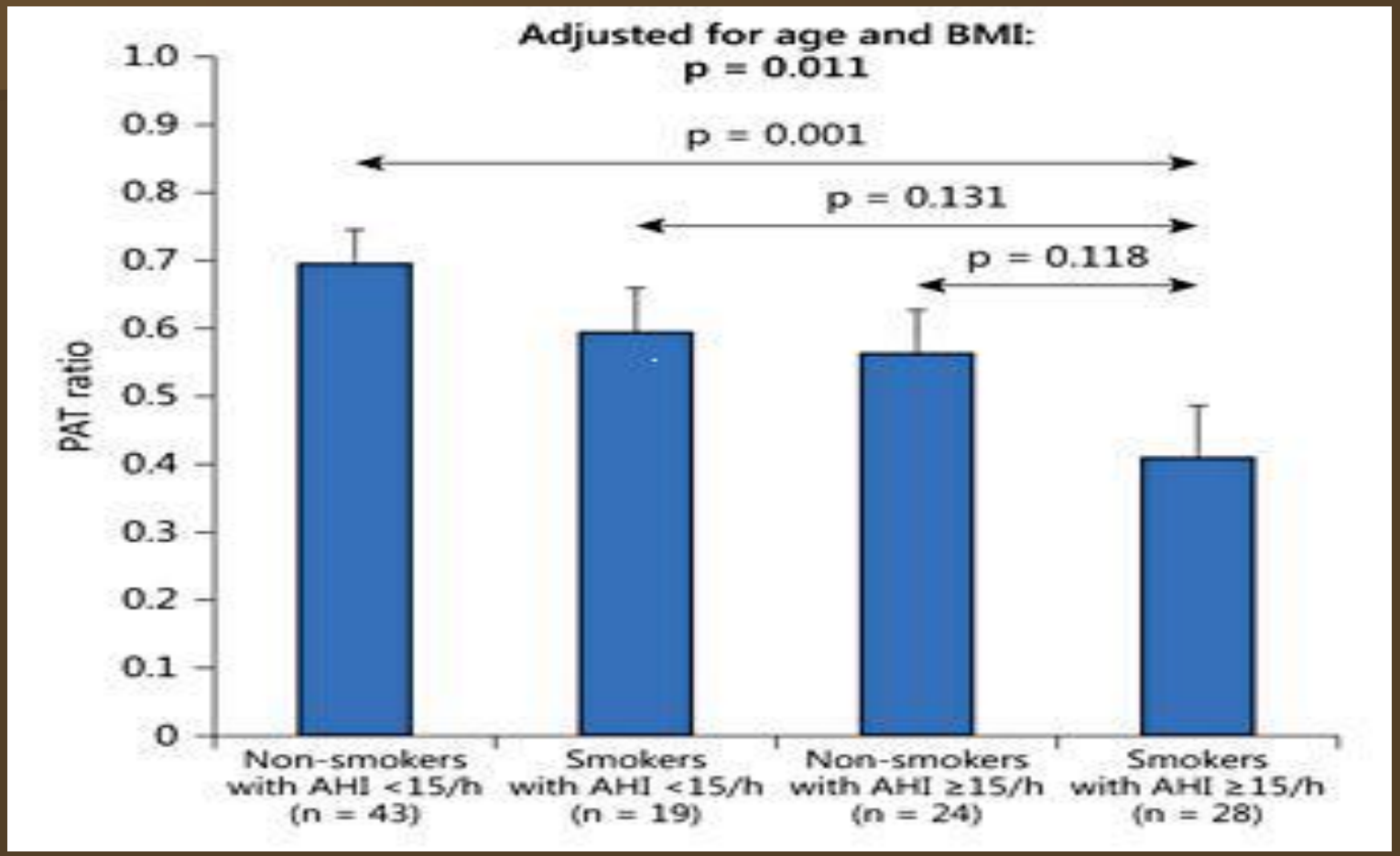
Multiple linear regression analyses showed that :

- severity of intermittent hypoxia,
- Monocyte chemo-attractant protein-1 (MCP-1) and
- pack-year exposure were independent predictors

- of peripheral arterial tonometry **PAT ratio**.

Respiration 2016;91:124-131

The Impact of Obstructive Sleep Apnea and Tobacco Smoking on Endothelial Function



Respiration 2016;91:124-131

Combined effect of obstructive sleep apnea and chronic smoking on cognitive impairment.

- The results suggested that the coexistence of OSA and chronic smoking resulted in more pronounced **cognitive deficits** than either factor along.
- Smoking cessation may benefit cognitive function to some extents in patients with OSA.

Sleep Breath. 2016 Mar;20(1):51-9

Combined effect of obstructive sleep apnea and chronic smoking on cognitive impairment.

118 male patients neurocognitive function tests

including Mini-Mental State Examination (MMSE), Montreal Cognitive Assessment (MoCA), clock drawing test (CDT), and verbal fluency test (VFT).

Variables of those neurocognitive function tests were analyzed with two factors: OSA and smoking.

- Smoking patients with OSA had the worst performance in the four tests compared with the other three groups (smoking patients without OSA, non-smoking patients with and without OSA).
- Ex-smokers with OSA tended to perform better than current smokers, but still worse than never-smokers with OSA in those tests.

Sleep Breath. 2016 Mar;20(1):51-9


CAN YOU GIVE ME ONE REASON WHY HEALTH INSURANCE IS SO HIGH?

Smoking status in relation to obstructive sleep apnea severity (OSA) and cardiovascular comorbidity in patients with newly diagnosed OSA.

- in 3,613 OSA patients
- **Smokers** with OSA had a higher apnea-hypopnea index **(AHI)**, $p = 0.03$], **lower mean oxygenation during sleep** $p < 0.01$] and a higher daytime sleepiness **(ESS)** $p < 0.001$).
- The most frequent **comorbidity** was hypertension, obesity, diabetes mellitus type 2 and coronary artery disease, with a statistically higher incidence of hypertension in non-smokers (59.2 vs 64.7 %, $p = 0.005$).
- smoking is related with OSA severity and increased daytime sleepiness.
- Our study confirmed the elevated frequency of cardiovascular comorbidities in OSA patients in general but did not show an increased incidence of these comorbidities in smokers.

Adv Respir Med. 2019;87(2):103-109.

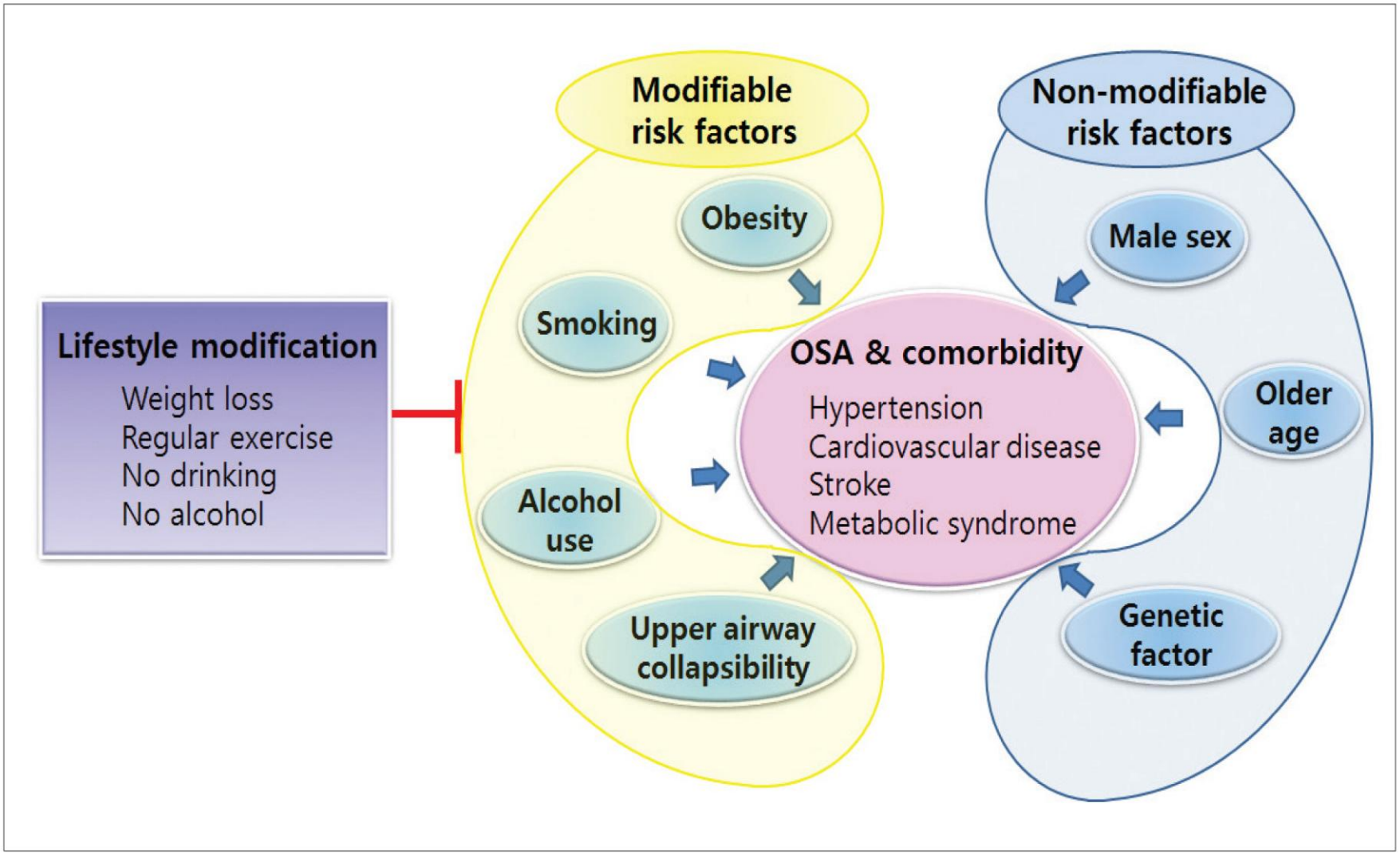
Does OSA Treatment Affect Smoking?

Determinants for adherence to continuous positive airway pressure therapy in obstructive sleep apnea

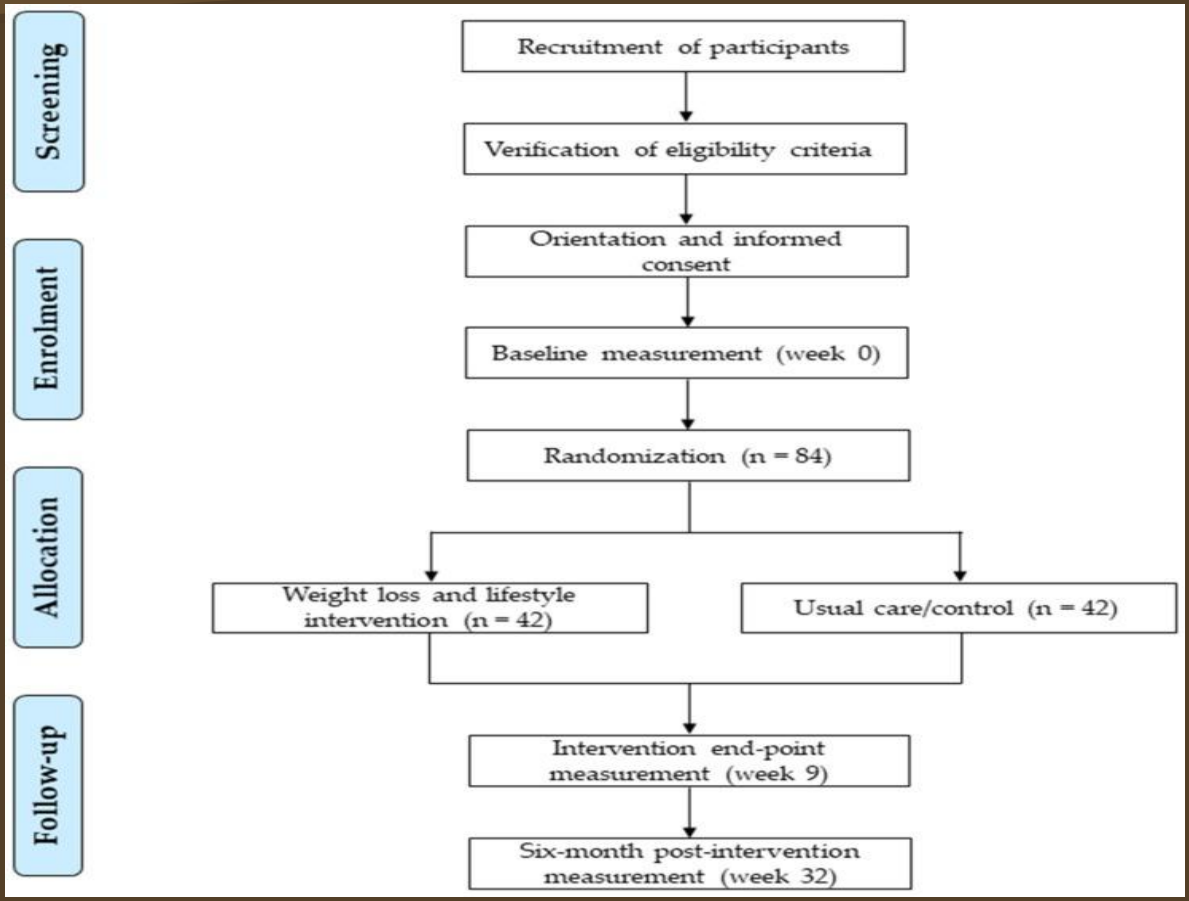
- The severity of OSA evaluated by AHI, subjective daytime sleepiness (ESS) and non-smoking is independently related to adherence to CPAP therapy.

Jacobsen AR et al. PLoS One. (2017)

Lifestyle Modification in Patients with Obstructive Sleep Apnea



Interdisciplinary Weight Loss and Lifestyle Intervention for Obstructive Sleep Apnoea in Adults: Rationale, Design and Methodology of the INTERAPNEA Study



Nutrients 2019 Sep; 11(9): 2227.

Description and timing of the INTERAPNEA intervention

Module	Objectives/Description	Number of Sessions	Frequency of Sessions	General Behavioural Change Techniques
Nutritional behaviour change	Nutrition education and dietary patterns change	8	Once a week	•Motivation and preparation for action •Goal-setting and action-planning •Self-monitoring and functional behavioural analysis •Review of behavioural goals, action plans, and adherence •Problem solving and social skills •Self-efficacy, maintenance, and relapse prevention
Physical exercise	Supervised moderate aerobic exercise and increase daily steps by 15% each week	8	Once a week	
Sleep hygiene	Change of inappropriate sleep habits: Insufficient sleep, consumption of coffee, alcohol and tobacco, and inappropriate sleep schedule and environment	4	Once every two weeks	
Tobacco cessation	Nicotine and cigarette fading: Reduction of nicotine and number of cigarettes by 30% each week	8	Once a week	
Alcohol avoidance	Alcohol consumption fading: Reduction of alcohol consumption by 30% each week	4	Once every two weeks	

Nutrients 2019 Sep; 11(9): 2227

Όνειρα γλυκά