



# Risk of Subsequent Cardiovascular Events among Medicare Beneficiaries Diagnosed with Obstructive Sleep Apnea and Treated with Continuous Positive Airway Pressure

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## Introduction

Obstructive sleep apnea (OSA) is associated with increased risk of cardiovascular disease (CVD) but it remains uncertain whether treatment with Continuous Airway Pressure (CPAP) can prevent major cardiovascular (CV) events, especially among older adults.

## Research Objective

To estimate the incidence of CV events among older Medicare beneficiaries, with and without pre-existing CVD, who initiated CPAP therapy following OSA diagnosis.

## Methods

**Study Design:** Retrospective Cohort Study.

**Data Source:** 5% sample of Medicare administrative claims data.

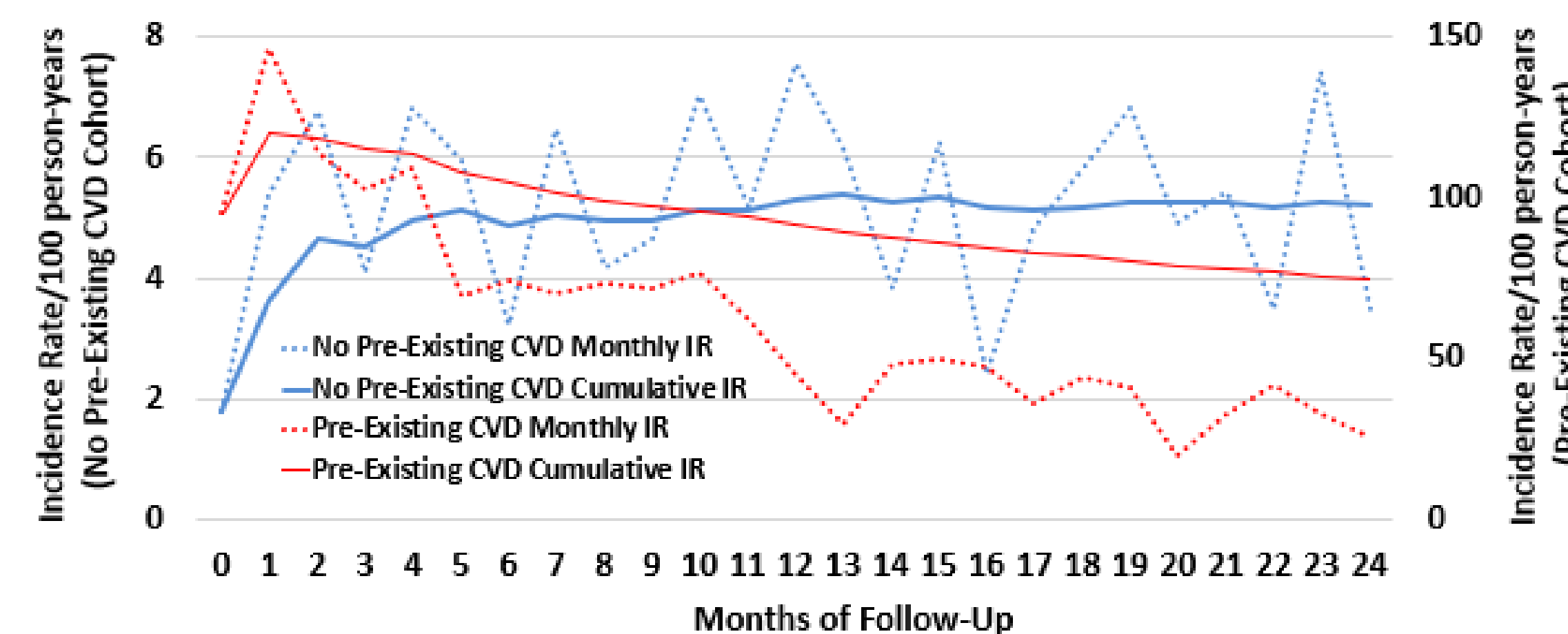
**Participants:** Adults  $\geq 65$  years, newly-diagnosed with OSA, who initiated CPAP (2009-2013).

**Inclusion Criteria:** Continuous Medicare Parts A, B, and D with no Part C coverage 12 months before and 24 months after CPAP initiation.

**Measures:** New CV events were operationalized using ICD-9-CM or CPT codes for the earliest of ischemic heart disease or cardiovascular or peripheral procedures following CPAP initiation. Pre-existing CVD was defined as any of these codes occurring before CPAP initiation.

**Analysis:** Person-time at risk was summed from the date of first CPAP charge to either a new CV event or the end of observation (i.e. 2 years). Incidence rates were estimated by dividing the number of new CV events by person-time at risk and 95% confidence intervals were estimated using standard methods for rates.

Unadjusted Incidence Rates of CV events following CPAP Initiation in Medicare Beneficiaries  $\geq 65$  years, diagnosed with OSA (2009-2013)



Baseline Characteristics of Medicare Beneficiaries  $\geq 65$  years, diagnosed with OSA (2009-2013) who received  $\geq 1$  CPAP charge (N=4,289)

	Total N=4,289	No history of CVD N=2,654	History of CVD N=1,635	p-value
<b>Age (Mean ,SD)</b>	71.6 (5.3)	70.9 (4.9)	72.9 (5.6)	<0.001
<b>Male (n,%)</b>	2,360 (55)	1,312 (49)	1,048 (64)	<0.001
<b>Race (n,%)</b>				0.04
White, Non-Hispanic	3,851 (90)	2,400 (90)	1,451 (89)	
Black, Non-Hispanic	257 (6)	140 (5)	117 (7)	
Other	181 (4)	114 (4)	67 (4)	
<b>Comorbidities (n,%)</b>				
AD and Dementia	252 (6)	119 (5)	133 (8)	<0.001
Anemia	1806 (42)	880 (33)	926 (57)	<0.001
Asthma	713 (17)	377 (14)	336 (21)	<0.001
All cancers	580 (14)	325 (12)	255 (16)	0.002
COPD	1,166 (27)	491 (19)	675 (41)	<0.001
Depression	1,013 (24)	567 (21)	446 (27)	<0.001
Diabetes	1,755 (41)	866 (33)	889 (54)	<0.001
Glaucoma	869 (20)	512 (19)	357 (22)	0.04
Hip Fracture	51 (1)	28 (1)	23 (1)	0.30
Hyperlipidemia	3,571 (83)	2,009 (76)	1,562 (96)	<0.001
Hyperplasia	932 (22)	476 (18)	456 (28)	<0.001
Hypertension	3,720 (88)	2132 (80)	1,588 (97)	<0.001
Hypothyroidism	939 (22)	551 (21)	388 (24)	0.02
Osteoporosis	823 (19)	478 (18)	345 (21)	0.01

## Results

4,289 beneficiaries met study criteria, of which 62% had no previous history of CVD. Most were white and male, with an average age of 71.6 years.

In the 2-year period following CPAP initiation, those without prior CVD had a 10% risk of having a new CV event compared to 73% among those with pre-existing CVD. The unadjusted incidence rate among those without prior CVD was 5.2 new CV events per 100 person-years (95% CI = 4.6-5.4), compared to 74.5 new CV events per 100 person-years among those with pre-existing CVD (95% CI= 70.4-78.2).

## Conclusions

Among beneficiaries newly diagnosed with OSA who initiated CPAP, those with prior CVD history were seven-times more likely to experience subsequent adverse cardiovascular events relative to beneficiaries without pre-existing CVD.

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