

Obstructive Sleep Apnea

Kate V Cole MS¹, R Benjamin Dexter MS², Will McConnell PhD¹, Kimberly L Sterling PharmD, MS¹

1 ResMed Science Center, San Diego, CA USA, 2 ResMed Science Centre, Halifax, NS CAN

BACKGROUND AND RATIONALE

Obstructive sleep apnea (OSA) is a prevalent sleep disorder that affects approximately 1 billion people worldwide.¹ OSA is associated with significant symptoms and health consequences in women yet remains underdiagnosed partly due to differences in presenting symptoms and/or sociocultural factors in comparison to men.²

Positive airway pressure (PAP) therapy is used to treat OSA, yet patients need to be adherent to therapy to realize its benefits. Gender has been evaluated as a predictor of adherence to PAP therapy, but results have not been consistent², leaving much still to be understood about women and their likelihood to adhere to PAP therapy.

Objective: This analysis used real-world data to create a logistic regression model predicting adherence to PAP therapy over 2 years.

METHODS

De-identified United States administrative claims data for patients with OSA were linked to OSA diagnostic test data and objectively-measured PAP usage data from cloud-connected devices.

Adherence to PAP therapy was categorized as either **adherent** or **not adherent**. The first two years of therapy were broken into eight 90-day quarters. Those that used their PAP device for more than 4 hours per night on 70% of nights in a consecutive 30-day period within the 90-day quarter were considered compliant for that quarter. Adherent patients met this compliance metric for all eight quarters in the first two years. Not adherent patients did not meet this compliance metric for at least one of the eight quarters over two years.

Adherent		Not Adherent	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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A logistic regression model based on predicting not adhering to PAP therapy over 2 years was developed using baseline covariates. Covariates included:

- Age
- Geographic region
- Insurance payer
- Disease severity (apnea hypopnea index)
- Comorbid conditions
- Healthcare resource (doctor visits, hospitalizations, emergency room visits) use in the year prior to starting PAP therapy

Age and insurance payer were characterized at the time of the diagnostic sleep test.

Disease severity in OSA is measured using the apnea hypopnea index during the diagnostic sleep test. A higher index score indicates more severe disease.

Comorbidity status was evaluated in the year prior to sleep test by assessing ICD-9/10 codes associated with healthcare encounters.

RESULTS

The model was developed using 5,896 women with OSA (Figure 1). The model fit (AUC ROC) was satisfactory at 66.3%. 34.2% of women were deemed 'Adherent' and 65.8% were deemed 'Not Adherent'.

Average age of the cohort was 53.8y and insurance coverage was 81.9% commercial, 9.3% Medicaid, and 8.8% Medicare Advantage. The average number of comorbidities per person was 3.2, with GERD, depression, anxiety, type 2 diabetes, and insomnia as the most prevalent conditions (Table 1).

Table 1. Cohort Characteristics

Characteristic	Prevalence
Age Group	
18-44	17.7%
45-54	31.8%
55-64	39.4%
65-69	5.4%
≥70	5.6%
Insurance Payer	
Commercial	81.9%
Medicaid	9.3%
Medicare Advantage	8.8%
Region	
West	20.8%
South	26.8%
Northeast	10.4%
Midwest	42.0%
Obesity	
Morbidly obese	29.9%
Obese	31.1%
No listed obesity	39.1%
Comorbidities	
Snoring	39.2%
GERD	29.4%
Depression	28.1%
Anxiety	26.6%
Type 2 diabetes	19.9%
Insomnia	19.5%
Headaches	14.5%
Psychotic disorders	3.1%

Figure 1. Logistic Regression Model Predicting Not Adhering to PAP Therapy over 2 Years

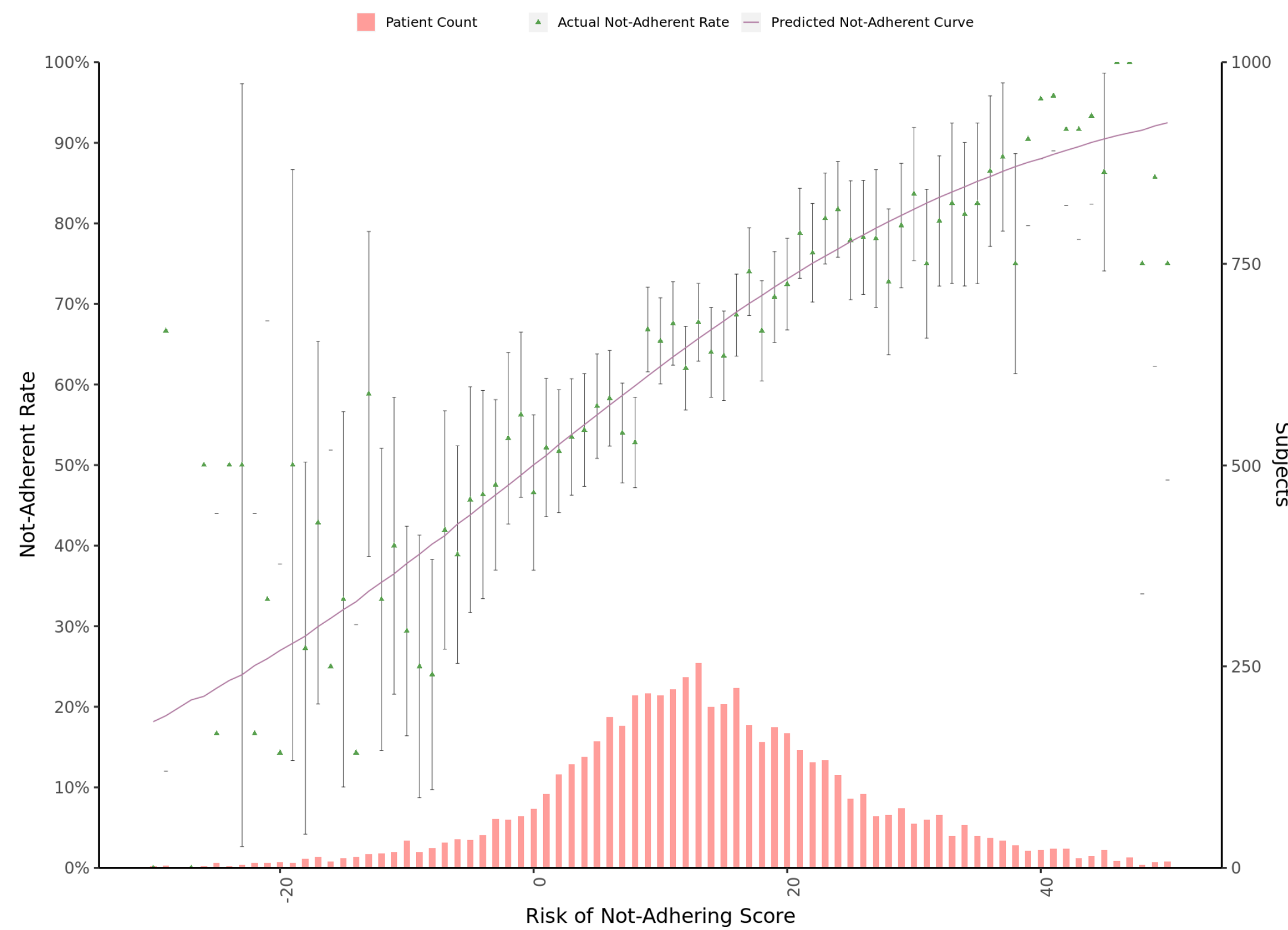
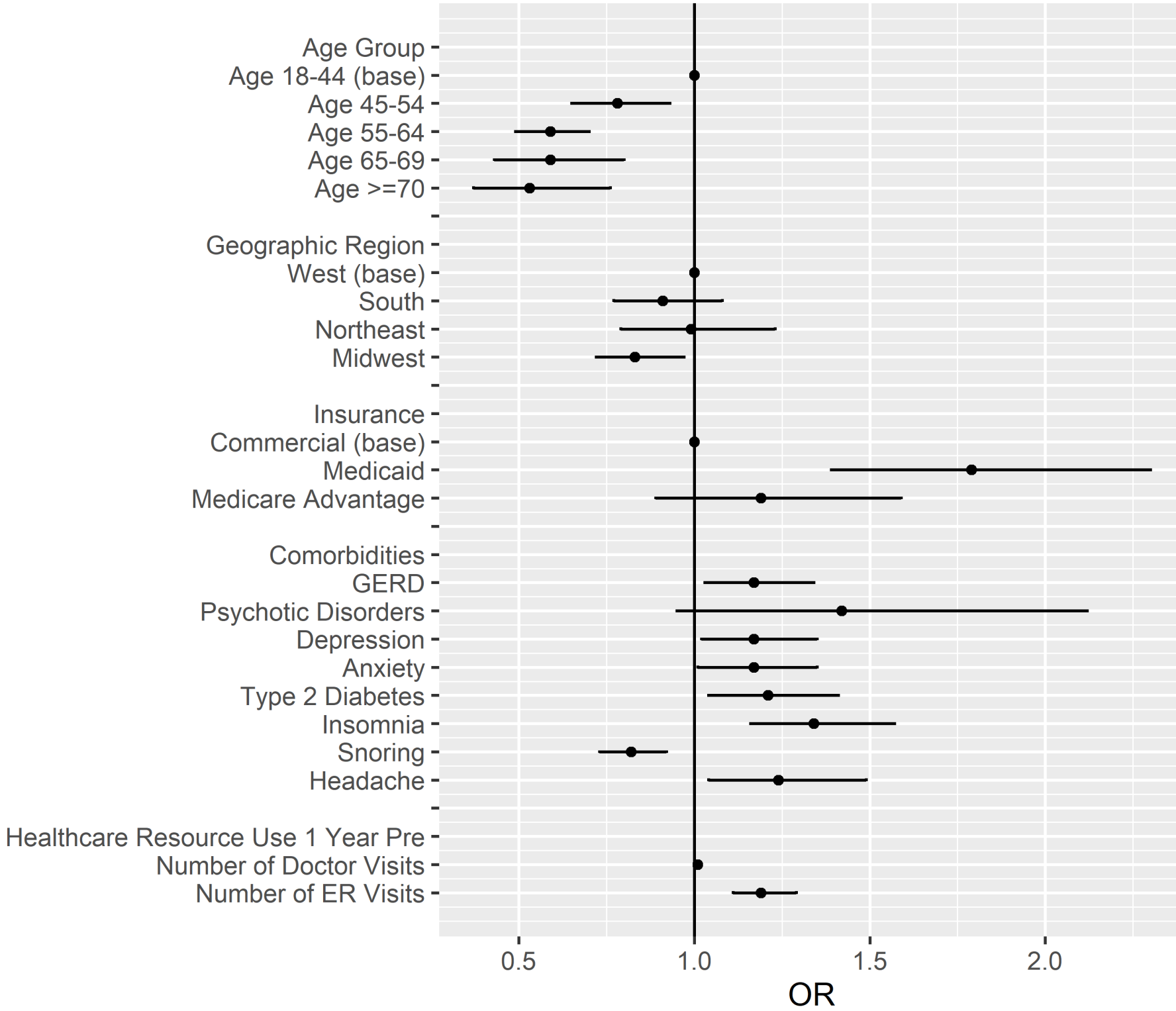


Figure 2. Forest Plot from Adherence Logistic Regression Model



Odds ratios for the statistically significant predictors that remained in the model after variable selection are shown in Figure 2.

Women were more likely to be adherent if they were:

- Older (45-54y OR: 0.78, 55-64y OR: 0.59, 65-69y OR: 0.59, ≥ 70y OR 0.53)
- Lived in the Midwest region (OR: 0.83) or
- Snored (OR: 0.82)

Women were less likely to be adherent if they had:

- Medicaid insurance (OR: 1.79)
- Psychotic disorders (OR: 1.42)
- Insomnia (OR: 1.35)
- Headache (OR: 1.24) or
- Type 2 diabetes (OR: 1.21)

CONCLUSIONS

This analysis from real-world data shows the demographic characteristics that are associated with being more or less likely to consistently adhere to PAP therapy over 2 years.

Knowing which factors impact likelihood to adhere may improve patient-centered care for women in sleep medicine.

REFERENCES AND ACKNOWLEDGEMENTS

1. Benjafield AV, Ayas NT, Eastwood PR, et al. Estimation of the global prevalence and burden of obstructive sleep apnoea: a literature-based analysis. *Lancet Respir Med*. 2019;7(8):687-698. doi:10.1016/S2213-2600(19)30198-5
2. Geer JH, Hilbert J. Gender Issues in Obstructive Sleep Apnea. *Yale J Biol Med*. 2021;94(3):487-496. Published 2021 Sep 30.

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