ASSOCIATION OF SMOKING AND ELECTRONIC CIGARETTE USE WITH WHEEZING AND RELATED RESPIRATORY SYMPTOMS IN ADULTS

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DISCLOSURE

- MLG received a research grant from Pfizer and served as a member of advisory board to Johnson & Johnson, manufacturers of smoking cessation medications.
- Other authors have no potential conflict of interest to declare.
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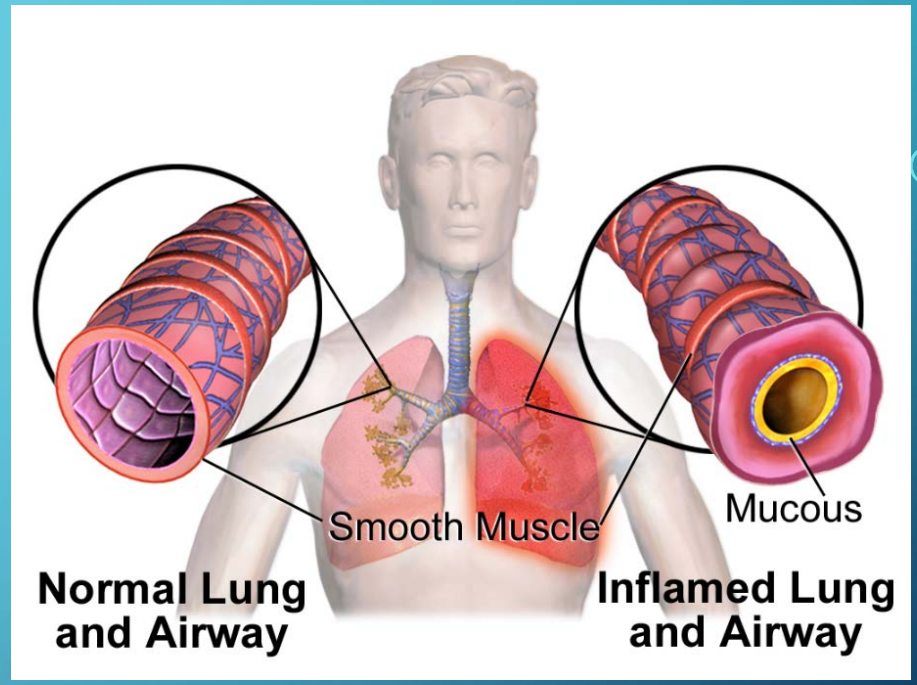
INTRODUCTION

- Cigarettes smoking is the leading cause of preventable death in the US.
- E-cigarettes gain popular in recent years, while their risks remain controversial.
- Past 30-day **e-cigarette use prevalence** increased from 1.5% in 2011 to 20.8% in 2018 in United States (US) high school students.

INTRODUCTION

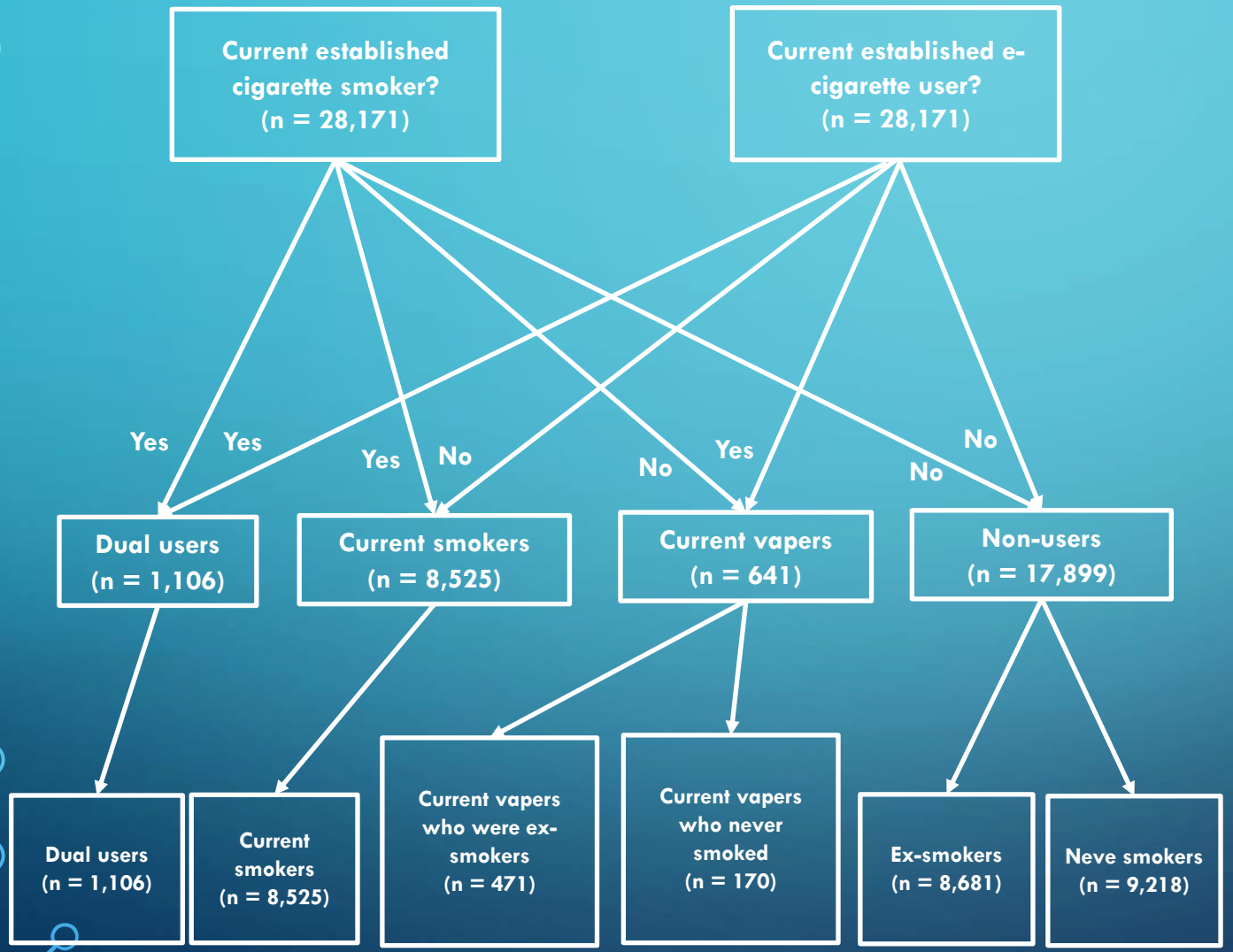
- Wheezing is a high-pitched lung sound due to narrowed or abnormal airways and is always associated with difficulty in breathing, which maybe an indication of more severe disease.
- Whether e-cigarette use alone is associated with wheezing in US adults and different from cigarette use only and dual use has not been investigated.



METHODS

- Study population
- The Population Assessment of Tobacco and Health (PATH) Study is a nationally representative, longitudinal cohort study of 45,971 adults and youth in the US.
- The PATH wave 2 data were collected from October 2014 to October 2015 including 28,362 adults and 12,172 youth.

CURRENT VAPING AND SMOKING STATUS



Current established cigarette smoker is defined as adult respondents who have smoked at least 100 cigarettes in their lifetime, and currently smoke every day or some days.

Current established e-cigarette user is defined as adult respondents who have ever used an e-cigarette, have ever used fairly regularly, and currently use every day or some days.

OUTCOME VARIABLES AND COVARIATES

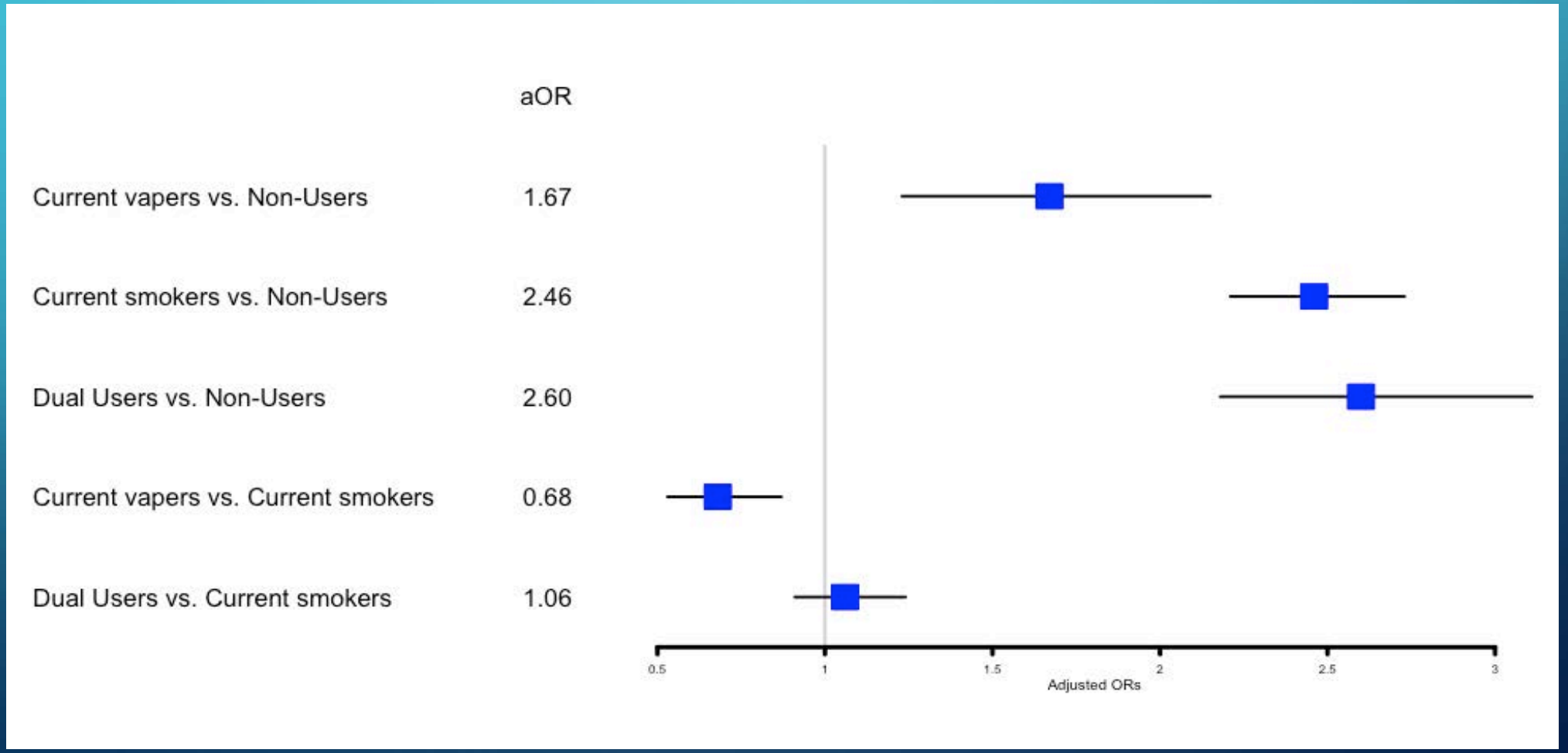
- Ever had wheezing or whistling in chest at any time in past
- In past 12 months, wheezing or whistling in the chest
- In past 12 months, number of wheezing attacks
- In past 12 months, how often has sleep been disturbed due to wheezing
- In past 12 months, had speech been limited to only one or two words between breaths due to wheezing
- In past 12 months, chest has sounded wheezy during or after exercise
- In past 12 months, had a dry cough at night not associated with a cold or chest infection
- Covariates: age categories, sex, race/ethnicity, income level, BMI categories, duration of e-cigarettes use, self-reported asthma, self-perception of physical health, self-perception of mental health, and second-hand smoke exposure

STATISTICAL ANALYSIS

- Weighted frequency distributions, regression analysis and the Rao-Scott Modified Likelihood Ratio test was used to examine the association between covariates and established cigarette use status.
- Both univariable and multivariable weighted logistic and cumulative logistic regression models were used for data analysis.
- The Fay's method was used to form replicate weights in variance estimation in all the PATH survey data analysis.

RESULTS: FOUR GROUPS COMPARISONS

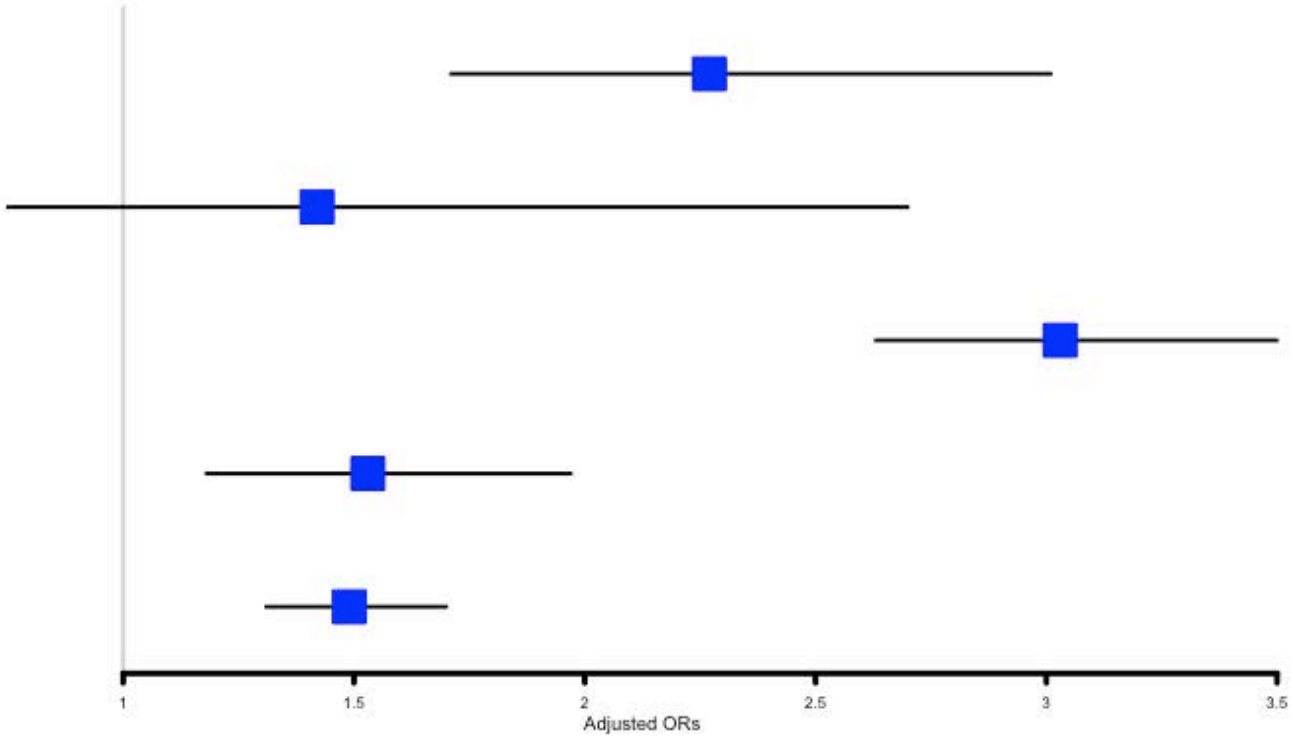
- Ever had wheezing or whistling in chest at any time in past



RESULTS: SIX GROUPS COMPARISONS

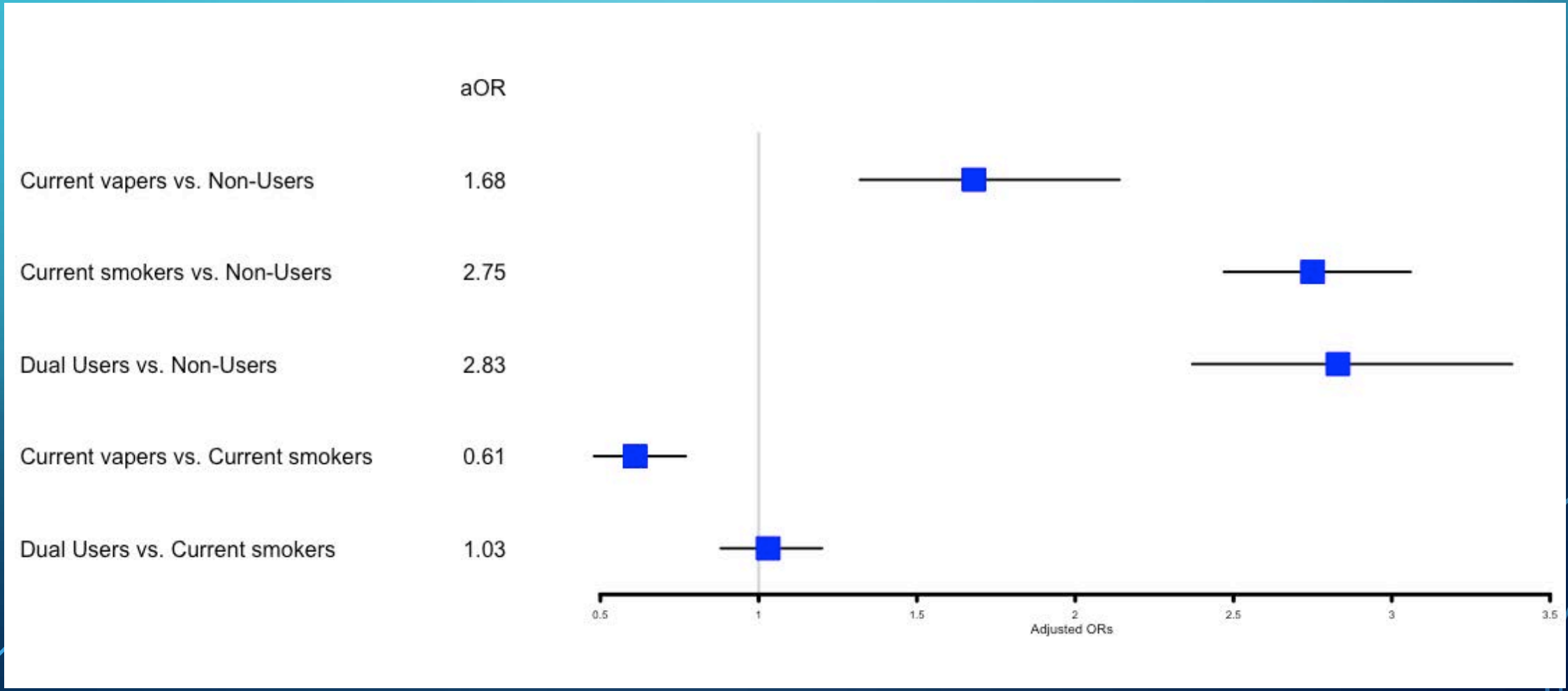
- Ever had wheezing or whistling in chest at any time in past

	aOR
Current vapers (ex-smokers) vs. Never-smokers	2.27
Current vapers (never smoked) vs. Never-smokers	1.42
Current smokers vs. Never-smokers	3.03
Current vapers (never smoked) vs. Ex-smokers	1.53
Ex-smokers vs. Never-smokers	1.49



RESULTS: FOUR GROUPS COMPARISONS

- Wheezing or whistling in chest in past 12 months



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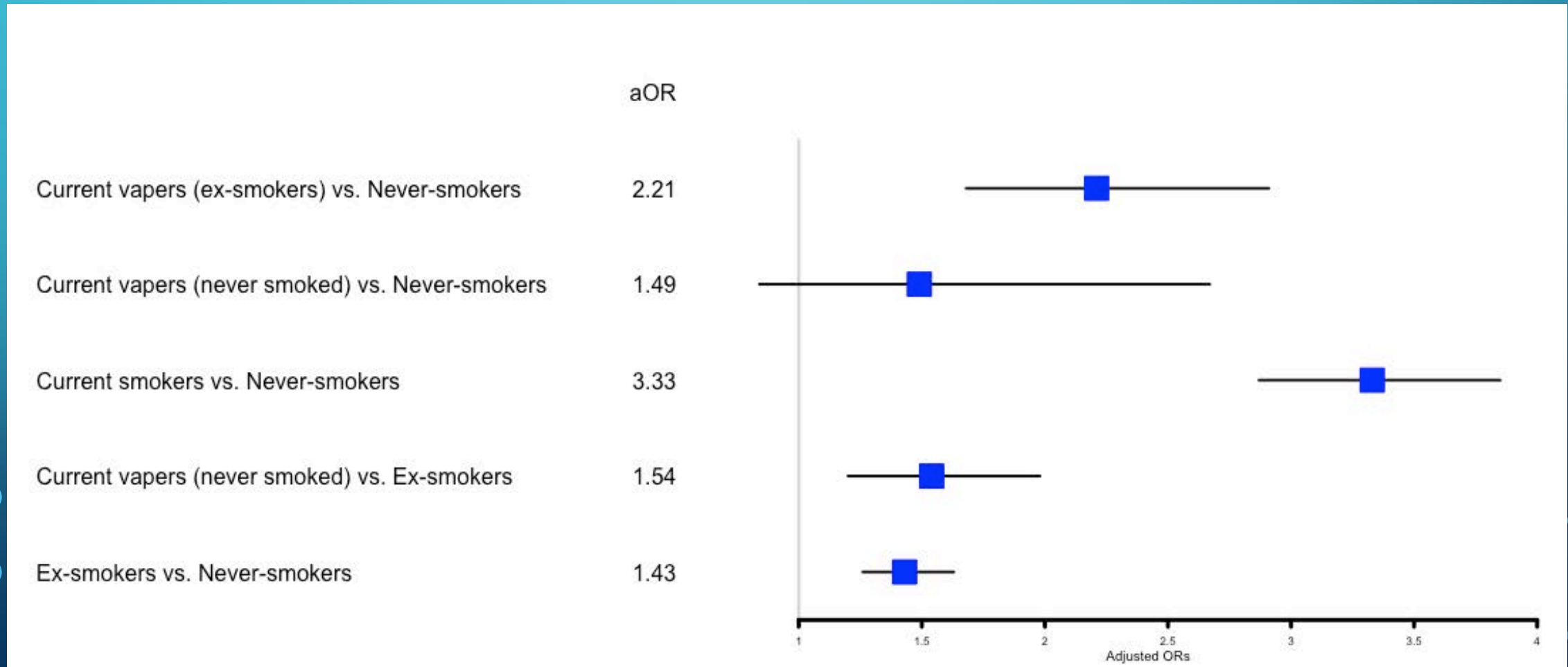
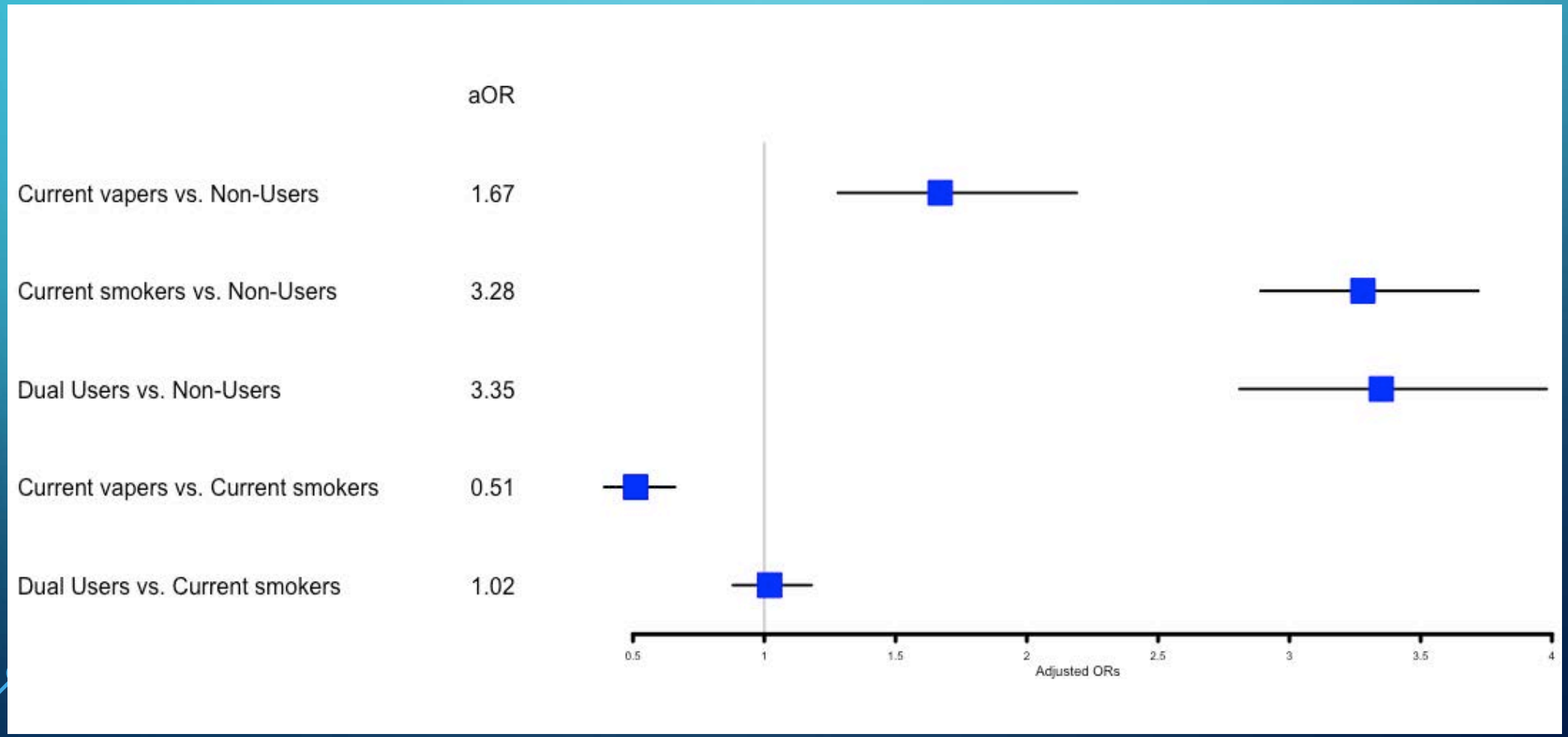


RESULTS: FOUR GROUPS COMPARISONS

- Number of wheezing attacks more than 12 in past 12 months



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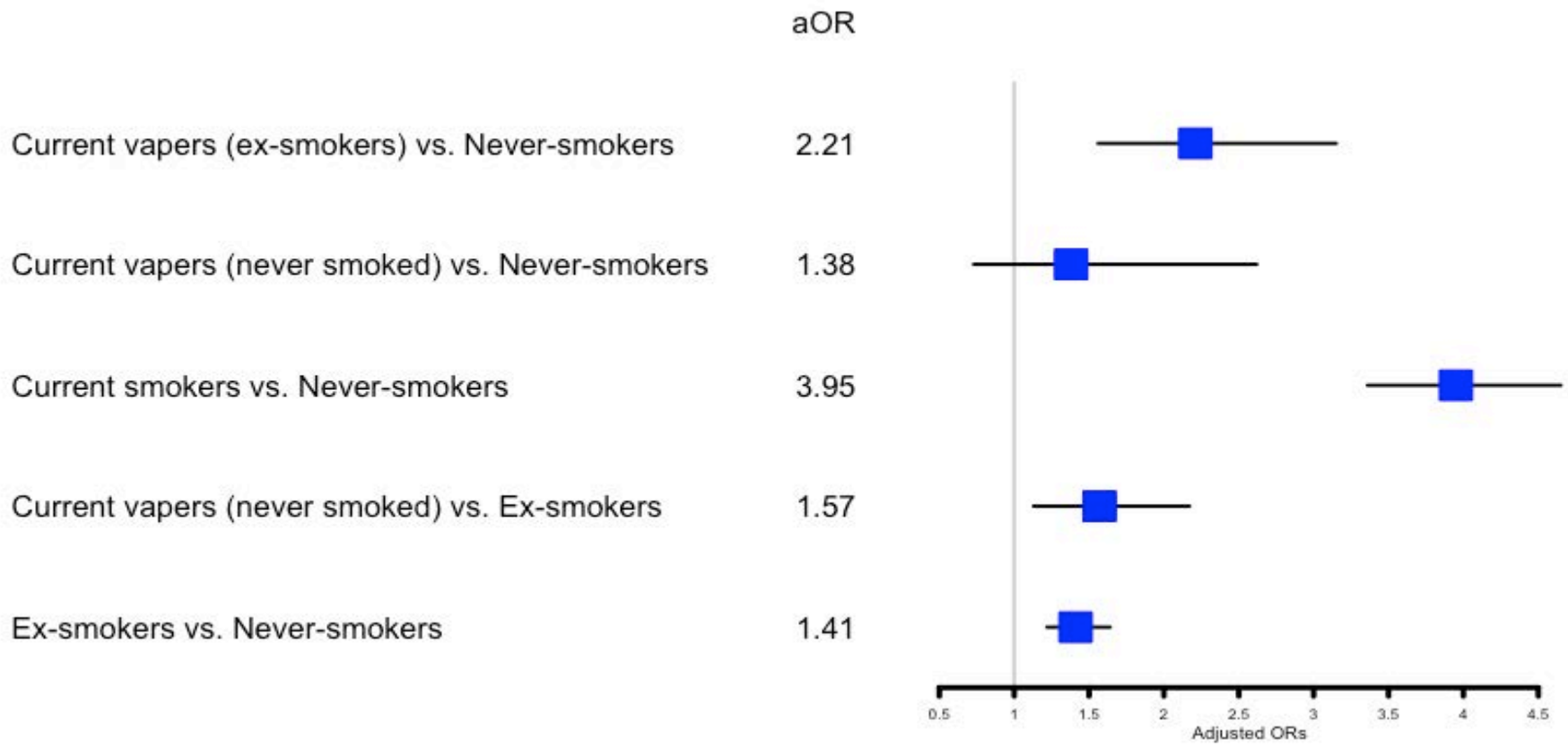
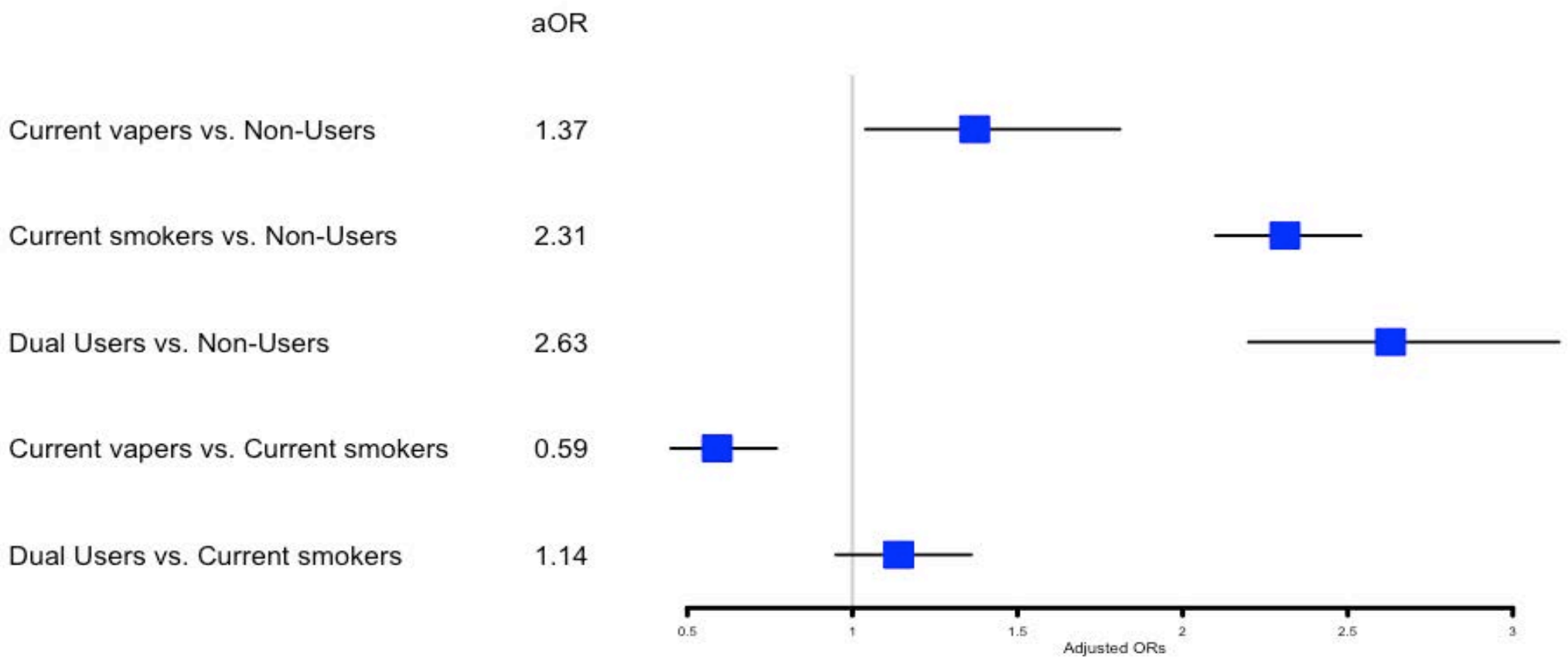


RESULTS: FOUR GROUPS COMPARISONS

- Dry cough at night not associated with a cold or chest infection



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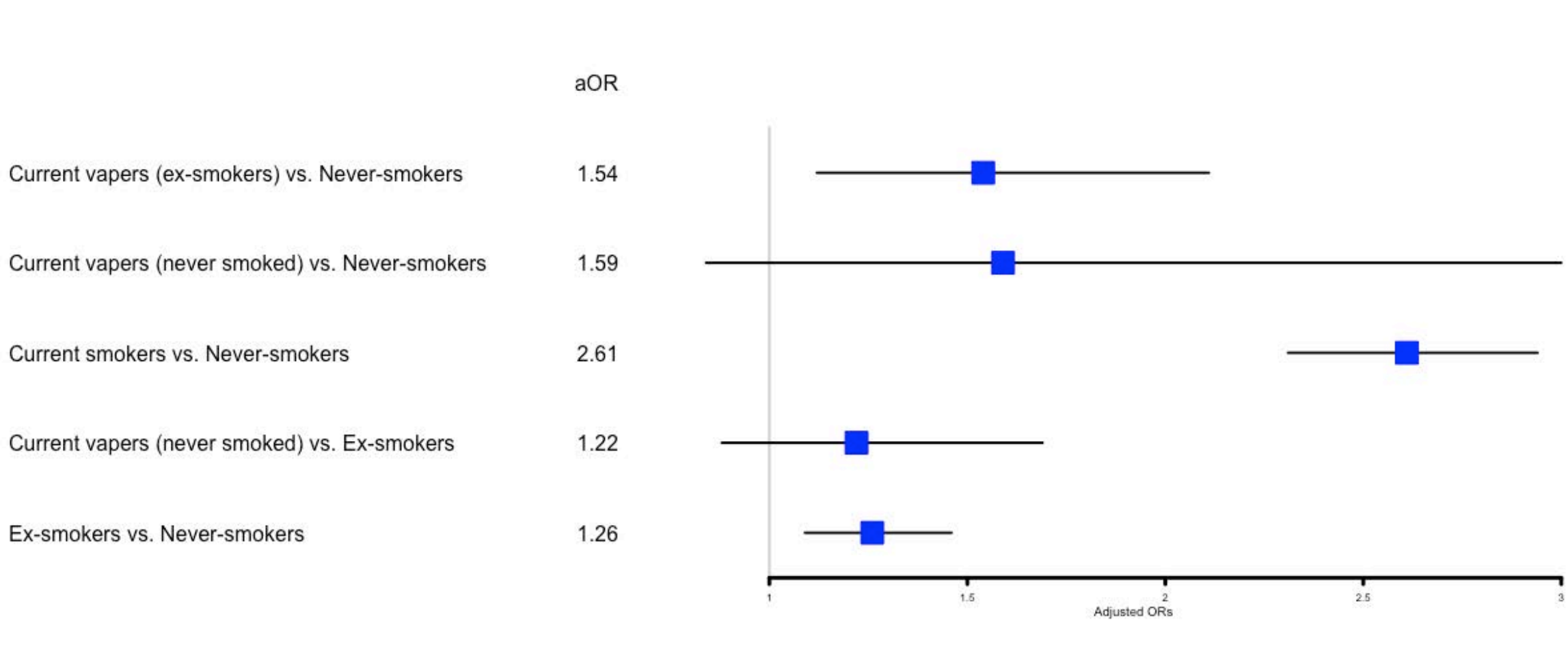

DISCUSSION

- We found a significant association of vaping with wheezing and related respiratory symptoms in adults, after adjustment for covariates.
- These findings contribute evidence on the potential harms of vaping at the population level –vaping had elevated odds of reporting wheeze after adjustment for relevant covariates and potential confounds.
- Though the sample size was small and likely did not allow sufficient statistical power to detect significance, there was a strong trend toward a risk for wheezing and related respiratory symptoms in current vapers who never smoked.

DISCUSSION

- Current vaping had lower (though still elevated) odds of wheezing relative to current smoking or dual use.
- This suggests a modicum of harm reduction on wheezing and related respiratory symptoms associated with vaping only, which was a minority pattern of e-cigarettes use – dual use appeared to confer no reduction is relative risk.
- Risks of wheezing and related respiratory symptoms were significantly higher among current vapers who were ex-smokers than in ex-smokers who did not vape, which also indicated potential harms of vaping in addition to prior smoking.

STRENGTHS AND LIMITATIONS

- Strengths
  - Nationally representative PATH study with large sample size and robust results
  - Many items in the PATH study are adapted from well-established existing national surveys with good internal consistency and reliability
- Limitations
  - Self-reported data may include recall bias.
  - Cross-sectional PATH wave 2 data and did not examine the longitudinal association of e-cigarettes use with wheezing and related symptoms.
  - The analysis might miss potential important confounding variables due to lack of information in the PATH data such as the diet and physical activity information.

KEY MESSAGES

- E-cigarette users (vapers) had an increased risk of wheezing and related respiratory symptoms relative to non-users.
- Vaping only (no other tobacco use) was associated with reduced risk of wheezing and related respiratory symptoms compared to smoking or dual use.
- Dual use did not reduce the risk of wheezing and related respiratory symptoms compared to smoking.
- These findings indicate that vaping triggers wheezing and respiratory symptoms in susceptible population.