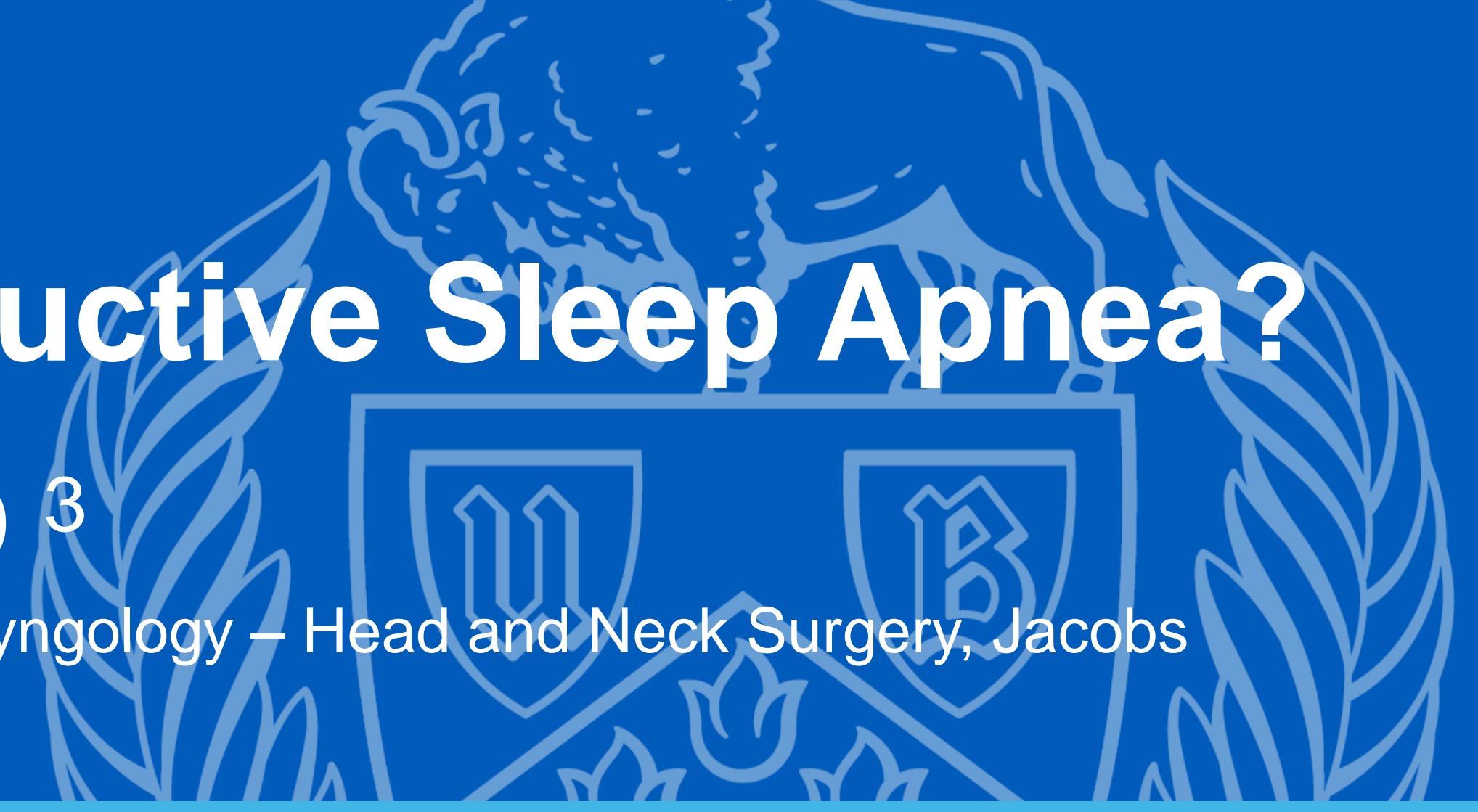


# Is there an Increased Risk of Acute Otitis Media in Children with Obstructive Sleep Apnea?

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## Introduction

- Obstructive sleep apnea (OSA) is defined as repetitive complete or partial pharyngeal collapse, leading to oxygen desaturation, hypercapnia, and fragmented sleep<sup>1,2</sup>
- Prevalence of pediatric OSA is 1-4%<sup>3</sup>
- Pediatric OSA is associated with psychiatric and cardiovascular pathology<sup>4-6</sup>
- Studies have suggested an increased prevalence of otitis media in children with OSA<sup>7,8</sup>
- The **purpose** of this study was to investigate the prevalence of otolaryngological sequelae in children with OSA compared to those without OSA in a large cohort.

## Methods and Materials

- A retrospective cohort study utilizing deidentified patient records from the US Collaborative Network within TriNetX, a global EHR network database
- The OSA cohort was defined using ICD-10 code G47.33 and the non OSA group excluded any patients with ICD-10 G47.33
- The cohorts underwent propensity score matching for sex, age, race and ethnicity
- Both cohorts were required to have a previous CPT code for an outpatient visit, either as a new or established patient: 99292, 99203, 99204, 99205, 99211, 99212, 99213, 99214, or 99215
- Associated pathologies were identified and tabulated using ICD-10 and CPT codes:
  - Otitis media** – ICD-10; H65, H66
  - Chronic otitis media** – ICD-10; H66.1, H66.2, H66.3, H65.2, H65.3, H65.4
  - Allergic rhinitis** – ICD-10; J30.9
  - Adenoidectomy** – CPT; 42830, 42831
  - Tonsillectomy** – CPT; 42825, 42826
  - Adenoidectomy and Tonsillectomy** – CPT; 42820, 42821
  - Tympanostomy** – CPT; 69436, 69433
- Chi-square tests for independence were used to assess the associated of each outcome between cohorts with and without OSA
- P < .05 were considered significant

**Table 1: Results of Propensity Score Matching**

	OSA N (%)	Non-OSA N (%)	P-Value
<b>Sex</b>	165,665 (M = 95949, F = 69901)	165,665 (M = 95949, F = 69901)	1.000
<b>Age</b>	10.7 years (SD = 4.07)	10.7 years (SD = 4.07)	1.000
<b>White</b>	90125 (54.34)	90125 (54.34)	1.000
<b>Hispanic or Latino</b>	38001 (22.91)	38001 (22.91)	1.000
<b>Black or African American</b>	35738 (21.546)	35738 (21.546)	1.000
<b>Asian</b>	3860 (2.33)	3860 (2.33)	1.000
<b>American Indian/ Alaskan Native</b>	1147 (0.69)	1147 (0.69)	1.000
<b>Native Hawaiian or Other Pacific Islander</b>	300 (0.18)	300 (0.18)	1.000

**Table 2: Statistical analyses of pathologies in children with and without OSA**

	Children without OSA	Children with OSA	P-Value
<b>N</b>	165865	165865	1
<b>Otitis Media N(%)</b>	31625 (19.067)	40029 (24.133)	<.0001
<b>Chronic Otitis Media N(%)</b>	3178 (1.916)	11704 (7.056)	<.0001
<b>Allergic Rhinitis N(%)</b>	12726 (7.673)	25815 (15.564)	<.0001
<b>Adenoidectomy N(%)</b>	1295 (0.781)	5289 (3.189)	<.0001
<b>Tonsillectomy N(%)</b>	156 (0.94)	2843 (1.709)	<.0001
<b>Tympanostomy Tubes N(%)</b>	3739 (2.254)	14238 (8.585)	<.0001
<b>Tonsillectomy + Adenoidectomy N(%)</b>	2116 (1.276)	52195 (31.468)	<.0001

## Results

- Otitis media is **1.3x** more frequent in children with OSA (P<.0001) compared to control
- Chronic otitis media is **3.7x** more frequent in children with OSA (P<.0001) compared to control
- Tympanostomy tubes were found **3.8x** more frequently in children with OSA (p<.0001) compared to control
- Allergic rhinitis was found **2.0x** more frequently in the OSA group (P<.0001) compared to control
- An adenoidectomy or tonsillectomy procedure was **4.1x** (p<.0001) and **1.8x** (p<.0001) more likely to occur in the OSA group compared to control, respectively
- A tonsillectomy and adenoidectomy procedure occurred **24.7x** more frequently in the OSA group

## Discussion

- Eustachian tube dysfunction, a contributor to the development of otitis media, can be related to allergic rhinitis and hypertrophic adenoids<sup>9</sup>
- Otolaryngologists should be aware of undiagnosed OSA in children undergoing tympanostomy tube insertion
- Pediatric OSA patients, due to repeated desaturation episodes, have altered mu receptors which results in opioid analgesics being effective at lower doses compared to those without OSA<sup>10</sup>
- With undiagnosed OSA, the pediatric patient faces increased risk of perioperative and postoperative complications like respiratory depression, airway obstruction secondary to instrumentation-related edema, neurologic injury and death without appropriately adjusted anesthesia management<sup>9</sup>

## Conclusion

- This association between OSA and otitis media likely relates to nasal obstruction and inflammation
- Children undergoing tympanostomy tube insertion may have undiagnosed OSA

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