

# Tonsillectomies Associated with Reduced Ear, Nose, and Throat Infections Among Tonsillitis Patients

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Last updated 18 June 2024 • Check for updates at [EpicResearch.org](https://EpicResearch.org)

## Key Findings:

- Patients who have undergone a tonsillectomy exhibit lower rates of subsequently being diagnosed with influenza, otitis media, strep throat, and sinusitis compared to those who have had tonsillitis without a tonsillectomy.

Tonsillectomy, the surgical removal of the tonsils, is typically performed on patients who suffer from an airway obstruction or recurrent infections in areas such as the ears, nose, and tonsils.<sup>1,2</sup> Previous studies have explored the correlation between tonsillectomy and certain upper respiratory infections but found no significant association.<sup>3</sup>

We compared 7,590 patients who had a tonsillectomy to 7,590 patients who had tonsillitis without a history of having had a tonsillectomy between 2018 and 2021. We sought to understand the likelihood of COVID-19, influenza, middle ear infection (otitis media), strep throat, and sinusitis. We adjusted for patient age, sex, race, ethnicity, social vulnerability index, flu vaccination status, date of tonsillectomy, prior infection status, and rural urban commuting area (RUCA) score. Patients who have had their adenoids removed were excluded from both populations.

We found that patients who have had their tonsils removed have lower rates of influenza, otitis media, strep throat, and sinusitis, as seen in Figure 1. Patients who had their tonsils removed were 59% less likely to be diagnosed with strep throat than those who did not have a tonsillectomy, which represented the greatest reduction of likelihood of any of the infections studied. We did not find a statistically significant difference in the frequency of COVID-19 between patients who had undergone a tonsillectomy and those who had not.

## Impact on Infection Rates by Tonsillectomy Status

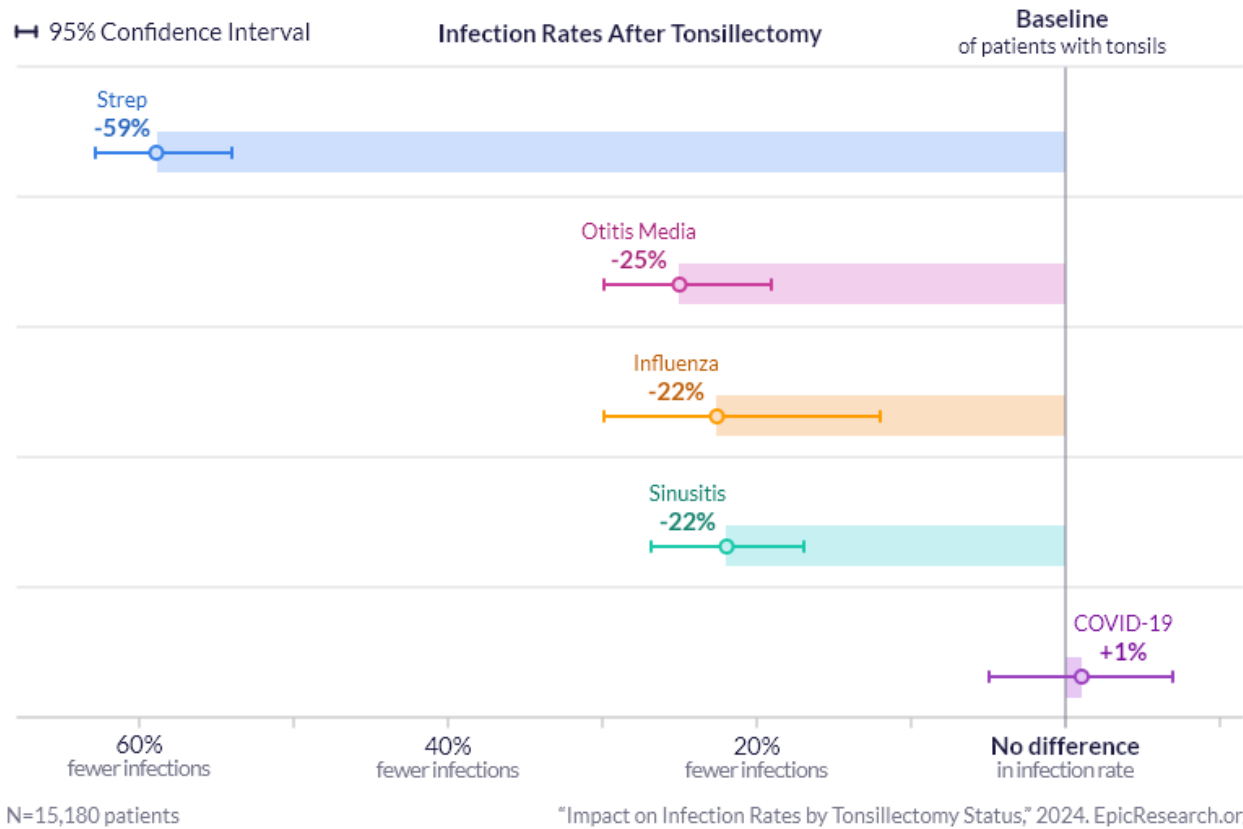


Figure 1. The impact on infection rates for tonsillitis patients by tonsillectomy status.

We also studied the rates of hospital admission and emergency department (ED) visits for each of the conditions studied. There was no statistically significant difference in rates for hospitalizations for those that did and did not have their tonsils removed for any of the infections studied. Additionally, there was no statistically significant difference in the likelihood of ED visits between groups, except for strep throat. Patients who had a tonsillectomy were 43% less likely to visit the ED for strep throat than those who still had their tonsils.

*These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 251 million patient records from 1,400 hospitals and more than 32,900 clinics from all 50 states and Lebanon. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Kayla Monnette.*

## References

1. Wald ER. Tonsillectomy and/or adenoidectomy in children: Indications and contraindications. UpToDate. Published May 2, 2023. <https://www.uptodate.com/contents/tonsillectomy-and-or-adenoidectomy-in-children-indications-and-contraindications>. Accessed April 24, 2024.
2. BuSaba N, Doron S. Tonsillectomy in adults: Indications. UpToDate. Published June 9, 2023. <https://www.uptodate.com/contents/tonsillectomy-in-adults-indications>. Accessed April 24, 2024.
3. Choi HG, Park B, Sim S, Ahn SH. Tonsillectomy does not reduce upper respiratory infections: A national cohort study. PLoS One. 2016;11(12):e0169264. doi:10.1371/journal.pone.0169264

## Data Definitions

Term	Definition
Study period	1/1/2018 and 4/1/2024
Study population	<p>Patients with evidence of <b>tonsillitis</b> and each of the following:</p> <ul style="list-style-type: none"> <li>• Two outpatient face-to-face visits in the prior five years</li> <li>• At least four encounters within five years of the index event</li> <li>• An outpatient face-to-face visit at least 1095 days after the index events</li> </ul> <p><b>Immunocompromised</b> patients or patients with evidence of an <b>adenoidectomy</b> were excluded.</p>
Tonsillitis	A diagnosis with ICD-10-CM code J03* or J35.0*
Tonsillectomy	Procedures with a name of “Tonsillectomy” that occurred between 1/1/2018 and 4/1/2021
Outcomes	<p>Influenza: A diagnosis with ICD-10-CM code J09*, J10*, or J11*</p> <p>COVID-19: A diagnosis with ICD-10-CM code J12.82 or U07.1</p> <p>Strep throat: A diagnosis with ICD-10-CM code J02.0*</p> <p>Sinusitis: A diagnosis with ICD-10-CM code J01*</p> <p>Otitis media: A diagnosis with ICD-10-CM cod H65*, H66*, or H67*</p> <p>ED visits</p> <p>Admissions</p>
Immunocompromised	<p>Cancer: A diagnosis with ICD-10-CM code C*</p> <p>HIV/AIDs: A diagnosis with ICD-10-CM code B20</p> <p>History of transplant: A diagnosis with SNOMED code 77465005</p> <p>History of splenectomy: A diagnosis with ICD-10-CM code Z90.81 or CPT code 38100, 38101, or 38102</p> <p>Immunocompromising medications: Anti-thymocyte globulin, Rituximab, Ofatumumab, Ocrelizumab, Veltuzumab, Y-ibritumomab tiuxetan, I-tositumomab, Obinutuzumab, Inotuzumab ozogamicin, OKT3, Alemtuzumab, Basiliximab, Daclizumab, Tocilizumab, Belimumab, IL-1-blocking agents, IL-5-blocking agents, IL-4 and IL-13 blocking agents, IL-17A blocking agents, IL-12 and IL-23 blocking agents, Abatacept, Belatacept, Natalizumab, Efalizumab, Fingolimod, Infliximab, Adalimumab, Certolizumab pegol, Golimumab, Etanercept, Eculizumab, Ibrutinib, Idelalisib, Janus kinase inhibitors, Tofacitinib, Ruxolitinib, Ipilimumab,</p>

	<p>Pembrolizumab, Nivolumab, Cemiplimab, Atezolizumab, Avelumab, Durvalumab, methotrexate, leflunomide, hydroxychloroquine, sulfasalazine, or azathioprine</p> <p>Chronic steroid use (&gt;1 months): prednisone, betamethasone, cortisone, dexamethasone, fludrocortisone, hydrocortisone (oral, IV, or IM), methylprednisolone, or prednisolone</p>
<b>Adenoidectomy</b>	Procedures with a name of "Adenoidectomy"
<b>Model Specifications</b>	<p>Tonsillectomy patients matched with tonsillitis patients based on tonsillitis date</p> <p>Poisson regression on number of respiratory infections between one and three years following the index date</p>

**Table 1: Impact on Infections Rates by Tonsillectomy Status**

Infection Type	Rate difference	Lower CI	Upper CI
<b>COVID</b>	1%	-5%	7%
<b>Flu</b>	-22%	-30%	-12%
<b>Otitis Media</b>	-25%	-30%	-19%
<b>Strep Throat</b>	-59%	-63%	-54%
<b>Sinusitis</b>	-22%	-27%	-17%