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# Incidence of adult tonsillectomy for hypertrophic indications in Southwest Finland

Henrik M. Sjöblom, MD<sup>1,2</sup>; Jenny C. Knubb, MD<sup>1,2</sup>; Tommi Kauko, MSc<sup>3</sup>; Jaakko Pulkkinen, MD, PhD<sup>1,2</sup>; Jaakko M. Piitulainen, MD, PhD<sup>1,2</sup>

<sup>1</sup> Department of Medicine, University of Turku, Turku, Finland

<sup>2</sup> Department of Otorhinolaryngology – Head and Neck Surgery, Division of Surgery and Cancer Diseases, Turku University Hospital, Turku, Finland

<sup>3</sup> Auria Clinical Informatics, Turku University Hospital, Turku, Finland

**Corresponding Author:** Jenny Knubb, MD, Turku University Hospital, Department of Otorhinolaryngology – Head and Neck Surgery, POB 52, 20521 Turku (jechkn@utu.fi), +358 2 313 0000, ORCID ID: 0000-0002-5068-408X.

**The full names of the authors and highest degrees:**

Henrik Mikael Sjöblom, MD, ORCID ID: 0000-0001-6582-7699

Jenny Christina Knubb, MD, ORCID ID: 0000-0002-5068-408X

Tommi Kauko, MSc, ORCID ID: 0000-0002-7644-3225

Jaakko Pulkkinen, MD, PhD, ORCID ID: 0000-0003-2116-9780

Jaakko Matias Piitulainen, MD, PhD, ORCID ID: 0000-0001-9788-8904

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# Abstract

## Background

Large palatine tonsils cause a variety of symptoms including obstructive sleep apnoea and snoring. In adults, the prevalence of tonsillar hypertrophy remains uncertain.

## Aims

We estimated the incidence of tonsillectomy for adult palatine tonsillar hypertrophy using population data and retrospective patient charts.

## Material and Methods

Patient data were retrospectively collected between 2004 and 2018 in the Hospital District of Southwest Finland. Adult patients with tonsil hypertrophy, obstructive sleep apnoea or mouth breathing/snoring as an indication for surgery were included. Data were verified from patient charts. To determine in adults the incidence of tonsillectomy for tonsillar hypertrophy, the number of surgeries was compared to population data.

## Results

The incidence of tonsillectomy for adult tonsillar hypertrophy was 8.49 per 100 000 person-years. In our hospital district, 9.5% of adults who underwent tonsil surgery had tonsillar hypertrophy. The incidence rate reduced with age. The most common indication for surgery of hypertrophic tonsils was snoring (30.8%). In this study, 12.7% of patients with asymmetric tonsils had malignancy with the most common being lymphoma.

## Conclusions and Significance

Symptomatic adult tonsil hypertrophy remains rare. In adults, tonsil asymmetry should invoke a suspicion of lymphoma. Even during adulthood, as age increases, tonsillar hypertrophy becomes less common.

**Key words:** Adult tonsillar hypertrophy, adult tonsillectomy, tonsil surgery, snoring

## Introduction

In otorhinolaryngology, tonsillectomy (TE) remains as one of the most common surgical procedures. One of the indications for TE is palatine tonsillar hypertrophy. Large palatine tonsils can cause a variety of symptoms including, but not limited to, obstructive sleep apnoea (OSA), snoring, difficulties in swallowing and voice changes. Different grading systems for palatine tonsil size exist with the Brodsky grading system having the highest mean interobserver reliability [1].

Typically, palatine tonsils are small at birth and become progressively larger until involution usually begins between the ages of 3 and 10 years, after which, the volume again decreases, usually by puberty [2,3]. Especially in children, tonsillectomy, with or without adenoidectomy, remains a common surgical procedure. Paediatric tonsil surgery is most often performed because of abnormal sleep breathing and other obstructive symptoms [4]. In a study of 1 211 school-aged children between 6 and 13 years old, the prevalence of tonsillar hypertrophy was 11%, and it is likely higher in younger children [5]. In random samples, adenoid hypertrophy prevalence in children is estimated to be 34% [6]. Asymptomatic tonsillar or adenoid hypertrophy without asymmetry is not an indication for surgery.

During or after adolescence, the B-cell component of the tonsils begins to involute, germinal centres become smaller and fibrous tissue proliferates, while the tonsils become smaller and disappear into the tonsillar fossae [7,8]. Around the age of 25 and progressing with age, fatty degeneration usually begins [9]. The mechanisms behind tonsil hyperplasia are not fully understood.

The prevalence of tonsillar hypertrophy in adults on a population-based level remains unclear. The prevalence of palatine tonsil hypertrophy with adult snorers has been reported to be 6% [10]. Two studies on tonsillectomy indications reported the percentage of surgeries, which were related to tonsillar hypertrophy, as 27% of 361 patients and 18.5% of 200 patients [11,12]. Here, we evaluated tonsil surgeries performed in our hospital district over a long period and compared those with population data such that we could offer an estimate of the incidence of tonsillectomy for symptomatic adult tonsillar hypertrophy. In addition, we examined the indications for tonsil surgery in adults with tonsillar hypertrophy or asymmetric tonsils.

## Material & Methods

In this 15-year retrospective study between January 1, 2004 and December 31, 2018, we analysed the medical records of 9 675 patients who underwent tonsil surgery in the Hospital District of Southwest Finland. This Hospital District is a public, jointly operated municipal authority producing specialised health care services through secondary hospitals and a tertiary hospital.

Auria Clinical Informatics was used to collect data from medical records by searching for NOMESCO Classification of Surgical Procedures codes: tonsillectomy (EMB10), tonsillotomy (EMB15), adenotonsillectomy (EMB20) and adenoidectomy (EMB30). The patients' age, sex, their indication for surgery and their type of surgery were collected. Patients, who were less than 18 years old at the time of tonsil surgery, were excluded.

Patients with possible symptoms of tonsillar hypertrophy were sought using the ICD-10 diagnostic codes J35.1 (hypertrophy of tonsils), J35.3 (hypertrophy of tonsils with hypertrophy of adenoids), G47.3 (obstructive sleep apnoea) or R06.5 (mouth breathing/snoring). The medical records of these patients were accessed for detailed evaluation. The patients' tonsil sizes and primary and secondary indications for surgery were collected. Unfortunately, numeric tonsil grades were not used in our institution between these years. If the patient charts mentioned hypertrophic tonsils, verbal descriptions were used to sort the patients into two groups of large or very large tonsils of which we aimed to roughly equal tonsil sizes 3 and 4. We also aimed to record any numeric grades mentioned, but, unfortunately, none were used. If no mention of tonsil size was found in patient charts, the patient was excluded even if the diagnostic code used was, for example, hypertrophy of tonsils (J35.1).

In asymmetric tonsils, when the primary or secondary indication for surgery was palatine tonsil asymmetry, we were also interested in the prevalence of malignancy. This was recorded from patient records regardless of if the tonsils were also hypertrophic or not. The histological diagnosis was collected and divided into three groups being benign tonsillar asymmetry, lymphoma and squamous cell carcinoma. The data collection process is presented (Figure 1).

To determine the incidence of tonsillectomy for tonsil hypertrophy in adults, we compared the number of tonsils listed as hypertrophic in the evaluated records of the patients to the total adult population of Southwest Finland. The population data were divided into four age groups being 18–25 years old, 26–35 years old, 36–45 years old and  $\geq 46$  years old. The annual number of hypertrophic tonsils in adult tonsil surgery patients was compared to population data per year between 2004 and 2018 and then averaged. About 20% of tonsillectomies nationwide are done in the private sector, and these were not included in the analysis [13].

Statistical analyses were performed using the R software version 4.4.0 (R Core Team (2024); R: A Language and Environment for Statistical Computing; R Foundation for Statistical Computing; Vienna, Austria; <https://www.R-project.org/>) with a graphical user interface RStudio version 2024.04.1 (Posit team (2024); RStudio: Integrated Development Environment for R. Posit Software; PBC; Boston, MA; [www.posit.co](http://www.posit.co)) utilizing packages openxlsx (version 4.2.5.2) and ggplot2 (version 3.5.1).

## Results

A total of 9 675 patients underwent tonsil surgery in the Hospital District of Southwest Finland between the years 2004 and 2018. 5 083 of these patients were adults. After careful review of 626 patient charts, a final total of 483 (9.5%, 197 female / 286 male) out of the 5083 adult tonsils were deemed hypertrophic. The adult population of the province of Southwest Finland increased between 2004 and 2018 from 362 537 to 392 412. In 2018, the male and female adult populations were 190 049 and 202 363 [14].

The incidence of tonsil surgery for adult tonsillar hypertrophy was 8.49 per 100 000 person-years. The incidence reduces as age increases being 30 per 100 000 person-years in 18- to 25-year-old persons to 1.85 per 100 000 person-years in 46-year-old persons and older. 59.2% of patients were men. The number of surgeries between sexes of various ages was not constant (Figure 2). The patients were on average 31.2 years old at the time of surgery (range = 18–85, median = 27.0). The incidence of tonsil surgeries in different age groups and between sexes is listed in Table 1, and the trends yearly are presented in Figure 3 and are divided by sex in Figure 4.

The most common indication for tonsil surgery in adult patients with tonsillar hypertrophy was snoring (30.8%), followed by tonsillitis (20.5%) and sleep apnoea (18.0%). The primary indications for surgery are listed in Table 2. Other than a small increase from 2007 to 2009, the number of surgeries remained steady within age groups over the years (Figure 3). Of 483 patients with hypertrophic tonsils, 155 patients (32.1%) had a history of tonsillitis, although, for everyone, it was not the primary indication for surgery. When sorting verbal descriptions of tonsil sizes into two categories, 64.0% of patients had large tonsils and 36.0% of patients had very large tonsils.

In total, 118 patients' tonsils of all 626 patients (18.8%) were sent to pathology because of some degree of asymmetry. In 107 patients, asymmetric tonsils were the only or main reason for tonsillectomy (17.1%). Of these 118 patients, where the primary or secondary indication for tonsillectomy was asymmetry, in total, 15 patients (12.7%) had a malignancy. Of these patients, 13 patients were diagnosed with lymphoma and 2 with squamous cell carcinoma.

## Discussion

In adult tonsil surgery patients only, the incidence of tonsillectomy for palatine tonsil hypertrophy was 8.49 per 100 000 person-years. This study did not have information about asymptomatic tonsillar hypertrophy. However, the data show that, as expected, adult tonsillar hypertrophy was uncommon. We can relate these findings to the global rate of appendicitis or appendix removal of 100 per 100 000 person-years [15].

The most common complaint leading to a tonsillectomy was snoring followed by tonsillitis and sleep apnoea. Large tonsils are a known risk factor of obstructive sleep apnoea, and, in these patients, tonsillectomy is an effective treatment [16]. The annual incidence of clinically diagnosed sleep apnoea is 600 per 100 000 in the Finnish adult population [17]. As stated, up to 6% of adult snorers could have hypertrophic tonsils [10].

Paediatric tonsil hypertrophy prevalence lowers significantly with age, especially after school ages are reached [18]. Here, this trend also existed, and symptomatic tonsillar hypertrophy became rarer even as aging continued into adulthood with the incidence of tonsil surgery for this indication reducing from 30 per 100 000 person-years in 18- to 25-year-old persons to 1.85 in 46-year-old persons and older (Table 1, Figure 2).

The incidence of tonsil surgery for symptomatic palatine tonsil hypertrophy was also higher in men (10.45 per 100 000 person-years) than in women (6.69 per 100 000 person-years), and this difference seems to continue from childhood, as the amount of adenotonsillectomies in small boys is known to be higher than girls [18,19].

In adults, a rapid unilateral tonsil enlargement warrants a suspicion of an underlying malignancy [20]. In our data, fifteen or 12.7% of the 118 patients with asymmetric tonsils had malignancy (i.e., lymphoma or squamous cell carcinoma). Because we sorted patients by diagnosis codes, this study did not include all patients with initially highly suspected malignancies (e.g., ICD-10 diagnostic code D10.4&).

## Limitations

At our institution during the years studied, no numeric or other grading systems were routinely used. Verbal descriptions of hypertrophic tonsil sizes were sorted into large or very large tonsil groups, but, ultimately, we thought that this sorting of retrospective charts was subjective, and we did not include this categorization. In our data search, we did not include pharyngoplasty codes. We also do not have data about tonsillectomies performed in the private sector, which, in Southwest Finland, amounted to approximately 20% of tonsillectomies [21].

## Conclusions

Judging by the incidence of tonsillectomy, symptomatic adult tonsil hypertrophy seems to be rare. An adult with tonsillar asymmetry should invoke a suspicion of lymphoma. Even in adults, as age increases, tonsillar hypertrophy becomes less common.

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## Figure Legends

Figure 1: Data collection.

Figure 2: The **incidence of tonsillectomy for tonsil hypertrophy** according to age at time of surgery among men and women.

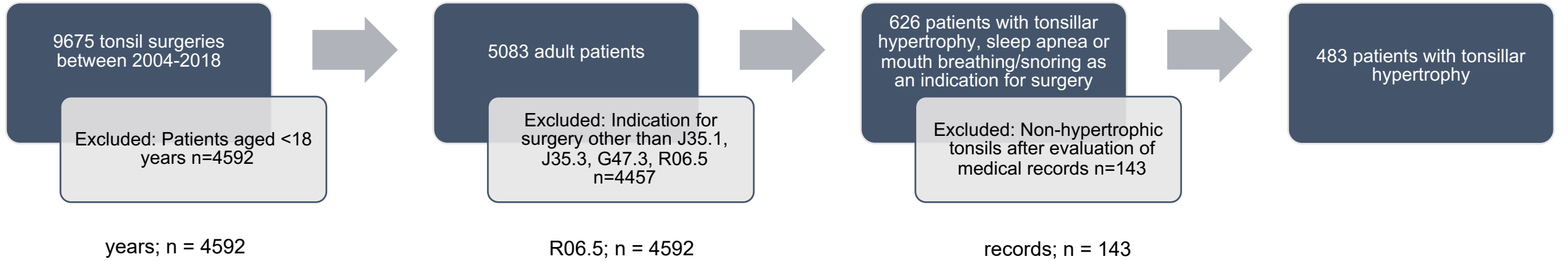
The reported number is the average number of tonsillectomies in per 100,000 person-years **calculated from the annual numbers of tonsillectomies over 15 years (n = 483) and yearly public population data.**

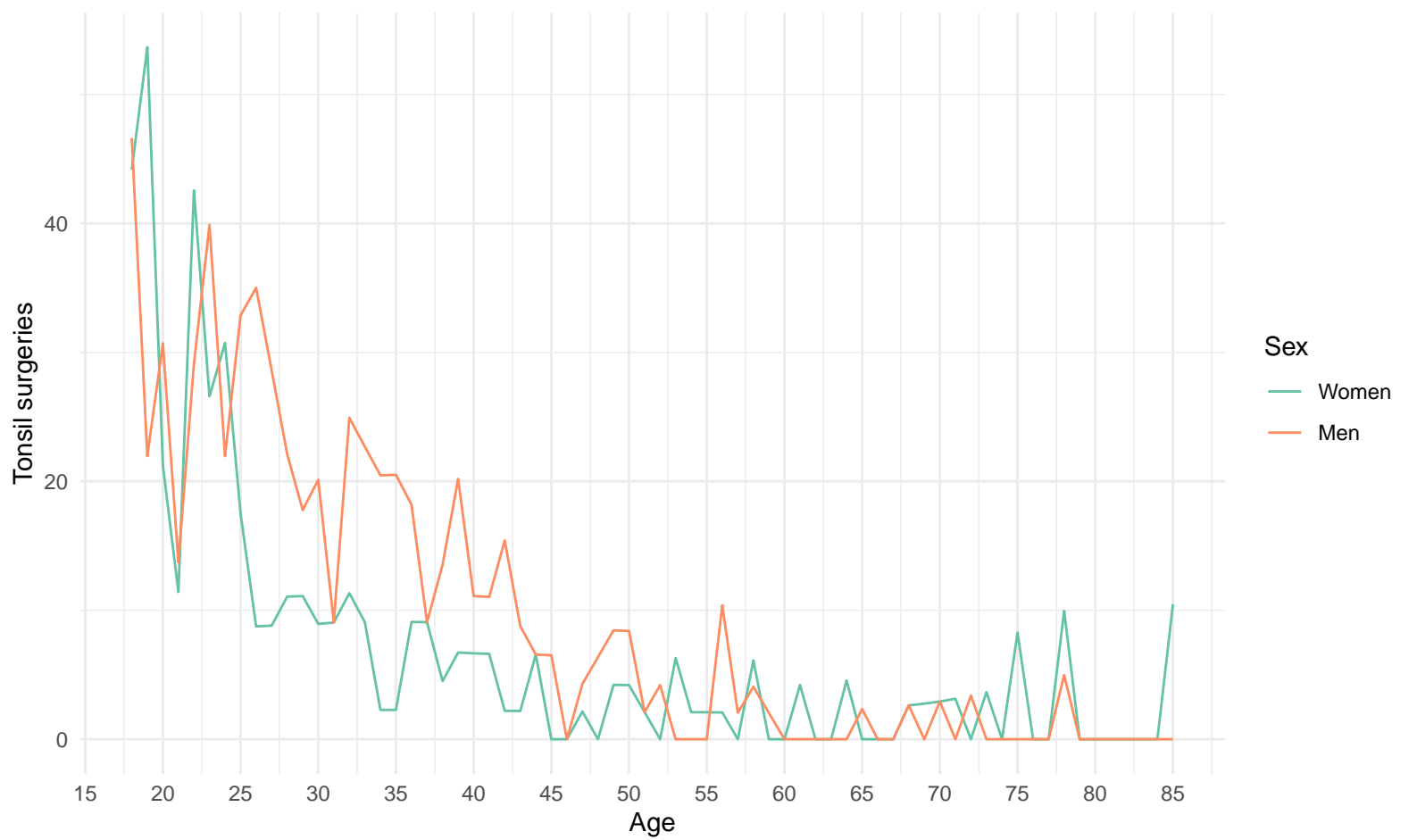
Figure 3: The **incidence of tonsillectomy for tonsil hypertrophy** grouped into 4 age groups (18–25-year-olds, 26–35-year-olds, 36–45-year-olds, 46-year-olds and older).

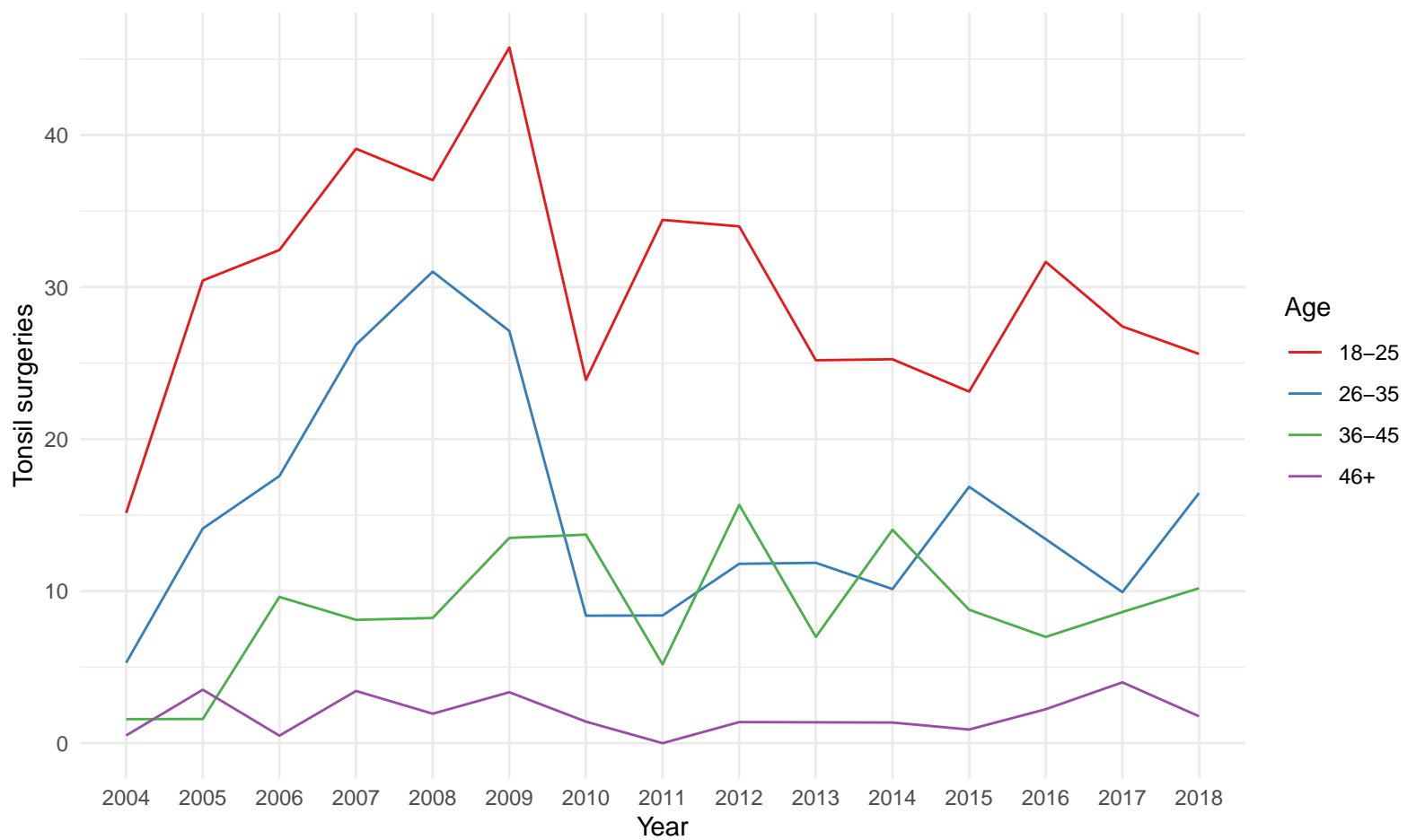
The reported number is the average number of tonsillectomies in per 100,000 person-years **calculated from the annual numbers of tonsillectomies over 15 years (n = 483) and yearly public population data.**

Figure 4: The **incidence of tonsillectomy for tonsil hypertrophy** among men and women grouped into 4 age groups (18–25-year-olds, 26–35-year-olds, 36–45-year-olds, 46-year-olds and older).

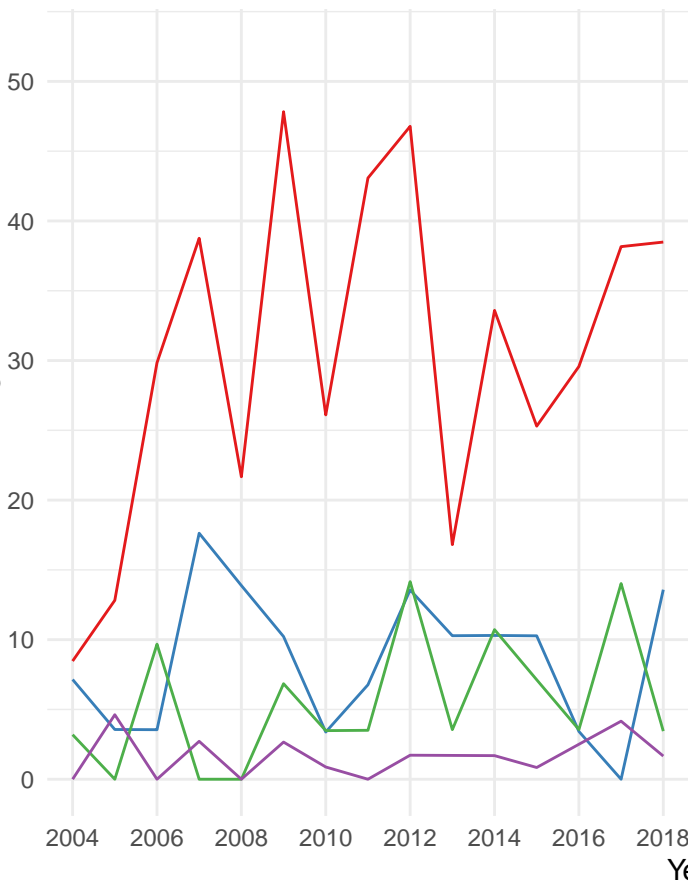
The reported number is the average number of tonsillectomies in per 100,000 person-years **calculated from the annual numbers of tonsillectomies over 15 years (n = 483) and yearly public population data.**



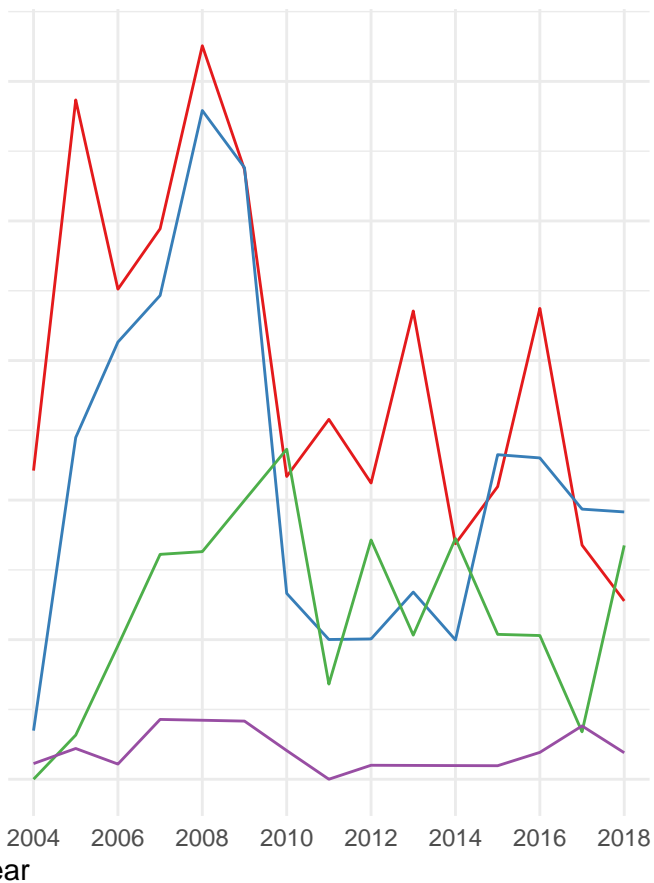




Women



Men



Age

18-25

26-35

36-45

46+

Table 1

The incidence of tonsillectomy for adult tonsillar hypertrophy in adults.

The reported number is the average number of tonsillectomies in per 100,000 person-years, which is calculated from the annual numbers of tonsillectomies over 15 years (n=483) and yearly public population data.

	All	Men	Women
18–25 years old	29.99	29.52	30.45
26–35 years old	15.21	21.73	8.51
36–45 years old	8.78	12.00	5.47
46 years and older	1.85	2.04	1.69
Total	8.49	10.45	6.69

Table 2

The listed primary indication for tonsil surgery in 483 patients with tonsillar hypertrophy over 15 years.

	n	%
Snoring	149	30.8
Tonsillitis	99	20.5
Sleep apnoea	87	18.0
Asymmetry	57	11.8
Large size only	47	9.7
Swallowing difficulties	23	4.8
Tonsil stones	13	2.7
Other	8	1.7
Total	483	