

## The rising rate of admissions for tonsillitis and neck space abscesses in England, 1991–2011

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### ABSTRACT

**INTRODUCTION** Sore throats and tonsillitis represent a considerable health burden as well as a significant source of expenditure for the National Health Service (NHS). As part of the recent NHS savings drive, the introduction of ‘procedures of low clinical effectiveness’ (PoLCE) lists has reinforced a large reduction in the number of tonsillectomies performed. We carried out a cross-sectional study of trends in emergency sore throat admissions in the context of the number of tonsillectomies performed.

**METHODS** Hospital Episode Statistics (HES) data were extracted. Office for National Statistics data were also used.

**RESULTS** Between 1991 and 2011, the overall tonsillectomy rate fell by 44%. In the same time, the admission rate for tonsillitis rose by 310% (Pearson’s  $r=-0.67$ ,  $p=0.01$ ). The peritonsillar abscess admission rate rose by 31% ( $r=-0.79$ ,  $p<0.01$ ). Between 1996 and 2011, the overall tonsillectomy rate fell by 41% and the retro and parapharyngeal abscess admission rate rose by 39% ( $r=-0.55$ ,  $p=0.026$ ). There was a 14% overall increase in tonsillectomy and sore throat associated bed days. This was despite the large fall in tonsillectomy numbers and the reduction in length of hospital stay.

**CONCLUSIONS** Efforts to reduce the tonsillectomy rate are correlated with a significant rise in emergency admissions. The rise in the retro and parapharyngeal abscess rate is perhaps most alarming given the very high mortality of these conditions. Bed day data suggest that no net saving has been made despite the new measures.

### KEYWORDS

Tonsillectomy – Tonsillitis – Peritonsillar abscess – Deep neck space infection – Parapharyngeal abscess

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Sore throats, including tonsillitis and peritonsillar abscesses, represent a considerable health burden. Estimates suggest that 35 million days are lost to sore throats in the UK each year.<sup>1</sup> General practitioner consultations for the same cost about £60 million annually; sore throats cost the National Health Service (NHS) £100 million overall.<sup>2</sup> It has been suggested that for those who have 4 sore throats a year who do not undergo tonsillectomy, a further 2.5 days of sore throats can be expected every six months.<sup>3</sup>

The NHS must achieve £20 billion in efficiencies by 2015. The number of tonsillectomies had already been declining from the late 1990s, culminating in the adoption of the Scottish Intercollegiate Guidelines Network (SIGN) recommendations for tonsillectomy. In 2005–2006 some primary care trusts (PCTs) began to compile lists of what they considered ‘procedures of low clinical effectiveness’ (PoLCE). This list included tonsillectomy under ‘relatively ineffective procedures’.

In 2009 the Department of Health (DH) commissioned McKinsey & Company to present a report on efficiency savings that could be made in the NHS. Among other recommendations in this report, tonsillectomy was listed at the top of a number of ‘relatively ineffective interventions’ that

should be decommissioned.<sup>4</sup> It was suggested that children from the most deprived areas are ‘much more likely’ to have their tonsils removed on the NHS than children from the least deprived areas. The report does not mention any confounding factors when comparing these two groups. The maximum potential reduction in tonsillectomies was put at 90%, with no clinical evidence offered in justification.

Like any other operation, tonsillectomy is not without risk.<sup>5</sup> It is, however, an effective treatment for chronic or recurrent acute tonsillitis.<sup>2,6–8</sup> It has been reported that where there is a clear indication, tonsillectomy both relieves symptoms efficiently and improves quality of life.<sup>6,9</sup> This effect is modest and ‘the gain [is] more marked in those most severely affected’.<sup>7</sup> Careful patient selection is therefore important. This paper aims to report trends in admissions for tonsillitis and associated infections in the context of the number of tonsillectomies performed each year in each English strategic health authority (SHA).

### Methods

An observational cross-sectional study was performed. Ethical approval was not required for the reuse of anonymous

and/or open access population data. Safeguards in the Hospital Episode Statistics (HES) extract service do not allow the disclosure of potentially patient identifiable data (ie very small samples). For this reason, it was not possible to garner socioeconomic data on top of annual, geographical, specialty and age breakdown.

**Population data**

The population of England and its constituent regions was obtained from the Office for National Statistics.<sup>10</sup> It was extrapolated for non-census years, assuming linear growth between the census years 1991, 2001 and 2011.

**Admission and bed day data**

A bespoke HES report was commissioned. The database was interrogated for the number of:

- > tonsillectomy finished consultant episodes (FCEs) using Office of Population Censuses and Surveys (OPCS-4) code F34;
- > peritonsillar abscess aspiration FCEs using OPCS-4 code F36.3;
- > pharyngitis and tonsillitis finished admission episodes (FAEs) using International Statistical Classification of Diseases (ICD-10) codes J02 and J03 or ICD-9 codes 054, 462 and 463;
- > peritonsillar abscess FAEs using ICD-10 code J36 or ICD-9 code 475; and
- > retro and parapharyngeal abscess FAEs using ICD-10 code J39 or ICD-9 code 478.

Admission data for the 21 years from 1991 to 2011 inclusive were provided by SHA of the patient’s residence, by treatment specialty and in under-16 and 16-and-over age bands. Only patients resident in English SHAs were included. Related bed day data for 2001–2011 were also obtained.<sup>11</sup> Data were recorded and analysed using Excel® (Microsoft, Redmond, WA, US). Statistical analysis was performed using SPSS® version 20 (IBM, New York, US). Relevant data are copyright 2012 and are being reused with the permission of the Health and Social Care Information Centre or under the terms of the Open Government Licence.

**Exclusions**

The numbers of retro and parapharyngeal abscess FAEs returned for 1991–1995 seemed unrealistically high. Treatment specialty was recorded unreliably from 1991 to 1995. The same numbers for 1996–2011 were, however, more in keeping with clinical experience and were therefore included.

**PolCE lists and commissioning policy**

All PCTs in each SHA were identified. Each PCT’s website was searched for information on commissioning for tonsillectomy. If no information was found online, the PCT was contacted directly either by email or telephone. The response rate was 100%.

**Results**

**Admissions**

Table 1 and Figure 1 give information on overall trends in England for tonsillectomy and admissions for neck space abscesses. Pearson’s correlation coefficients showed statistically significant, strong negative correlations between the tonsillectomy rate and the sore throat related admission variables. There appears to be a small dip in the tonsillectomy rate around 2000 and 2001, when the DH recommended using single-use surgical instruments in response to concerns about transmissibility of variant Creutzfeldt–Jakob disease.

The majority of the fall in the tonsillectomy rate was in the under-16 age group (551 per 100,000 in 1991 to 284 per 100,000 in 2011). The same group bore the vast majority of the rise in the tonsillitis rate (98 per 100,000 in 1991 to 390 per 100,000 in 2011).

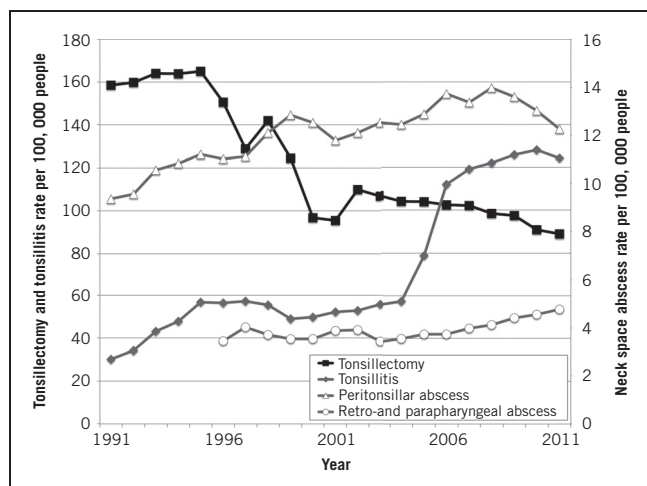
There was marked regional variation in both the tonsillectomy rates and the size of reductions. Figure 2 shows the regional changes in the tonsillectomy and tonsillitis admission rates over the study period. Figure 3 compares regional tonsillectomy rates across the study period.

**Bed days**

Table 2 shows the total number of bed days in 2001–2002 and 2010–2011 for tonsillectomy and sore throats. There

**Table 1** Summary of trends in admissions (rates per 100,000 people in England) with Pearson’s correlation coefficient (r) and the coefficient of determination (r<sup>2</sup>)

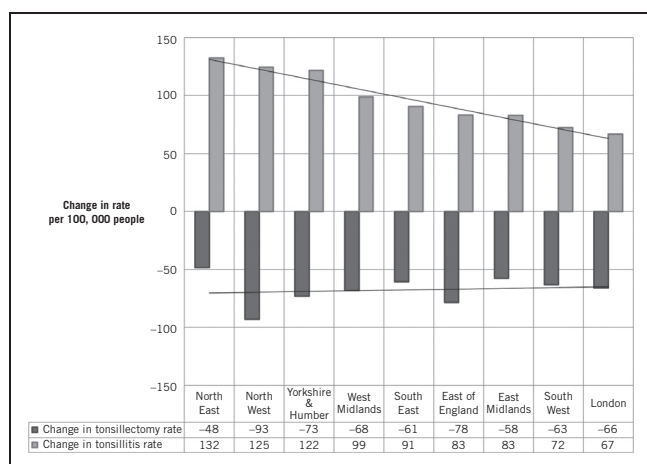
Code	2011 rate	Change from 1991	Change (%)	r	Adjusted r <sup>2</sup>	p-value
Tonsillectomy	89	-70	-44%	-	-	-
Tonsillitis and pharyngitis	124	+94	+310%	-0.673	0.424	<b>0.01</b>
Peritonsillar abscess	12	+3	+31%	-0.787	0.600	<b>&lt;0.01</b>
	2011 rate	Change from 1996	Change (%)	r	Adjusted r <sup>2</sup>	p-value
Tonsillectomy	89	-62	-41%	-	-	-
Retro and parapharyngeal abscess	5	+2	+41%	-0.554	0.260	<b>0.026</b>



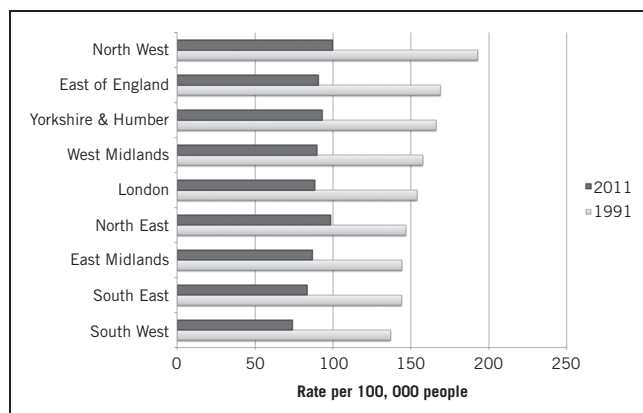
**Figure 1** Overall trends in England for tonsillectomy (left vertical axis) against admissions for neck space abscesses (right vertical axis)

was a strong negative correlation between the tonsillectomy related and sore throat related bed day trends ( $r=-0.829$ ,  $r^2=0.648$ ,  $p=0.005$ ). The mean length of stay (LOS) for tonsillitis alone was 1.4 days in 2001, dropping to 0.9 days by 2010. Similarly, the mean LOS for peritonsillar abscess alone was 2 days in 2001, falling to 1.5 days by 2010.

The number of bed days (including critical care) for deep neck space infections could not be taken into account. While one bed day is probably an overestimate of the cost of the stay for a day-case tonsillectomy, the cost of performing the operations was not included.



**Figure 2** Comparison of change in tonsillitis admissions rate in each strategic health authority (SHA) and change in tonsillectomy rate between 1991 and 2011. Census data are only available for the South East as a region, which necessitated the amalgamation of the South Central and South East Coast SHAs in this analysis.



**Figure 3** Comparison of tonsillectomy rates in 1991 against those in 2011 by strategic health authority

**PoLCE lists**

All PCTs in England had PoLCE lists and tonsillectomy was included on all. Some PCTs seemed to adhere broadly to SIGN recommendations<sup>12</sup> (eg NHS Suffolk) whereas others seemed to have more stringent guidelines (eg NHS North of Tyne). There was therefore significant regional variation in commissioning policy.

**Discussion**

These data were gathered by the NHS and quasi-governmental statistical bodies in order to inform public policy. A number of authors have shown that HES data are of sufficient quality to perform analysis of operative outcome.<sup>15</sup> Others have also shown that HES data can be used routinely to monitor such outcomes.<sup>14</sup> Missing data or miscoding are possible limitations but this is unlikely to affect tonsillectomy and tonsillitis greatly as these are very common and have well defined codes. Many of the codes used were first released in 1992 with OPCS-4, for example, undergoing updates every 18 months, and they are unlikely to undergo sudden and massive changes.

**Table 2** Total number of bed days for tonsillectomy and sore throats

	2001–2002	2010–2011	Change
Inpatient tonsillectomy	55,620	32,585	-41%
Day-case tonsillectomy	2,987	15,199	+409%
All tonsillectomy	58,607	47,784	-18%
Sore throat (tonsillitis, pharyngitis, peritonsillar abscess)	49,740	76,084	+53%
Tonsillectomy + sore throat	108,347	123,868	+14%
Population of England	49,451,000	52,656,800	+6%

There has been no discernable change in clinical admission policy for these diseases; patients with sore throats tend to be admitted when they are unable to swallow. It is possible that the large rise in the tonsillectomy rate in 2005–2006 is owing to artefact but the correlation coefficient suggests a strong negative relationship overall. Comparing the regional and age related rates provides some evidence for reliability and internal consistency.

### Regional variation

There appeared to be considerable regional variation in the total number of tonsillectomies in each region in 1991. Since then, reductions in the order of 40% in every region would appear to have reduced variability.

Kara *et al* posited that there is significant variation in practice around the country.<sup>15</sup> Certain SHAs had also put in place treatment policies that depart significantly from SIGN recommendations.<sup>12</sup> Others seemed to adhere to the SIGN criteria. Although this may not be new, commissioning policy seems to be subject to regional variation.

### PoLCE lists

The introduction of PoLCE lists from 2006 onwards may have slightly accelerated the drop in the tonsillectomy rate. Unfortunately, since this has been relatively recent, firm conclusions cannot be drawn. In the context of a rising tonsillitis rate, a non-evidence-based drive to reduce the tonsillectomy rate could exacerbate the situation.

### No overall savings?

In terms of cost alone, the rising rates for sore throat related admissions may negate any savings from limiting the use of tonsillectomy. Since 2006, the rate for admission of tonsillitis patients has been higher than the tonsillectomy rate. Our data show a net increase in bed days despite a significant fall in the LOS for both tonsillectomies and sore throat related admissions. Although bed days are only a proxy for the cost of emergency admissions, it is probable that no saving has been made overall.

Tonsillectomy seems to be an efficacious treatment if patients are selected using evidence-based criteria. Many papers using standardised quality of life measures before and after tonsillectomy report benefit from the procedure.<sup>16–20</sup> In the study by Hsu *et al*, tonsillectomy would even seem to pass the ‘friends and family’ test.<sup>19</sup>

### Conclusions

A return to the tonsillectomy rates of the 1950s is not desirable or justifiable. However, the controversial indications or poor selection of the past do not mean that tonsillectomy itself is an ineffective procedure.<sup>21</sup> The perceived gain of savings from arbitrarily limiting certain procedures should not prevent health policy makers from considering all the evidence. Surgeons recognise the value of examining every

option in making savings. Nevertheless, health policy should not be decided on the basis of money saving alone.

### Acknowledgement

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