

# Pediatric Posttonsillectomy Hemorrhage: Demographic and Geographic Variation in Health Care Costs in the United States



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## Abstract

**Objective.** To examine variations in management of pediatric posttonsillectomy hemorrhage and associated costs from a national third-party payer perspective.  
**Methods.** The MarketScan database was analyzed for claims made for 30 days following tonsillectomy/adenotonsillectomy between 2008 and 2012 for privately insured children aged 1 to 17 years. Costs for management of postoperative hemorrhage by age, sex, and region were calculated in addition to total costs incurred for 30 days postoperatively.  
**Results.** 305,860 children were included. 0.3% had a postoperative bleed that required treatment but not surgical intervention/hospitalization; 0.2% had one that required hospitalization; and 0.8% had one that required surgical intervention. The mean 30-day costs were \$7660 for postoperative bleed that required surgery/hospitalization, \$4580 for outpatient treatment, and \$370 for no postoperative bleed. Children between 11 and 17 years old were most likely to have interventions for postoperative bleeding but had the lowest mean costs for them (\$7320 for hospital based, \$3860 for outpatient).  
**Conclusions.** There are geographic and demographic variations in managing pediatric posttonsillectomy hemorrhage and in the costs associated with management on a national level.

## Introduction

Although posttonsillectomy bleeds are relatively uncommon, they represent the most costly of complications. Thus, reducing the frequency of tonsillectomy complications and related interventions is important for a fiscally efficient health care system that delivers quality health care at an affordable cost.<sup>1</sup> Current literature does not tell us how postoperative tonsillectomy bleeds in American children are managed or how the costs related to each option compare. Our objective is to examine variations in management of pediatric posttonsillectomy hemorrhage and associated costs from a national third-party payer perspective.

## Methods and Materials

- The MarketScan database was analyzed for claims made for 30 days following tonsillectomy/adenotonsillectomy between 2008 and 2012 for privately insured children aged 1 to 17 years using ICD-9-CM and CPT codes.
- Costs for management of postoperative hemorrhage by age, sex, and region were calculated in addition to total costs incurred for 30 days postoperatively.
- For statistical analysis, we defined 4 study groups on the basis of CPT codes (table 1) and calculated the 99.2% CIs
- Because of the similarity in costs for patients with PTH treated with surgery or hospitalization, these groups were combined for all secondary analyses.

**Table 1. Definition of CPT-Based Study Groups.**

Study Groups by CPT code	Study Groups Defined
• Patients who had code 42962 at any time during the 30 day post-op period	• Bleeding complication requiring surgery
• Patients who did not have code 42962 but who had code 42961 at any time during the 30 day post-op period	• PTH requiring hospitalization
• Patients who did not have codes 42962 or 42961 but did have code 42960 at any time during the 30 day post-op period	• PTH not requiring surgery or hospitalization, but requiring treatment
• Patients who did not have any of these CPT codes during the 30 day post-op period	• No bleeding, or bleeding that was not treated

**Table 2. Summary of Healthcare Costs by Study Group.**

	PTH requiring surgery (n = 2480)	PTH requiring hospitalization (n = 500)	PTH not requiring surgery or hospitalization (n = 860)	No bleeding, or bleeding that was not treated (n = 302020)
Mean (SD)	\$7600 (\$7100)	\$7950 (\$7610)	\$4580 (\$5310)	\$370 (\$4320)
Median (IQR)	\$6010 (\$3680-\$9320)	\$6260 (\$3690-\$9610)	\$2940 (\$1260-\$6070)	\$10 (\$0-\$150)
99.2% CI	(\$7250-\$8000)	(\$1450-\$20,050)	(\$260-\$13,230)	(\$0-\$1420)
Range	(\$440-\$103,400)	(\$360-\$90,110)	(\$110-\$53,830)	(\$0-\$1,903,000)

Abbreviations: 99.2% CI, 95% confidence interval; IQR, interquartile range; PTH, posttonsillectomy hemorrhage. aValues presented in US dollars, unless noted otherwise.

## Results

- There were 301,695 ambulatory and 4165 inpatient tonsillectomies performed (total n = 305,860).
- 2.8% (n = 8518) of children had an episode of hemorrhage.
- Table 2 shows a summary of 30-day postoperative health care costs for each of these groups.
- Table 3 shows mean costs by age for each study group. The mean costs associated with these interventions generally decreased with increasing age. Those between 11 and 17 years old who required treatment for PTH had significantly lower mean costs (inpatient: \$7320, 95% CI: \$6960-\$7730; outpatient: \$3860, 95% CI: \$3390-\$4400) versus children between 1 and 3 years (inpatient: \$8920, 95% CI: \$7940-\$9960; outpatient: \$6300, 95% CI: \$5030-\$7650).
- Table 4 shows mean costs by region for each study group. Among patients who required inpatient intervention, those in the West had significantly higher mean costs (\$8850, 95% CI: \$8170-\$9600) than those in the South (\$7160, 95% CI: \$6780-\$7540) and Midwest (\$7600, 95% CI: \$7210-\$8100). No statistically significant differences were found among regions for patients requiring outpatient intervention.

**Table 3. Groups by Age.**

Age (years)	PTH requiring inpatient intervention Cost*	PTH requiring outpatient intervention Cost*	No bleeding, or bleeding that was not treated Cost*
1-3	\$8920 (\$7940-\$9960)	\$6300 (\$5030-\$7650)	\$540 (\$510-\$570)
4-6	\$7870 (\$7250-\$8460)	\$5130 (\$4460-\$5830)	\$300 (\$290-\$310)
7-10	\$7510 (\$7080-\$7980)	\$5130 (\$4350-\$6050)	\$290 (\$270-\$300)
11-17	\$7320 (\$6960-\$7730)	\$3860 (\$3390-\$4400)	\$410 (\$370-\$470)
Total			

Abbreviation: PTH, posttonsillectomy hemorrhage.

\*Mean cumulative health care costs at 30 days postdischarge, adjusted to 2012 dollars, with 95% confidence intervals in parentheses.

**Table 4. Groups by Region.**

Region	PTH requiring inpatient intervention Cost*	PTH requiring outpatient intervention Cost*	No bleeding or bleeding that was not treated Cost*
Northeast	\$8170 (\$7500-\$8880)	\$5290 (\$3970-\$6990)	\$400 (\$370-\$440)
Midwest	\$7600 (\$7210-\$8100)	\$4420 (\$3900-\$4920)	\$360 (\$330-\$410)
South	\$7160 (\$6780-\$7540)	\$4720 (\$4200-\$5290)	\$350 (\$340-\$370)
West	\$8850 (\$8170-\$9600)	\$4090 (\$3220-\$5050)	\$410 (\$380-\$440)
Total			

Abbreviation: PTH, posttonsillectomy hemorrhage.

\*Mean cumulative health care costs at 30 days postdischarge, adjusted to 2012 dollars, with 95% confidence intervals in parentheses.

## Discussion

Most tonsillectomy procedures (97.2%) did not result in hemorrhage. Managing a bleed with surgery was \$350 less than when hospitalization without surgery occurred, which is counterintuitive that reimbursement is not higher if the OR is utilized. Whether private insurers reimburse less here or whether the costs are actually lower is unknown.

Children 11 and 17 years old had lower costs for either PTH intervention as compared with children between 1 and 3, who had the highest mean costs (\$8920 for inpatient and \$6300 for outpatient intervention). The latter may require more monitoring and more care thereby contributing to higher costs. There were regional differences, as the West had the highest costs of inpatient interventions (\$8850). There are regional differences outside the scope of this study—for example, inflation rates and consumer price indices are typically lower in the South region.<sup>2</sup> Local management strategies may also affect costs, and these are not described in the database used.

## Conclusions

29% of children with PTH had surgery for control of bleeding, but reimbursed costs were lower than for children that had no surgery. Costs to manage PTH were higher in the youngest children and lower in teenagers, but the latter group composed almost half the bleeding group. The West had the highest costs of inpatient interventions.

## References

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