With >500,000 cases performed annually, adenotonsillectomy is 1 of the most commonly performed pediatric surgeries in the United States and comprises >15% of surgical procedures in children younger than age 15 years.1,2 The primary indication for tonsillectomy has shifted over the last 20 years from recurrent infections to obstructive sleep-disordered breathing and obstructive sleep apnea (OSA).3,4 Polysomnography physiologically measures sleep efficiency and sleep architecture and has long been held as the gold standard for the diagnosis and grading of OSA. Although there are many in-depth survey tools targeted at evaluating specific areas of clinical improvement, such as quality of life (QoL) and symptom scores, they can be cumbersome and lack generalizability to other outcomes. Resolution of polysomnography abnormalities has been suggested as a central post-treatment benchmark. In this issue of Pediatrics, in their article, “Polysomnography and Treatment-Related Outcomes of Childhood Sleep Apnea,” Isaiah et al5 explore the validity of using postoperative polysomnography as a proxy for different domains of clinical improvement after tonsillectomy performed in children for OSA.

OSA has significant short- and long-term health and QoL concerns. It has been associated with a 5-point decrease in IQ, hypersomnolence, emotional lability, decreased attention, small stature, enuresis, cardiopulmonary morbidity, and missed school.6 Further evidence of this relationship is seen in the reported improvements in behavior, attention, QoL, neurocognitive functioning, enuresis, parasomnias, and restless sleep and in the reversal of associated cardiovascular sequelae.7,8 In a 2009 meta-analysis, Bonuck et al9 showed a significant improvement in both height and weight as well as an increase in serum growth biomarker levels after tonsillectomy.

The year 2013 saw the publication of the Childhood Adenotonsillectomy Trial (CHAT).10 CHAT was the first large randomized trial in which tonsillectomy was compared with observation and was performed in children aged 5 to 9 years. A total of 464 children were randomly assigned into either early adenotonsillectomy or watchful waiting groups. Polysomnography, cognitive, behavioral, and health outcomes were assessed at baseline and 7 months postsurgery.10 The adenotonsillectomy group demonstrated significantly greater improvement in symptoms, behavior, QoL, and polysomnography outcomes but not in executive function and attention. In addition, 79% of patients in the adenotonsillectomy group showed normalization of their polysomnography results compared with 46% of patients in the observation group. An Agency for Healthcare Research and Quality systematic review and subsequent meta-analysis from 2017 revealed that tonsillectomy was associated with improvements in symptoms, QoL, and behavior as well as a mean reduction.
in the Apnea-Hypopnea Index of 4.8, as measured by polysomnography, when compared with observation.11,12

In 2019 The American Academy of Otolaryngology–Head and Neck Surgery Foundation released updated clinical practice guidelines endorsed by the American Academy of Family Physicians, the American Academy of Sleep Medicine, and the American Society of Pediatric Otolaryngology, among others.13 These guidelines recommend tonsillectomy for children with OSA. They also advocate for routine preoperative polysomnography in children younger than 2 years and in those with obesity, Down syndrome, craniofacial disorders, mucopolysaccharidoses, neuromuscular disorders, and sickle cell disease. Polysomnography is also recommended if the diagnosis is uncertain or if there is a discrepancy between history and the physical examination. According to an American Society of Pediatric Otolaryngology survey, <6% of pediatric otolaryngologists obtained a preoperative polysomnogram most of the time, and postoperative studies were even more rare.14 Although previous recommendations have been in favor of routine pre- and postoperative polysomnography, the 2019 American Academy of Otolaryngology–Head and Neck Surgery guidelines offer no specific recommendations for obtaining a postoperative polysomnogram and identify this as a gap in the existing knowledge.13

Isaiah et al5 employed causal mediation analysis. In this study, 2 mediators, (1) symptomatic resolution and (2) decreased severity of OSA, are modeled against a variety of clinical posttonsillectomy outcomes. This was done by using data from the CHAT database; the general model is visually demonstrated in Figure 1 of their article.5 The rationale for doing this was to understand if polysomnography results were a suitable proxy for other clinical outcomes. Causal mediation was noted in a significant portion of the changes in standardized symptoms scores, as measured by the Epworth Sleepiness Scale and the Pediatric Sleep Questionnaire, and disease-specific QoL scores. Causal mediation was absent from the remaining outcomes displayed in Supplemental Table 1 of the Isaiah et al5 article. This suggests that the postoperative polysomnography severity score alone is not a suitable surrogate for other clinical outcomes. Isaiah et al5 suggest that the differences observed in clinical outcomes are not a direct result of tonsillectomy improving polysomnography severity scores but do not explore another pathway that explains the outcomes. Although the data are limited by the age range of patients and the possibility that polysomnography may take longer than the follow-up period to normalize, it is helpful to know the limitations of applying polysomnography metrics to other outcomes.

Obtaining polysomnograms is labor and resource intensive, and high-quality pediatric polysomnography is not always available to all patients. Given the associated health care burden of obtaining these data, the utility of polysomnography to alter the course of care must be carefully weighed in the context of the care of the individual patient.

**ABBREVIATIONS**

CHAT: Childhood Adenotonsillectomy Trial

OSA: obstructive sleep-disordered breathing and obstructive sleep apnea

QoL: quality of life

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Pediatric Tonsillectomy: A Surgery in Search of an Outcome Measure
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Pediatrics 2019;144;
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