

Have You Heard?

Ontario & the Unique Opportunity to Study Ear Disease

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• I have no actual or potential conflicts of interest in relation to this educational program

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- Hearing
- Vestibular (balance) function

- <u>Objectives</u>
 - 1. Describe the unique opportunity Ontario presents for the study of ear disease
 - 2. Describe new risk factors for ear disease
 - 3. Describe the results of current treatment options

What happens when the ear doesn't work well?

Recurrent infections

– Pain

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- Need for antibiotics
 - Most common reason for antibiotics in young children
- Lost days at work/school

• Hearing loss

- Speech & communication difficulties
- Impaired functioning at work
- Social isolation
- Tinnitus (ringing in the ears)

Hearing Loss



Normal



Ear infection

Perforation Umbo Stapes Kiddle ear

Tympania membrana Cholestaatoma

Hole in Eardrum

Skin Cyst



- Acute infection
 - Antibiotic therapy
- Recurrent infections and fluid build-up
 - Tympanostomy Tubes ("ear tubes")
 - Most common outpatient surgery performed on children
 - Drain fluid
 - Improve hearing
 - Reduce bacterial infections









With this tremendous opportunity, let's answer some important questions.









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Clinical Predictors of Multiple Tympanostomy Tube Placements in Ontario Children

Jason A. Beyea, MD, PhD, FRCSC D; Paul Nguyen, MSc, PhD; Stephen F. Hall, MD, MSc, FRCSC

Objectives: To characterize risk factors that predict the need for multiple tympanostomy tube (TT) procedures. **Study Design:** Retrospective population-based cohort study of children aged 18 years and younger in Ontario, Canada, who underwent at least one TT placement between January 1, 1994, and October 31, 2013.

Methods: The relative risk (RR) of need for multiple TT procedures was determined using log-binomial regression.

Results: There were 193,880 children who underwent TT insertion included in this cohort. Of these, 28.58% underwent at least two separate TT procedures. Over time, the RR of undergoing multiple TT procedures is decreasing for all children. In general, the younger the child was at the first TT procedure, the more likely the child was to undergo multiple TT procedures. Significantly higher RR for multiple TT procedures also was associated with male sex, the second-highest neighborhood income quintile, asthma or reactive airways, gastrointestinal disease, prematurity, or cleft lip and/or palate. Significantly lower RR for multiple TT procedures was associated with adenoidectomy or tonsillectomy (with or without adenoidectomy) at first TT placement or within 3 years prior. Furthermore, the benefit of adjuvant adenoidectomy or tonsillectomy was present for children aged under 4 years, in addition to those aged 4 years and older.

Conclusion: Among Ontario children who have had TT placement, more than one in four will have multiple sets placed. These identified risk factors permit improved preoperative counseling and enable identification of children who need closer follow-up.

Key Words: Hearing loss, otitis media, outcomes. Level of Evidence: 2b.

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- Risk of needing 2 or more sets of ear tubes -1 in 3.5 children
- Gender disparity
 - -60-63% of patients were male
 - Ontario pediatric population: 51.1-51.4% male
- Children with Asthma/reactive airways much more likely to have ear disease
 - 30.9% of cohort
 - Canadian pediatric asthma prevalence 13.4%



*all p<0.05, except 3.5 to 4.5



Relative Risk of Needing More Tubes

| | ≥2 Tube Surgery | ≥3 Tube Surgery | ≥4 Tube Surgery | ≥5 Tube Surgery |
|------------------|-----------------|-----------------|-----------------|-----------------|
| Male | 1.056* | 1.075* | 1.082* | 0.996 |
| Asthma | 1.075* | 1.146* | 1.247* | 1.333* |
| Prematurity | 1.143* | 1.286* | 1.442* | 1.596 * |
| Cleft lip/palate | 1.493* | 2.328* | 3.322* | 4.847* |

All of these factors <u>increase</u> the risk

*p<0.001



Relative Risk of Needing More Tubes

| | ≥2 Tube Surgery | ≥3 Tube Surgery | ≥4 Tube Surgery | ≥5 Tube Surgery |
|-------------------------------|-----------------|-----------------|-----------------|-----------------|
| Adenoidectomy | 0.614* | 0.485* | 0.461* | 0.424* |
| Tonsillectomy +/- Adenoids | 0.600* | 0.513* | 0.502* | 0.490* |

These adjuvant surgeries <u>reduce</u> the risk

*p<0.001





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- Higher risk of ongoing ear disease:
 - Males
 - Asthmatics
 - Born premature
 - Cleft lip/palate
- Reduced risk of ongoing ear disease:
 - Adenoidectomy
 - Tonsillectomy



What about hearing loss?

Current Guidelines: Hearing Assessment Rosenfeld et al **S9** Table 6. Summary of guideline action statements. Statement Action Strength Clinicians should obtain an age-appropriate hearing test if OME persists for 3 2. Hearing testing Recommendation months or longer (chronic OME) OR prior to surgery when a child becomes a candidate for tympanostomy tube insertion.

- All children should undergo a hearing test prior to ear tube surgery.
 - Is this happening?



Original Research

Audiometric Testing Guideline Adherence in Children Undergoing Tympanostomy Tubes: A Population-Based Study

Jason A. Beyea, MD, PhD, FRCSC¹, Emily Rosen, MCISc, CASLPO², Trina Stephens, MSc¹, Paul Nguyen, PhD³, and Stephen F. Hall, MD, FRCSC¹ AMERICAN ACADEMY OF OTOLARYNGOLOGY-HEAD AND NECK SURGERY

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We are **<u>not</u>** meeting our guidelines



Table 2. Comparison of Audiometric and Impedance Testing before and after Introduction of the 2013 AAO-HNSF Guidelines.

| | Before and After Introduction of July 2013 AAO-HNS Guidelines ^a | | | | |
|-----------------------------------|--|---------------------------|------------------------|---------|--|
| | Before Guidelines, No. (%) | After Guidelines, No. (%) | Relative Risk (95% CI) | P Value | |
| Preoperative audiometric testing | 21,321 (69.08) | 20,849 (72.72) | 1.12 (0.85-1.47) | .432 | |
| Preoperative impedance testing | 22,887 (74.15) | 22,154 (77.28) | 1.40 (0.84-2.34) | .192 | |
| Postoperative audiometric testing | 18,874 (61.15) | 18,697 (65.22) | 1.10 (0.82-1.48) | .516 | |
| Postoperative impedance testing | 19,561 (63.38) | 19,265 (67.20) | 1.44 (0.97-2.13) | .069 | |

Abbreviations: AAO-HNSF, American Academy of Otolaryngology—Head and Neck Surgery Foundation; CI, confidence interval.

^aAnalysis is for tympanostomy tubes placed before publication (August 1, 2010, to June 30, 2013) of AAO-HNSF guidelines and after publication (August 1, 2013, to June 30, 2016).

Introduction of the guidelines had <u>no effect</u> on physician behavior





AMERICAN ACADEMY OF OTOLARYNGOLOGY-HEAD AND NECK SURGERY F O U N D A T I O N

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- Hearing tests are performed much less often than expected, but this is improving
- Introduction of guidelines did not change physician behaviour
- Significant geographic variability in hearing testing



Ear Tubes are meant to prevent worsening ear disease. Is this reality?



- Many new risk factors (some modifiable) for ear disease
- Guideline adherence remains an ongoing opportunity

We continue to learn how to better care for our patients

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