



## Tracheostomy care: Clinical practice patterns of pediatric otolaryngologists-head and neck surgeons in a publicly funded (Canadian) health care system

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### ABSTRACT

**Objectives:** To investigate variability in pediatric tracheostomy tube care practice patterns and access to resources across Canada.

**Methods:** Canadian pediatric otolaryngologists-head & neck surgeons reported their own practice patterns for children with chronic tracheostomy tubes using a web-based, 29-item multiple choice and short answer questionnaire. Domains investigated included tracheostomy team membership, inpatient care practices, caregiver education, homecare resources, speech and communication, and completeness of emergency tracheostomy kits. **Results:** The response rate was 86.4% (38/44). Most respondents care for children with tracheostomy tubes as part of an inter-professional team (25/36; 69.4%) and arrange routine follow-up with a speech and language pathologist (22/36; 61.1%). However, the majority (23/34; 67.6%) of respondents do not formally reassess caregiver competencies (i.e. cardiopulmonary resuscitation, emergency tracheostomy care). Notably, respondents were also unsure 36.1% (13/36) of how frequently Shiley tracheostomy tubes should be washed and reused with the majority (15/36; 41.7%) reporting never. Most (15/36; 41.7%) respondents were also unsure of reuse recommendations for Bivona tracheostomy tubes. One third (12/36; 33.3%) of respondents were unsure about government-funded homecare services being provided in their community to children with tracheostomy tubes.

**Conclusion:** There is much variability in pediatric tracheostomy tube care practice patterns across Canada. Results suggest that an evidence-based Canadian clinical practice guideline may help to streamline care provided to Canadian children with tracheostomy tubes.

### 1. Introduction

A tracheostomy is a surgically created passage through the neck into the trachea, performed to bypass an upper airway obstruction, facilitate long-term mechanical ventilation and/or allow for pulmonary clearance [1]. Children with tracheostomies are at risk for recurrent hospitalization due to tracheostomy-related complications, such as respiratory infections [2,3]. The American College of Surgeons National Surgical Quality Improvement Pediatric Program demonstrated that the highest contribution to morbidity in otolaryngology is seen in children younger than two years of age undergoing tracheostomy [4]. Clearly, there is a need to identify and optimize the care of children undergoing tracheostomy.

A multidisciplinary team approach that applies consistent care

practices appears to be the best way to manage the many complexities seen in children with tracheostomy tubes [5–7]. The American Association of Otolaryngology-Head & Neck Surgery (AAOHNHNS) guideline for tracheostomy tube care highlights that efforts should be made to minimize variations in practice when caring for patients with tracheostomy tubes with the goal of minimizing tracheostomy tube related complications, prolonged hospitalizations and death [8].

Tracheostomy tube care practices in a publicly funded healthcare system have not yet been investigated. Institution of standardized practices at a national level is faced by a number of challenges. Utilizing standard care guidelines in a publicly funded setting may prove even more challenging based on resource limitations. However, it also presents a unique opportunity to streamline national practices given there are still variations in care even amongst a relatively small group of

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involved healthcare professionals.

The aim of our study is to describe the clinical practice patterns of Canadian pediatric otolaryngologists regarding chronic tracheostomy tube care and to examine community resource variability (speech language, homecare professionals, etc.) in Canada with the goal of working towards standardizing care across the country and improving pediatric tracheostomy tube related complications and overall outcomes.

## 2. Methods

A cross-sectional survey of pediatric otolaryngologists-head and neck surgeons was conducted from January 1 to May 31, 2017 (Supplement A). This study utilizes a similar model to survey based study of physicians prepared by Senders at al [9]. This study was approved by The Research Ethics Boards at the Hospital for Sick Children (REB #1000051363).

An online external REDCap (Research Electronic Data Capture; Vanderbilt University, Nashville) survey regarding current practices for caring for children with tracheostomy tubes was developed by the authors who have expertise in pediatric otolaryngology and long-term ventilation. The 29-item survey consisted of multiple choice and short answer questions. Investigated domains included tracheostomy team membership, inpatient care practices, caregiver education, homecare resources, speech and communication, as well as ongoing assessments of emergency tracheostomy kits. The survey was emailed to Canadian pediatric otolaryngologists using addresses obtained from hospital websites, phone communication with administrative personnel and the authors' social networks. The data collection tool allowed only a single response per participant via an individualized survey link and all participation was voluntary and anonymous. Each potential study participant received a first email reminder 2 weeks after the initial survey, a second reminder at 12 weeks and a third reminder at 14 weeks. Descriptive statistics were used to summarize study results. Microsoft excel (Microsoft, Washington) was used for quantitative and qualitative data analysis. Thirty-eight of 44 (86.4%) pediatric otolaryngologists-head and neck surgeons responded. Partial responses were identified for 9 survey items and all surveys were included in data analysis.

## 3. Results

### 3.1. Respondent demographics

All respondents identified themselves as working in an academic hospital. Respondents practiced in 6 of 10 provinces, and 1 of 3 territories. The geographic representation of respondents is summarized in Table 1. The majority (40%) had been in practice 11–20 years, 29% between 5 and 10 years, 18% greater than 21 years, and 13% less than 5 years.

### 3.2. Tracheostomy team membership

The majority of respondents (25/36) had a multidisciplinary inpatient tracheostomy team at their institution, all of which had a

**Table 1**  
Geographic representation of the survey respondents.

Province/Territory	Number of survey respondents (n = 38)
Ontario	15 (39.5%)
Quebec	7 (18.4%)
Alberta	6 (15.8%)
British Columbia	5 (13.2%)
Nova Scotia	3 (7.9%)
Manitoba	2 (5.3%)
Nunavut	1 (2.6%)

\*No respondents from Provinces/Territories not listed.

**Table 2**

Tracheostomy team membership of inpatient and outpatient tracheostomy teams across Canada as per survey respondents.

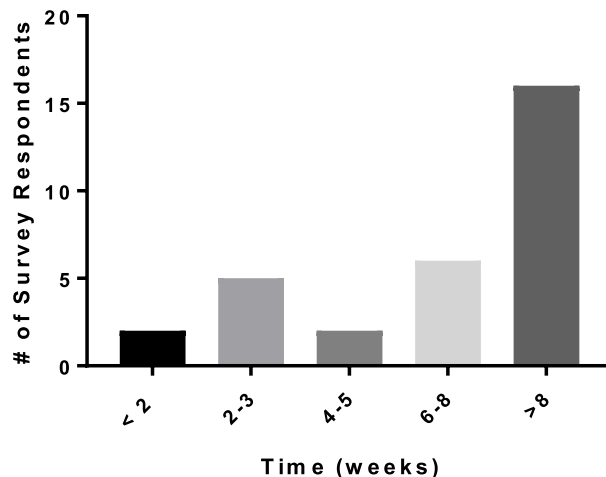
Inter-professional designation	Survey Respondents	
	Inpatient team membership (n = 25)	Outpatient team membership (n = 24)
Otolaryngologist	25 (100%)	23 (95.8%)
Pediatrician	11 (44.0%)	4 (16.7%)
Neonatologist	6 (24.0%)	0 (0%)
Respirologist	19 (76.0%)	19 (79.2%)
Intensive Care Physician	9 (36.0%)	3 (12.5%)
Respiratory Therapist	18 (72.0%)	15 (62.5%)
Nurse Practitioner	13 (52.0%)	12 (50.0%)
Registered Nurse	14 (56.0%)	14 (58.3%)
Social Worker	9 (36.0%)	8 (33.3%)
Speech Therapist	9 (36.0%)	8 (33.3%)
Pharmacist	1 (4.0%)	1 (4.2%)
Dietician	4 (16.0%)	3 (12.5%)
Other: ethicist, geneticist, palliative care/assist team, home care coordinator	3 (12.0%)	2 (8.3%)

pediatric otolaryngologist-head and neck surgeon as a member (Table 2). Most (24/37; 64.8%) had a dedicated outpatient tracheostomy clinic at their institution.

### 3.3. Tracheostomy care practices

Most (22/37; 59.5%) pediatric otolaryngologists – head and neck surgeons reported an average length of stay for non-ventilated patients from tracheostomy tube insertion to discharge home lasting greater than 6 weeks (Fig. 1). Six (6/37; 16.2%) respondents were unsure of the average length of stay at their institution. Most (32/37; 86.4%) patients with new tracheostomy tubes do not transition to rehabilitation facilities prior to discharge home.

Shiley (Medtronic, Minneapolis, USA) and Bivona (Smiths Medical, Minneapolis, USA) tracheostomy tubes were used by 100% (37/37) and 97.3% (36/37) of respondents, respectively. The majority (21/37; 56.7%) primarily used Shiley tubes and the rest primarily used Bivona tubes (17/37; 45.9%). A small subset of respondents (2/37; 5.4%) reported also using custom designed tracheostomy tubes made by TRACOE (TRACOE medical, Neider-Olm, Germany) or Portex (Smiths Medical, Minneapolis, USA). Cuffed tracheostomy tubes were most commonly used in children requiring long-term ventilation (33/36; 91.7%), who had chronic aspiration (8/36; 22.2%) or a consistent leak



**Fig. 1.** Average length of stay from tracheostomy to discharge home for non-ventilated patients as reported by survey respondents.

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