

Airway Procedures in Pediatric Emergency Medicine: A Worldwide Survey of Provider Experience and Confidence: A Pediatric Emergency Research Networks (PERN) Study



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Background

- Airway management procedures are critical, but rarely performed in pediatric emergency medicine
- Limited data exist on the frequency of procedural performance and provider confidence

Objectives

- To determine the frequency with which senior pediatric emergency clinicians perform or supervise airway procedures including: bag-mask ventilation (BMV), endotracheal intubation (ETI), laryngeal mask airway (LMA) insertion, tracheostomy tube change (trach Δ), and surgical airway
- To investigate predictors of procedural confidence

Methods

The PERN Critical Procedures Survey

- Multicenter cross-sectional survey of senior pediatric emergency clinicians
- 101 hospitals w/in Pediatric Emergency Research Network (PERN)
- Distributed between August 2015 and July 2016.
- At least 1 study investigator per network
- Nominated researcher at each hospital distributed a "clinician survey" to eligible staff

Inclusion criteria

- Physicians who served in a supervisory / "senior" capacity in the ED
 - Can include: all attendings, specialist staff, trainees / residents working night shift without more senior supervision

Survey content

- Demographics, hours of work, and type of training
- Most recent clinical experience performing or supervising airway procedures, or with hands-on practice or procedural teaching
- Confidence reported using 5-point Likert scale

Survey distribution

- Initial email, weekly reminders x 2

Analysis

- Last clinical experience dichotomized to w/in last year or ≥ 1 year
- Confidence dichotomized to not confident (1-3) or confident (4-5)
- Multivariate regression to assess associations between confidence and experience

Results

The survey was distributed to 2446 participants in 101 emergency depts..

- 1490 (61%) provided data on performance & confidence for airway procedures

Table 1: Demographic Information

	n=1,490
Region	
Australia / NZ	186 (12)
Canada	150 (10)
United Kingdom and Ireland	406 (27)
Europe	113 (8)
South America	36 (2)
United States	599 (40)
Sex (male)	661 (45)
Age in years	39 [34, 46]
Average weekly clinical hours in the ED	25 [18, 32]
PEM specialty qualification	713 (48)

Values in table represent frequency (percent) or median [interquartile range]

Figure 1: Performance or Supervision of Airway Procedures Within the Last Year

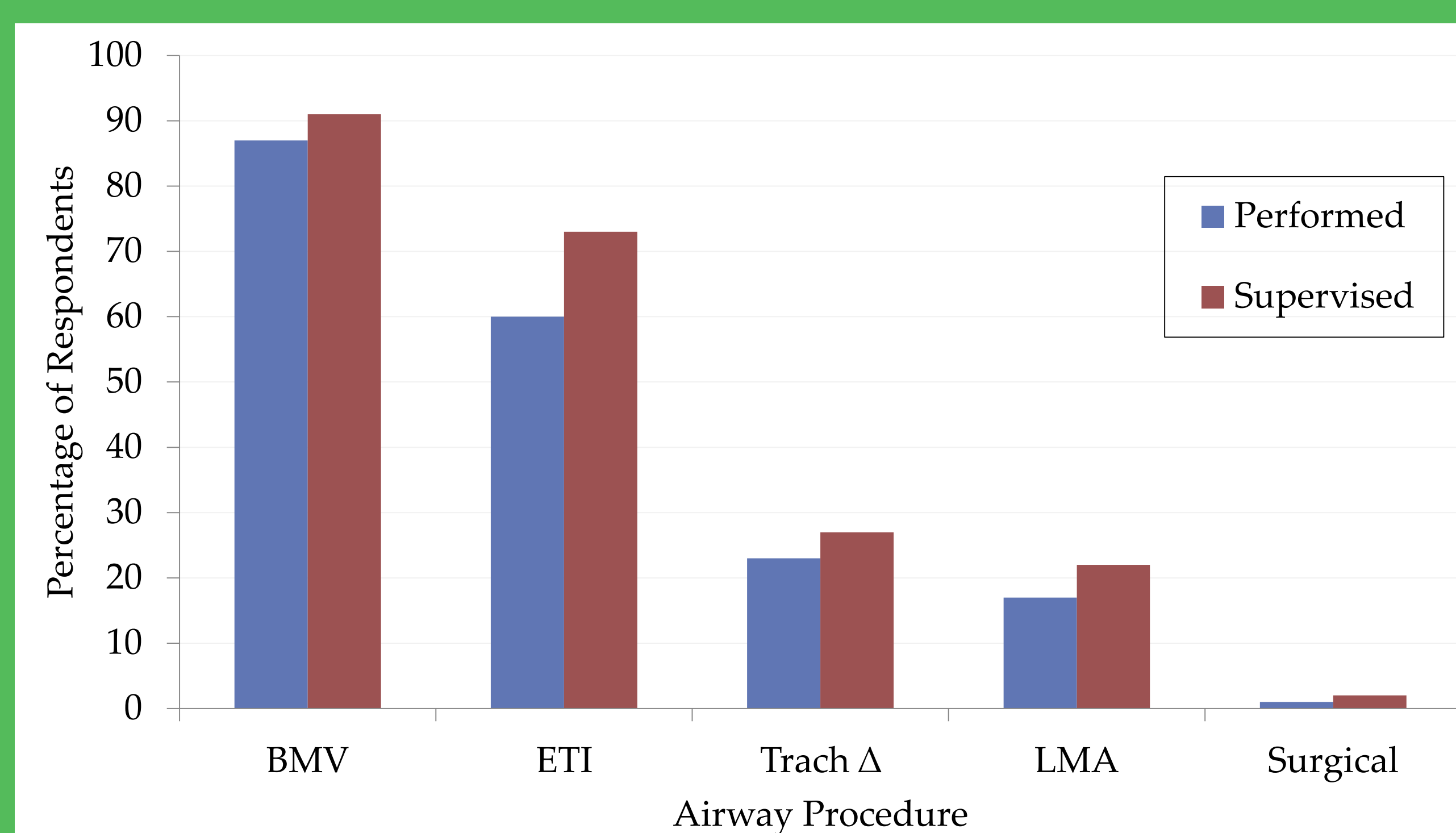


Figure 2a & b: Providers Confident in Performing Procedures, ETI and LMA by Patient Age

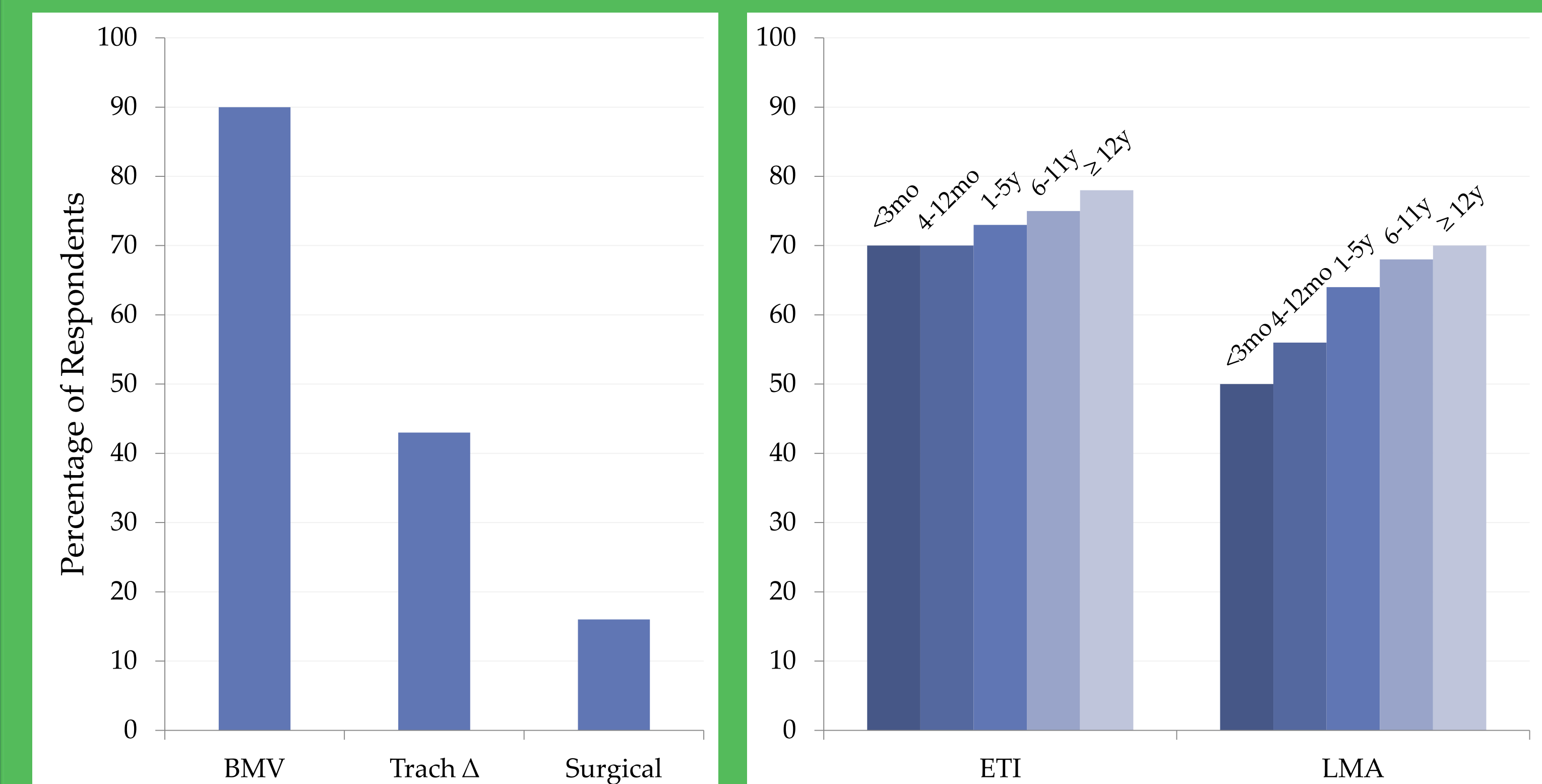


Table 2. Predictors of Confidence Across Pediatric Airway Procedures, ETI and LMA by Age

Procedure	Predictors:		
	Performed within last year	Supervised within last year	Hands on practice within last year
Bag-mask ventilation	not estimated ¹	8.5 (4.5, 16.1)	3.2 (1.7, 6.0)
Endotracheal intubation			
< 3 months	3.2 (2.4, 4.4)	4.4 (3.2, 6.1)	1.2 (0.9, 1.8)
4-12 months	3.2 (2.3, 4.4)	4.2 (3.1, 5.8)	1.3 (0.9, 1.9)
1-5 years	4.2 (3.0, 6.0)	4.8 (3.4, 6.7)	1.1 (0.7, 1.6)
6-11 years	3.3 (2.3, 4.7)	5.3 (3.7, 7.6)	1.1 (0.7, 1.6)
≥12 years	2.3 (1.6, 3.3)	4.8 (3.3, 6.9)	1.1 (0.7, 1.6)
Laryngeal mask airway (LMA)			
< 3 months	2.6 (1.8, 3.7)	2.3 (1.5, 3.6)	1.8 (1.4, 2.3)
4-12 months	2.4 (1.6, 3.6)	2.7 (1.6, 4.4)	2.3 (1.8, 3.0)
1-5 years	2.5 (1.6, 3.8)	3.6 (1.9, 6.7)	1.9 (1.5, 2.5)
6-11 years	2.4 (1.5, 3.8)	3.2 (1.7, 6.1)	2.2 (1.6, 2.8)
≥12 years	2.3 (1.5, 3.7)	3.0 (1.6, 5.8)	2.2 (1.6, 2.8)
Surgical airway – needle cric	0.8 (0.1, 9.6)	20.9 (1.9, 232.3)	2.7 (1.9, 3.7)
Surgical airway – Seldinger	0.7 (0.0, 38.3)	20.9 (1.5, 298.9)	2.8 (1.9, 4.0)
Surgical airway – open technique	12.4 (1.7, 90.3)	not estimated ²	6.0 (4.0, 9.0)
Change of tracheostomy	3.4 (2.2, 5.1)	10.1 (5.7, 17.6)	3.62 (2.58, 5.08)

Values in table represent odds ratio (95% confidence interval), adjusted for provider age, sex, specialty, and training status (ie, specialist versus trainee) ¹dropped due to collinearity, ²dropped due to sparse data

Conclusions

BMV and ETI are the most commonly performed airway procedures, and surgical airways are very rare in pediatric emergency medicine.

Clinical confidence varies across airway procedures, with additional variation by age for ETI and LMA placement.

Supervising airway procedures may serve to maintain procedural confidence for providers despite infrequent opportunities as the primary proceduralist.

The relationship between self-reported confidence and procedural proficiency was not studied.