

THE FEASIBILITY AND USE OF SIMULATION TO ASSESS PARENT LEARNING: IMPLEMENTATION AND EVALUATION OF THE PAWS PROGRAM

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What was the identified problem?

Number of children dependent upon long term mechanical ventilation (LTMV) has increased significantly over the last decade with the most recent figures available suggesting 173.6 children per 100,000

- Increased risk for mortality, morbidity, and readmissions related to compromised respiratory systems and require complex, hands on care
- Quality of care a child receives in the home is directly linked to their long-term health outcomes
- Families are not prepared and preparedness matters
- Edwards and colleagues conducted a survey which reviewed the records of 54 children totaling 295 patient years of LTMV and demonstrated that 68 severe emergencies and four eventual deaths of these children were all directly linked to inefficient care within the home environment

Proposed Solution

- Improve parent discharge education → Program development!
- Parent Airway Assessment with Simulation (PAWS)
 - examined the benefits of adopting a revised discharge education program that combined research driven clinical evidence with the best teaching modality used in the clinical setting
- Parents who will be providing care to their child dependent on LTMV post discharge must also be proficient in caring for their child's tracheostomy, which is often the first step in parent education
- This feasibility study was focused on tracheostomy care and was designed around the four key skills needed to safely and effectively manage a pediatric artificial airway in the home setting (trach site assessment, trach change, suctioning, securement)



Literature Review: Pediatric Tracheostomy Care

Pediatric-specific tracheostomy literature was reviewed to drive best practices and embedded these practices throughout the program

- Skin integrity
- Trach suctioning
- Trach securement
- Trach changes

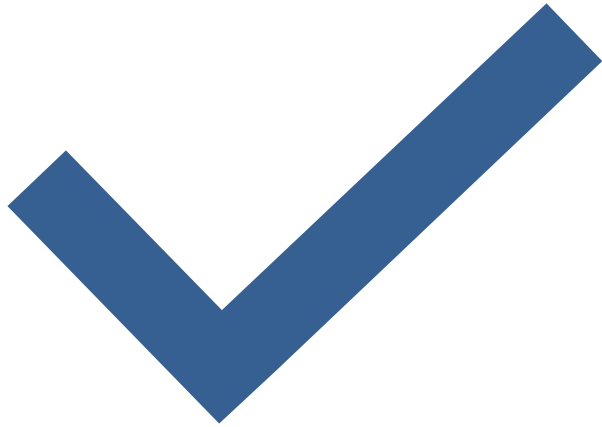
Consensus decisions were found within several sources and were used to guide development of this program



Literature Review: Simulation Education for Adult Learners

- Successful mode of providing education to novice healthcare providers and has demonstrated benefits in both decision making and psychomotor development in this population of learners
- Deliberate practice associated with simulation training can secure and transform skills, moving learners from novice to expert
- Simulation is used widely in various levels of healthcare education, however very few studies have focused on the direct impact of nursing care on patient outcomes with this area of study remaining largely undeveloped

Current Publications



- Three existing published studies were identified in which simulation has been successfully applied to parent discharge education.
- In all three cases benefits were demonstrated
- The addition of simulation to existing discharge education program was able to provide the parents with an environment to demonstrate and practice skill proficiency in a setting that was safe and risk free
- **Quantitative skill assessment was not evaluated any of the three published studies**

PROGRAM DEVELOPMENT & IMPLEMENTATION

PAWS—Parental Airway Education with Simulation

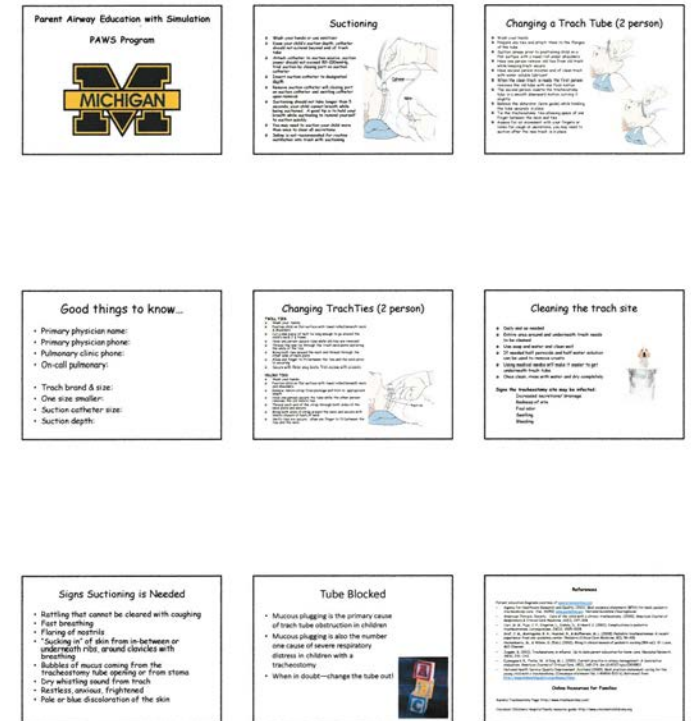
- **GOAL:** To assess and evaluate existing caregiver education and provide educational reinforcement with deliberate repetition of hands on skills.
- In **ADJUNCT** to standard discharge education and planning with no changes to existing discharge teaching and planning



TOOLS

Resource Cards

- Resource cards are a proven method of staff education in intensive care nursing units and are widely used in health education to simplify complex information and break it into manageable steps
- Total of eight cards categorized into needed actions along with a patient specific emergency contact card
- Systematic instructions for each component of tracheostomy care
- Photos were clear and easy to follow



Skill Checklists (4)

- Four skill checklists developed
- CVI
 - 10 clinical experts
 - Four-point relevancy scale
 - Each item was evaluated and each of the four skill checklists had an average CVI calculated
 - The CVI values ranged from 0.5 to 1.0; items with a CVI > 0.8 were retained as written on the checklist.
 - Items with a CVI calculated as less than or equal to 0.8 were reworded, clarified, and re-evaluated to ensure that the tool, as developed, had the capability to measure the parent's skills during simulation

Parent Checklist: SUCTIONING

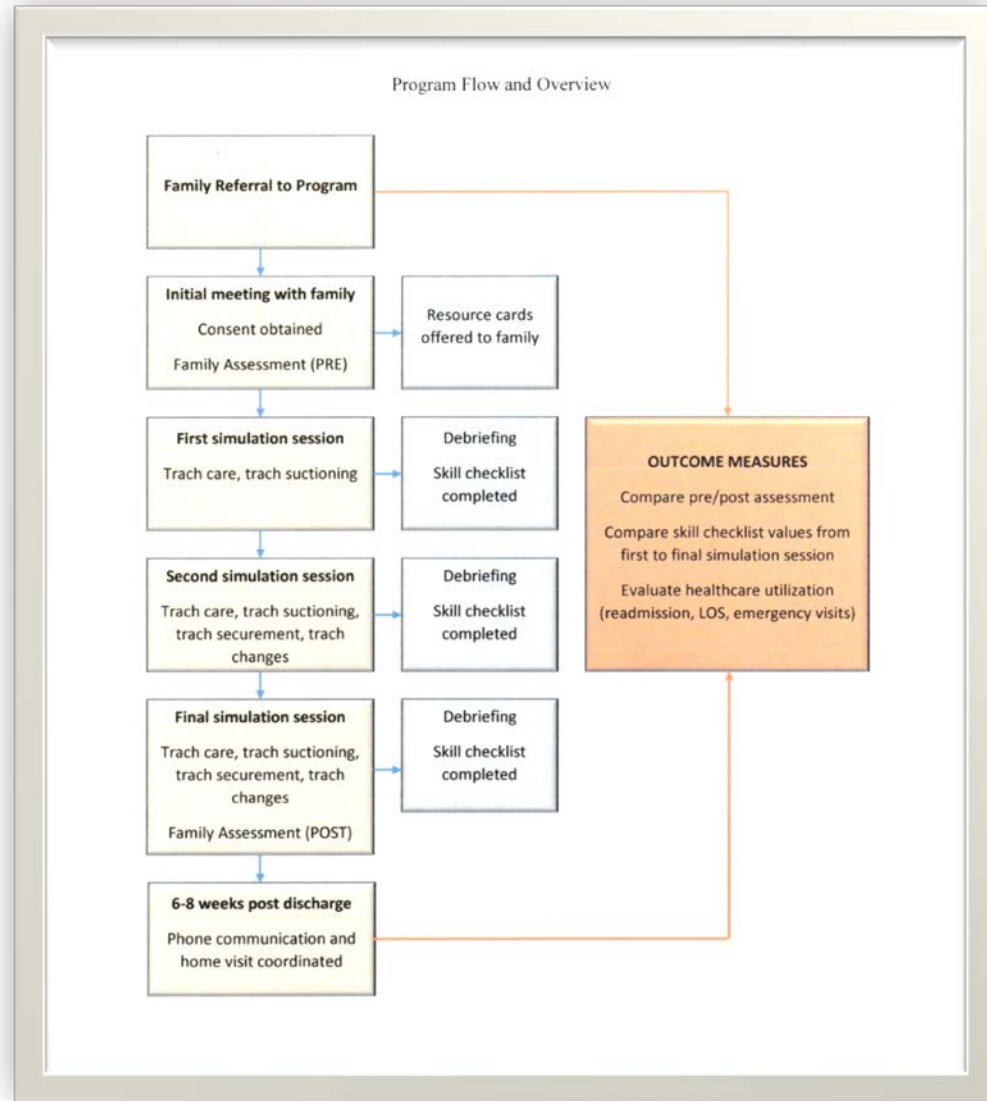
Skill: SUCTIONING	Point 1pt/ skill	Rationale
1. Wash hands or use hand sanitizer		Effective handwashing can decrease risk of infection
2. Correctly identify clinical signs that suctioning is needed		Decreased air exchange, decreased SpO ₂ , coughing may indicate increased secretions in trach tube
3. Know proper suctioning depth		Deep suctioning can cause epithelial damage and permanent indentions within the bronchial branches
4. Be able to show proper suctioning depth marking on catheter		Deep suctioning can cause epithelial damage and permanent indentions within the bronchial branches
5. Prepare suction machine (attach suction catheter, turn on)		

Family Assessment Questionnaire

- Parental confidence was measured on the 18 item, 4-point Likert like scale
- At the time of development, the Family Assessment Survey was referred to pediatric sub specialty services at two children's hospitals as well as a team of pediatric and neonatal ICU nurses and respiratory care therapists
- In addition, the survey was shared with a group of over 150 families now caring for children with tracheostomies to obtain feedback on topic inclusion and to insure the wording was clear for laypersons and was not filled with complex medical jargon

PAWS Program Intervention and Outcome Evaluation

Pre-Intervention Assessment	Intervention	Post-Intervention Assessment
Pre-Family Assessment Survey	Resource Cards	
	Simulation Session 1: Skin Integrity and Trach Suctioning	Skill Checklist Debriefing
	Simulation Session 2: Skin Integrity, Trach Suctioning, Trach Securement, Trach Changes	Skill Checklist Debriefing
	Simulation Session 3: Skin Integrity, Trach Suctioning, Trach Securement, Trach Changes	Skill Checklist Debriefing Post-Family Assessment Survey
	Home visit, Simulation Session 4: Skin Integrity, Trach Suctioning, Trach Securement, Trach Changes	Skill checklist Debriefing



PAWS PROGRAM FLOW

SAMPLE



Inclusion Criteria

- Pediatric patient < 18 years old with new primary trach placement
- Receiving care at Mott Children's hospital and referred from ENT and/ or pulmonary
- Sample size for this pilot program was fluid; goal for enrollment was 6-10 parents/ caregivers
- Referred 15 children in all
- Deferred 7-2 deaths, 2 over 18, 2 CPS cases, 1 ESL

Population Description ($n=8$)

Age	Sex	Primary Diagnoses
4 months	F	Cleft palate, micrognathia, Pierre Robin
5 months	F	Former 27-week infant, complex course in NICU, ventilator dependant, G-tube feedings
3 months	M	Former 23-week infant, multiple congenital anomalies, failure to wean from ventilator
2 months	F	Former 25-week infant, hydrocephalus, VSD, ASD, and subglottic stenosis
4 months	M	Multiple brainstem defects, epilepsy, dysphagia, palliative care
6 months	F	Former 23-week infant, failure to thrive, BPD, ASD, severe pulmonary hypertension
2 months	M	Pierre Robin, microcephaly
6 months	F	Former 24-week infant, ASD, VSD, BPD, chronic hypoxia, ventilator dependent

RESULTS

Parent Skill Assessment Combined Scores

Improvement seen across all parent groups over time for pediatric tracheostomy care

Parent	Session 1	Final Session	% Change
Parent 1	12	18	+33%
Parent 2	14	17	+17%
Parent 3	12	17	+27%
Parent 4	14	17	+16%
Parent 5	12	18	+33%
Parent 6	12	18	+33%
Parent 7	12	17	+27%
Parent 8	12	17	+27%

Statistical Analysis

Skills

- The Pearson correlation value for skill acquisition across all four skills was $r = 0.92$
- Increases for all four skills; trach care, trach suctioning, trach securement, and trach changes, were measured using separate t test evaluations indicating a Pearson's r coefficient level of 0.75 to 0.94 respectfully
- There was a significant increase in mean score increases across all four skills assessed that increased incrementally over time with a positive correlation demonstrated between the first simulation session and the applied intervention in the final simulation session.
- The increase in mean skill level was across all parent groups and all four skill sets with a p value of 0.02

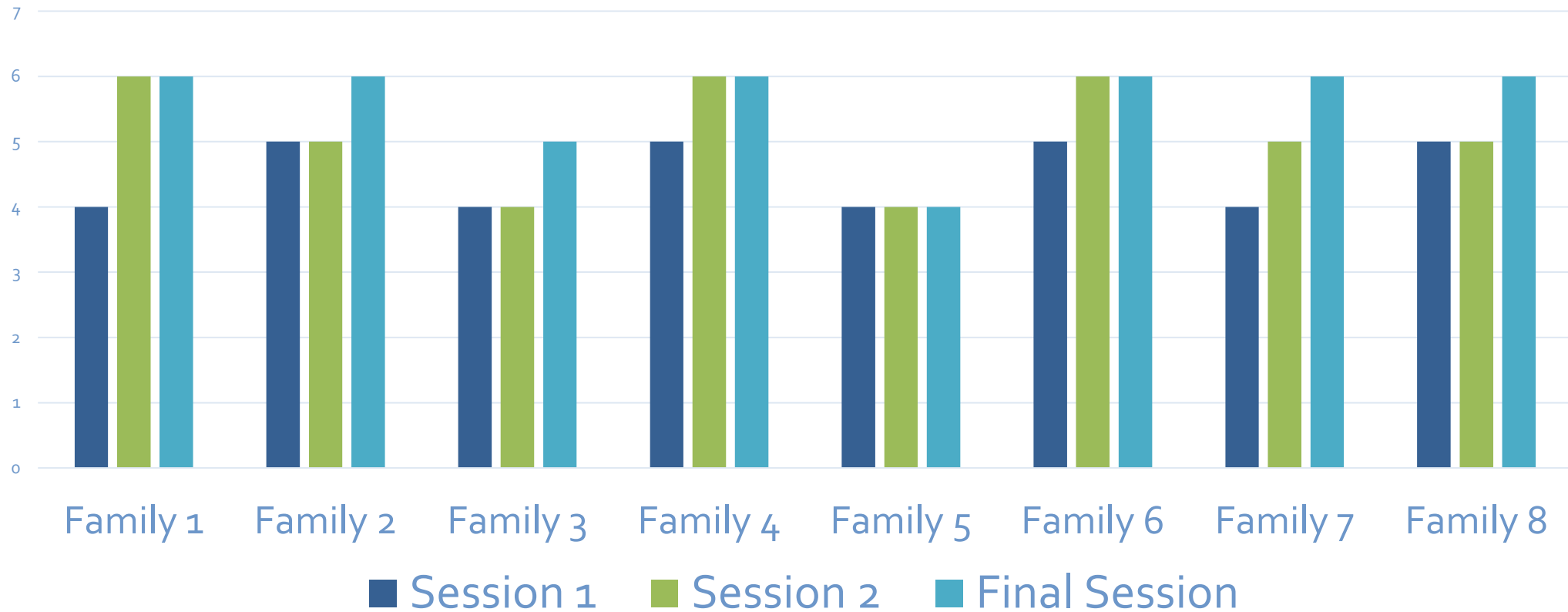
Confidence

- Increases in survey questions directly addressing parent responses to confidence related to emergency management and increase in knowledge across multiple spectrums of trach care
- Parent confidence increased from 72% on the pre-intervention assessment survey to 94% on the post-intervention survey over the course of the program
- Pearson's coefficient $r = 0.65$

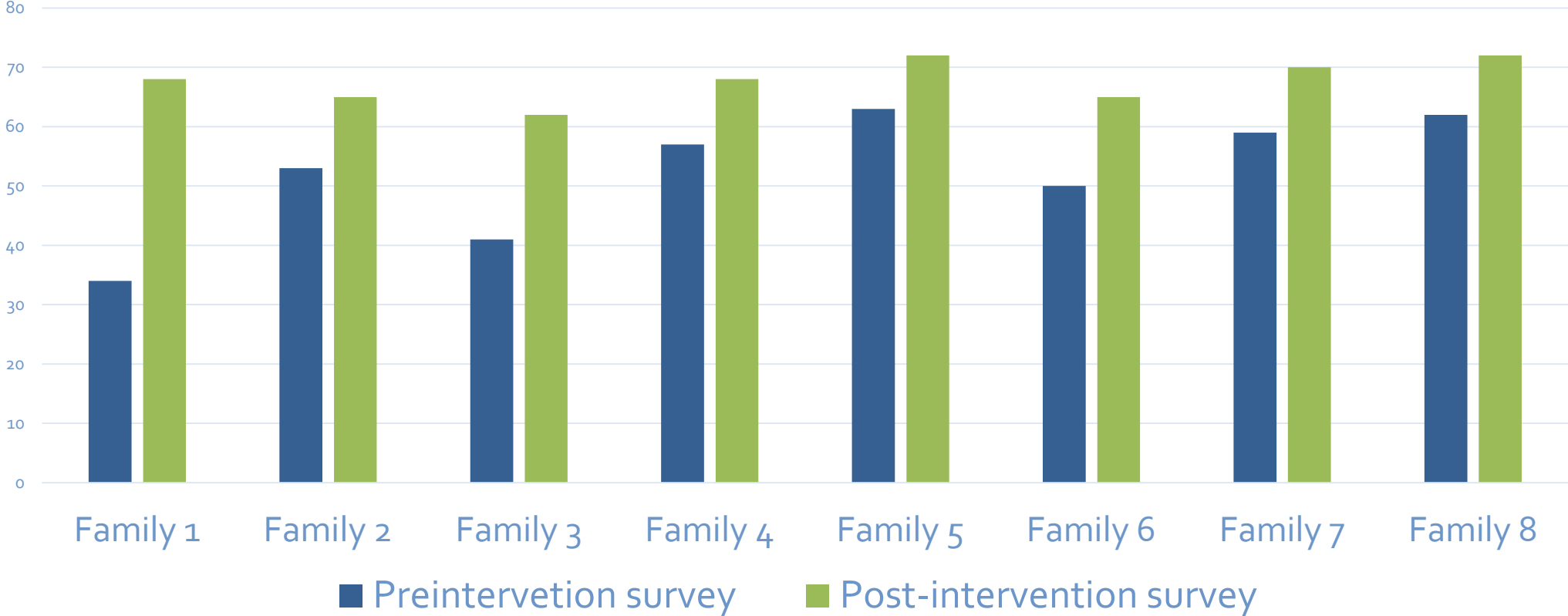
ANOVA All Skill Assessment

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	2	48.16	24.08	4.03	0.02
Within Groups	77	460.03		5.97	
Total	79	508.20			

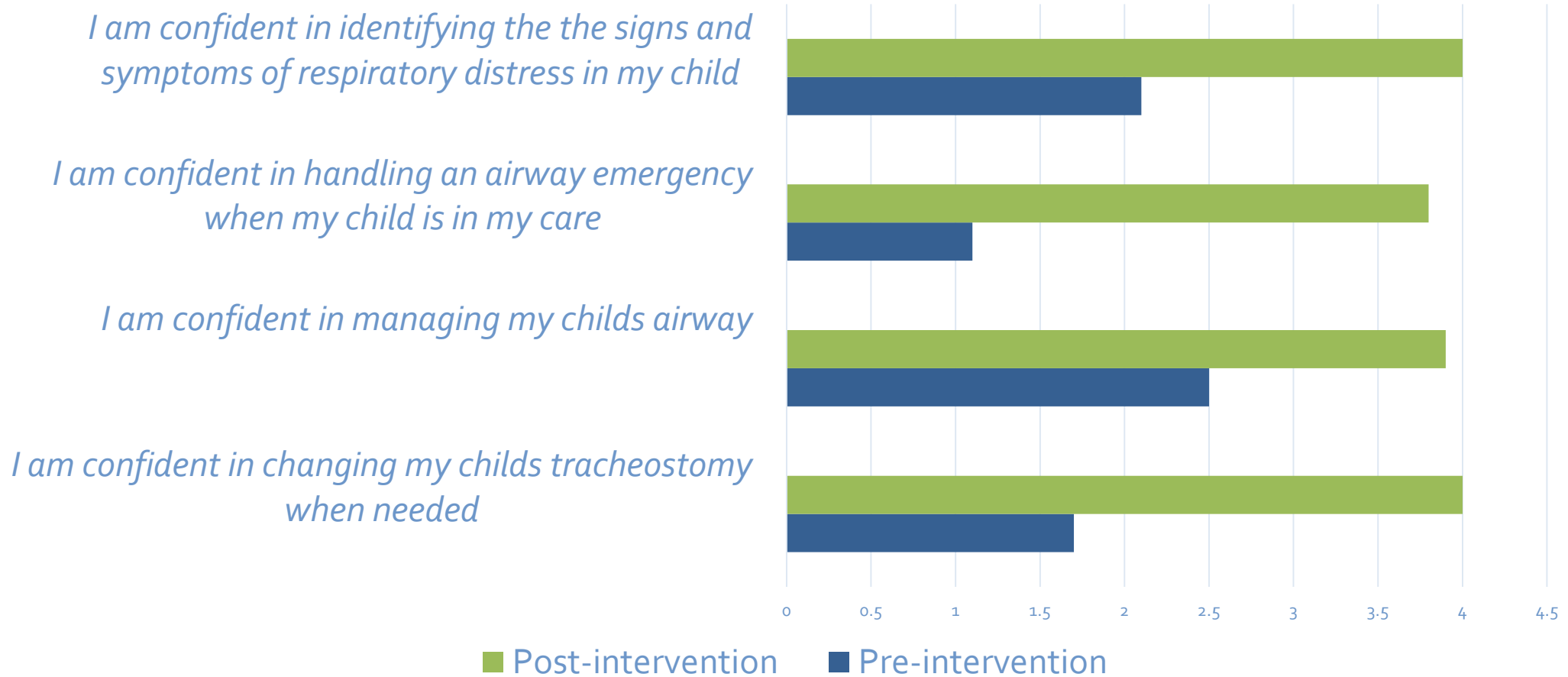
Trach Care/Skin Integrity Skill Assessment



Family Confidence Changes Post-Intervention



Self-reported Confidence Family Assessment



IMPLICATIONS

Actionable Implications of Findings

- Children who are technology *dependent require complex discharge planning and skills* that are preformed by healthcare professionals—and parents should be trained as such
- Be aware of current evidence based standards of care and insure that the teaching we are providing is *consistent* with these standards
- Assess frequently where parents are in the process of providing safe, quality care in their home; tailor education to adult learning needs with hands on practice
- Quantifying skill attainment can provide objective data to medical team prior to discharging infant home