Beyond the Broselow

Pediatric Emergency Airway Management

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Meet the Researchers

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Objectives

- Analyze the current knowledge gaps and barriers to effective pediatric airway management in mixed-population emergency departments (EDs), and their impact on patient outcomes.
- Evaluate the efficacy of the "Beyond the Broselow" learning module by comparing pre- and post-intervention data, emphasizing changes in knowledge and self-efficacy among healthcare providers.
- Propose strategies for improving pediatric airway management training and identify opportunities for future research to build on the outcomes of "Beyond the Broselow," focusing on sustainable education interventions and their potential to reduce morbidity and mortality rates.

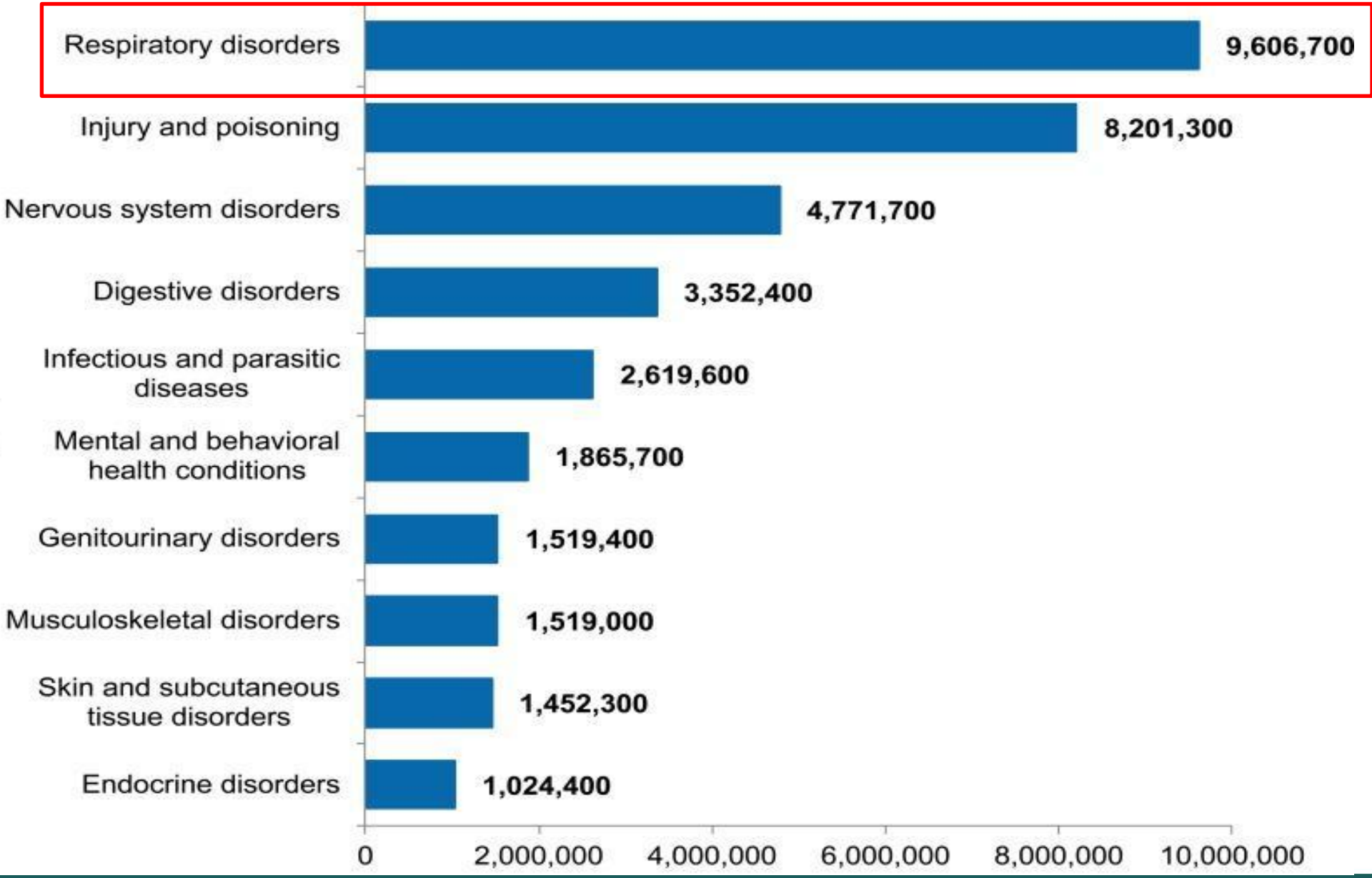
THE WALL STREET JOURNAL.

EXCLUSIVE

Children Are Dying in Ill-Prepared Emergency Rooms Across America

Hospitals and regulators have done little to ensure E.R.s are ready to treat children in emergencies, while researchers prove taking basic steps can save lives

Ten Most Common All-Listed Reasons for Pediatric ED Visits by Body System, Fiscal Year 2015



Pediatric Emergency Care is Complex

- Anatomical, developmental, and physiological differences compared to adult counterparts.
- Provider's discomfort and heightened emotional toll levels.
- Low patient volumes, poor institutional priority/buy-in for pediatric services, and access to educational resources and ongoing training is minimal.

From Google Images

Does the development and implementation of an evidence-based and self-paced training curriculum for pediatric airway management for healthcare providers increase knowledge and self-efficacy?

Beyond the Broselow: Project Aims

- Allow flexibility of self-paced e-learning.
- Increase healthcare provider's knowledge and self-efficacy.
- Complete pilot testing to provide data for future clinical site partnerships highlighting the effectiveness of the module.
- Promote longitudinal study and opportunities for further outcome measurements.

Theoretical Framework

- The Agency for Healthcare Research and Quality's (AHRQ) Knowledge Transfer (KT)/Implementation program distributes and implements research, tools, and products to specific target groups.

Knowledge Creation & Distillation

Diffusion & Dissemination

Adoption, Implementation, & Institutionalization

Project Implementation

- Module creation and expert content review
- International Review Board (IRB) approval
- Module Disbursement
- Data collection and analysis

Online Module

- Recorded on PowerPoint, saved, and embedded into video format within Teachable module.
- ~60 slides of actual course content.
- Go-live was April 24, 2024-July 20, 2024.
- Play and pause feature available allowing completion at learner's leisure.
- Total time including pre and post-test surveys ~1hour.

Beyond the Broselow
Course Objectives

- Identify the common causes of pediatric respiratory distress that require airway management in the emergency department.
- Highlight airway anatomy and respiratory physiology differences between adults and children.
- Discuss the presenting signs and symptoms of common pediatric conditions such as viral bronchiolitis, reactive airway disease/asthma, croup, epiglottitis, foreign body aspiration, and pneumonia that lead to respiratory compromise.
- Explain commonly-used medications for rapid sequence intubation (RSI) for pediatric patients.
- Discuss the approach to preparing for a successful pediatric

Croup

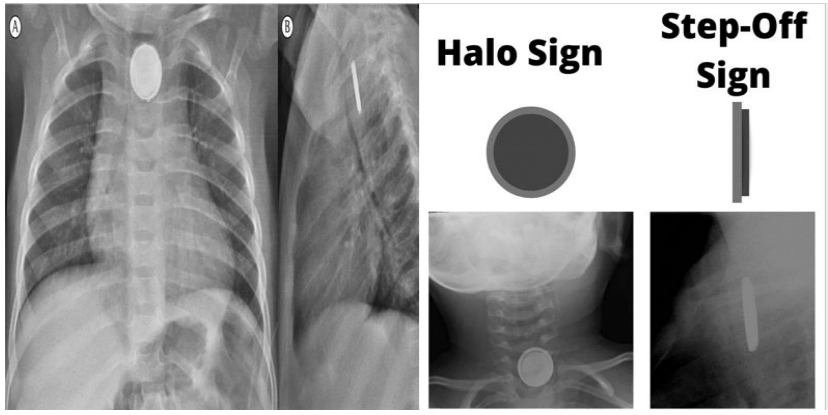
- Laryngotracheobronchitis
- Inflammation/narrowing of the airway below the vocal cords
- Viral Parainfluenza
- Low grade fever, barking "seal" cough, stridor with suprasternal retractions
- Frontal CXR *Steeple Sign

Epiglottitis

- ***Life threatening emergency**
- Inflammation of the epiglottis
- Bacterial H. Influenza
- Rapid onset high grade fever, drooling, dysphagia, dysphonia, distress
- Lateral CXR *Thumb print sign

Foreign Body Aspiration (FBA)

- **Commonly Aspirated Items:**
  - Foods: hot dogs, grapes, beans (expand when wet, worsening obstruction)
- **Dangerous Items:**
  - Coins, button batteries, magnets
- **Key Considerations:**
  - Imaging to determine obstruction level and radiopacity
  - T2-clavicle level obstructions can be life-threatening
- **Action:**
  - Keep the child calm; may require surgical airway in operating room



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Pediatric ETT Sizing & Depth

ETT Size

(Age in years/4) + 4 = UNCUFFED

Minus 0.5 for CUFFED

Cuffed tubes preferred

Newborn 3 or 3.5

OR

(Age in years + 16) / 4 = UNCUFFED

Minus 0.5 for CUFFED

ETT Depth

Tube Size x 3= Approximate location cm at lip

Always verify ETT location with bilateral breath sounds, EtCO2, and CXR

From Google Images

Fentanyl

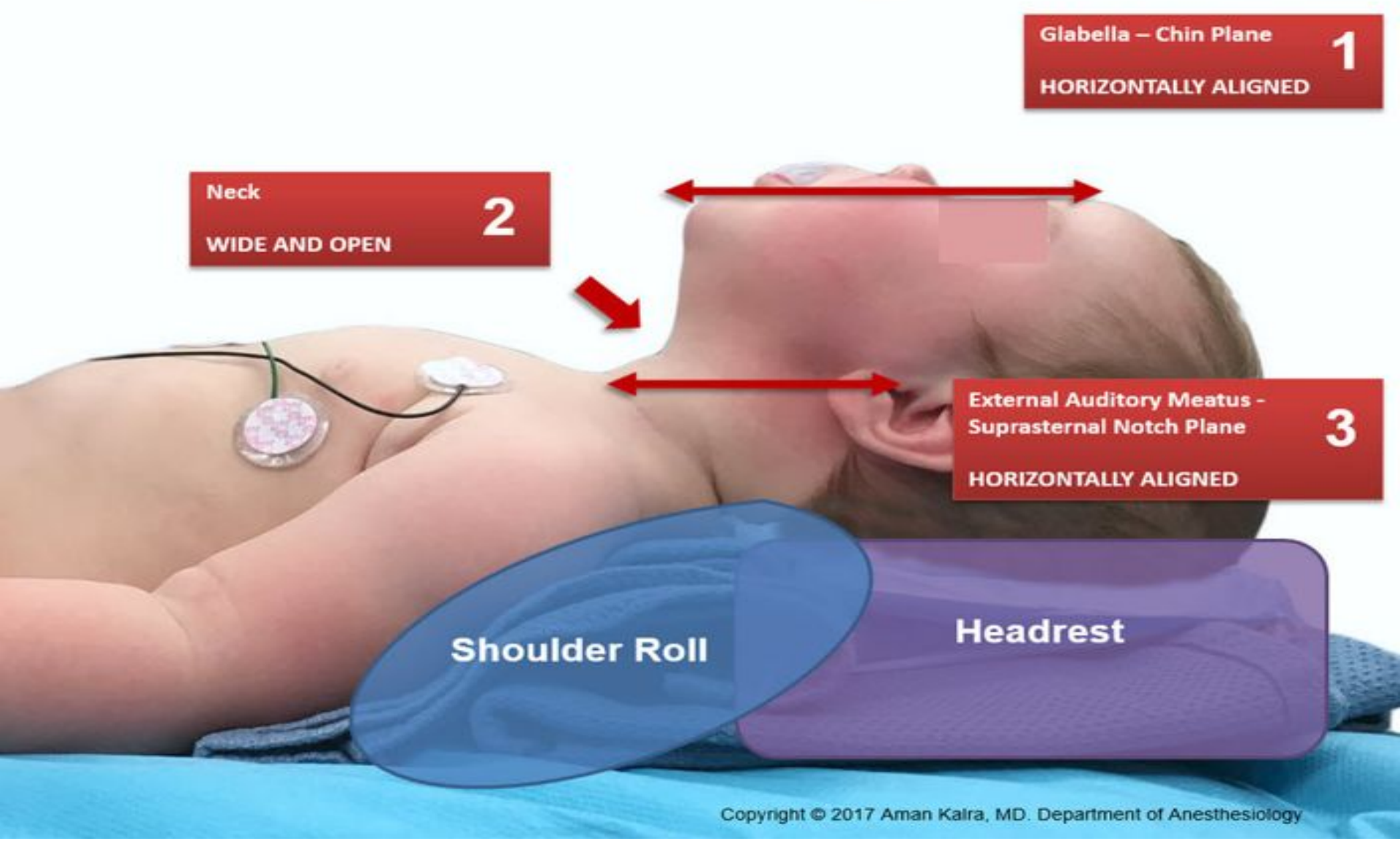
- Medication Class: opioid
- Why we use it: decrease sympathetic response to laryngoscopy
- Dose: 1-2 mcg/kg
- Special Considerations: *Push SLOW in infants rapid administration can cause chest wall rigidity

From Google Images

Midazolam (Versed)

- Medication Class: benzodiazepine/sedative
- Why we use it: sedative to prevent awareness and as an adjunct to decrease sympathetic response
- Dose: 0.1mg/kg
- Special Considerations: may cause profound hypotension

An Infant in the "Sniffing Position"



Gastric Tube

- Many children's abdomens become distended with air when ventilating/pre-oxygenating
- This can lead to compression of diaphragm poor ventilatio
- Dropping a gastric tube (Nasogastric preferred) and pulling off air can be helpful
- Vent G. Tube if present

From Google Images

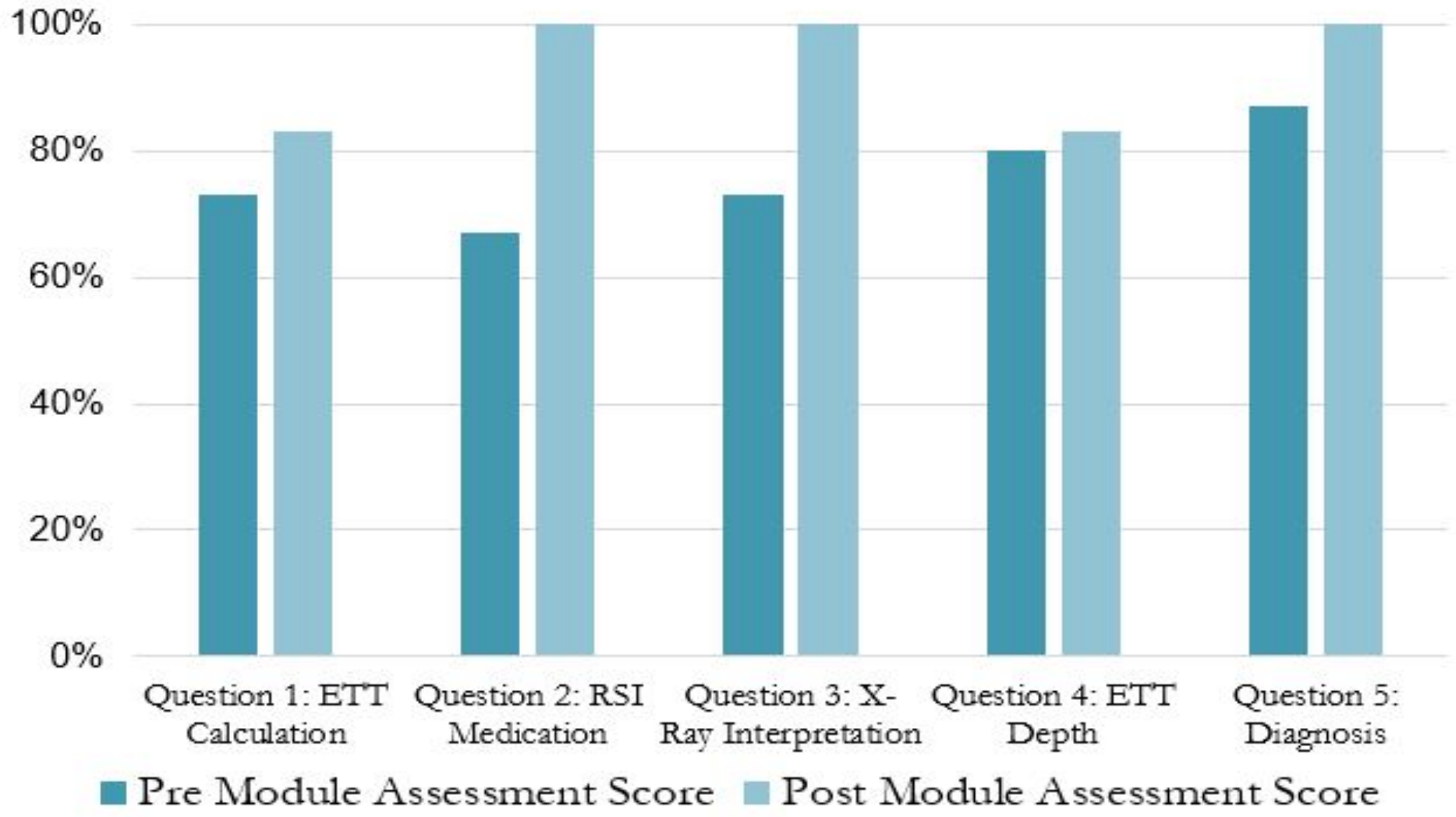
Results

Participant Demographics

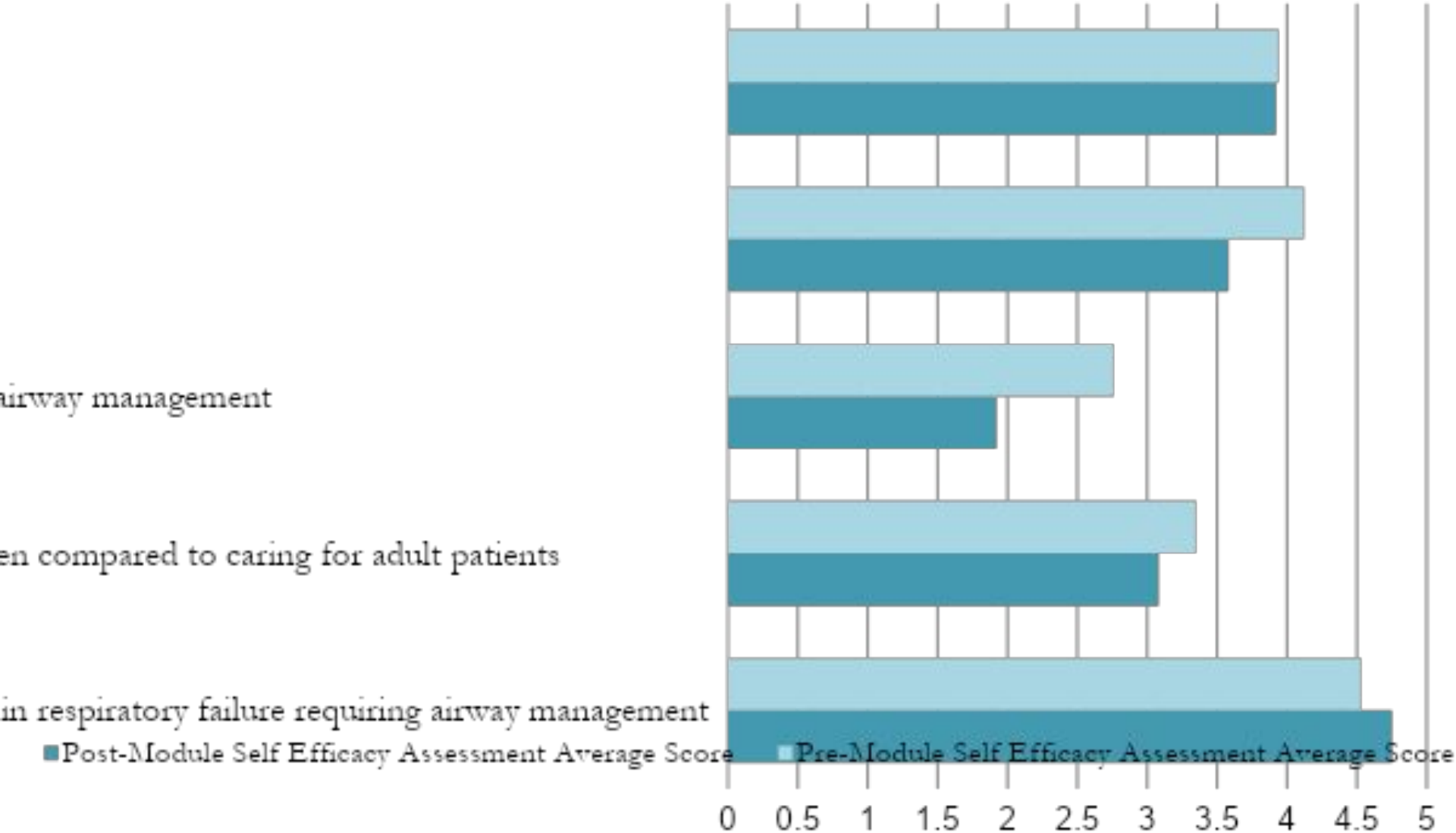
- Seventeen learners completed the module in its entirety.
- Most were certified in Pediatric Advanced Life Support (PALS) and were Registered Nurses (RNs).
- 88% of the participants had been involved in a pediatric code or airway event, and about half relied on the Broselow tape for management.

From Google Images

Pre/Post Module Knowledge Assessment Average Scores



Pre/Post Module Self-Efficacy Assessment Average Scores



Recommendations and Future Opportunities

- Maximize completeness of survey responses for enhanced data collection.
- RN specific module and allocating continuing education credits.
- Follow up knowledge retainment and if module led to practice changes.
- Patient outcome measurements.
- Implementation of module into yearly education for emergency department nurses.

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