Pediatric Toxicology Patients and Appropriateness of Initial Disposition

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Background

- Approximately 14% of toxic exposures reported to poison centers in the US are admitted to a critical care unit, representing over 80,000 patients in 2020.
- Recent studies suggest that many pediatric toxicology patients may not actually require critical care interventions despite being admitted to a critical care unit, resulting in thousands of dollars of excess cost per patient.
- Given these findings, we sought to determine the proportion of pediatric toxicology patients admitted to the pediatric intensive care unit (PICU) at Children's Hospital Colorado (CHCO) as a preliminary step in a quality improvement project designed to improve the proportion of pediatric toxicology patients admitted to the appropriate level of care.

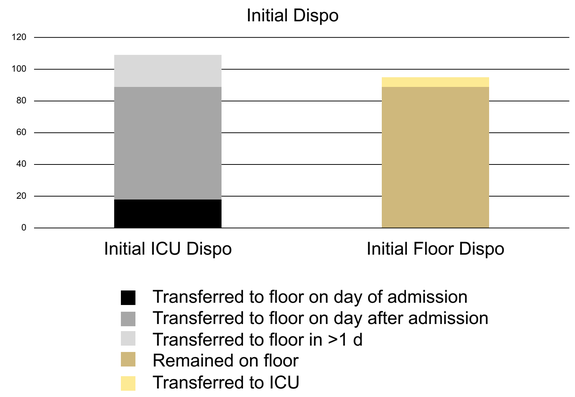
Methods

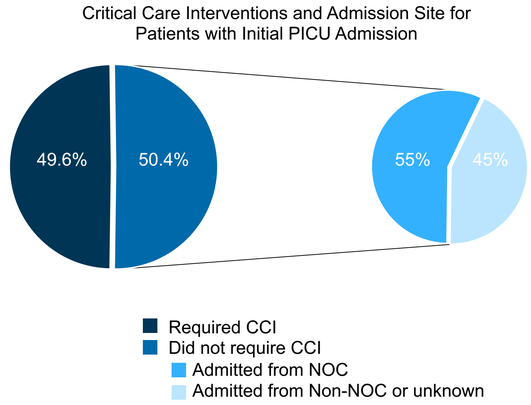
- Pediatric toxicology patients were defined as those evaluated by the medical toxicology consultation service.
- Disposition to a critical care setting was deemed "appropriate" if the patient received at least one critical intervention. Critical interventions were defined as those typically not performed outside of a critical care setting at CHCO (Box 1).
- Trained data abstractors reviewed the medical records of all toxicology patients admitted to CHCO between January 1, 2021 and December 31, 2021.
- Patient demographics, admission characteristics, and critical interventions performed were collected.
- Descriptive statistics were used to summarize the data.

Results

	Mean	SD	
Age	11.7	5.8	
		N = 204	%
Sex	Female	137	67%
	Male	67	33%
Disposition	ICU (Initial)	109	53%
	Floor (Initial)	95	47%
	ICU (Ever)	115	56%
Transfer of Care	De-Escalation from ICU to Floor Within Same Day	18	17%
	De-Escalation from ICU to Floor Within One Day	89	82%
	Escalation from Floor to ICU Ever	6	6%
Admission Site	NOC (Anschutz ED + Network of Care Sites)	141	69%
	Non-NOC	49	24%
	Unknown	14	7%

Table 1. Demographics and admission characteristics





Respiratory Interventions	Mechanical ventilation, noninvasive ventilation, bronchoscopy, tracheostomy tube insertion, airway adjuncts (e.g., nasal trumpet), continuous nebulizer, high frequency oscillatory ventilation, Heliox, inhaled nitric oxide, hyperbaric O2 chamber
Cardiac Interventions	Cardiopulmonary resuscitation, defibrillation, pacing, cardioversion
Neurologic Interventions	Therapeutic hypothermia, intracranial pressure monitoring, pentobarbital coma
Other Systemic Interventions	Continuous renal replacement therapy (any modality), hemodialysis/peritoneal dialysis, extracorporeal membrane oxygenation (ECMO), plasmapheresis
Frequently Utilized Critical Care Medications	Any vasopressor use, infusions of other cardiac medications (e.g. esmolol), naloxone (single doses or infusion), sodium bicarbonate (single doses or infusion), physostigmine (single doses or infusion), high dose insulin infusion, infusions of medications for the purpose of sedation (e.g. benzodiazepines, opioids, dexmedetomidine)

Box 1. Interventions considered "critical care interventions."

Conclusions

- Over half of pediatric toxicology patients admitted to CHCO were initially admitted to the PICU, the majority of whom did not require critical care interventions.
- Of those patients admitted to the PICU who did not require critical care interventions, more were admitted via our own institution's emergency departments than from outside facilities.

Implications

- These results suggest a promising target for a hospital-wide quality improvement intervention designed to improve the appropriateness of initial disposition for pediatric toxicology patients. Potential interventions could include the creation of clinical pathways, clickable criteria when entering ICU admission requests, and targeted education for relevant stakeholders on anticipated hospital courses for ingestions frequently inappropriately triaged to the PICU.

Future Directions

- Our next steps include process mapping the current state of how disposition decisions are made for pediatric toxicology patients and gathering relevant stakeholders throughout CHCO in order to identify specific opportunities for improvement.

Disclosures

- We have no disclosures to report