

SETTING THE WORLD ON FHIR®

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A series of case studies illuminating how HIT professionals are using HL7® FHIR® to improve and advance modern healthcare

CHILDREN'S HOSPITAL OF PHILADELPHIA

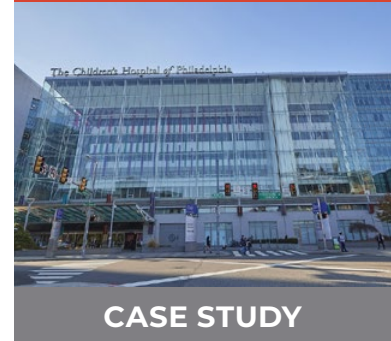
Founded in 1855, Children's Hospital of Philadelphia is one of the nation's leading pediatric hospitals and research institutions, with a long history of advancing care for children through clinical excellence, innovation and discovery. At CHOP, technology is being used not only to improve access to information, but to bring real-time decision support into some of the most complex and high-risk moments in pediatric care.

Goal

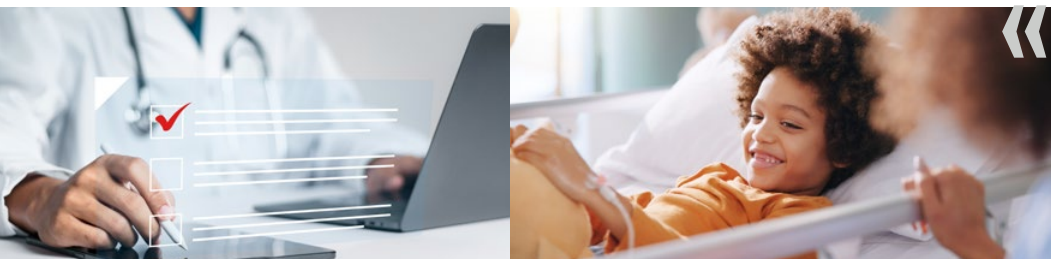
To improve patient safety and quality of care during pediatric tracheal intubation

Opportunity

To use HL7® FHIR® to bring real-time, patient-specific guidance into the clinical workflow, helping care teams make safer, more coordinated decisions during high-risk intubations



CASE STUDY



HL7 FHIR gives us a standards-based way to bring the right information into the checklist at the right time, without adding unnecessary burden for the clinical team.

— Jeritt Thayer, PhD, software engineer,
Children's Hospital of Philadelphia

Project

Acute respiratory failure is the leading cause of pediatric intensive care unit (PICU) admission in the United States. More than 20,000 children admitted to PICUs require tracheal intubation, a procedure that can be especially high risk for critically ill children with limited oxygen reserve, challenging anatomy or life-threatening instability.

Adverse airway outcomes affect about 25% of critically ill children undergoing tracheal intubation and are linked to longer mechanical ventilation, longer ICU admissions and higher mortality.

Epic Home Chart Schedule In Basket Patient Lists Encounter Record Viewer Secure Patient Station Login Cbit

Test, Kyleadmit

DEVELOPMENT JERITT T.

Summary Chart ... Results Problems Notes Manage Or... Order ... Ord/M... Intake/...

Smart Checklist

Equipment Selection

Primary Equipment

ETT Size: 7 ETT Type: Cuffed Device: CMAC Blade Type: Mac Blade Size: 2

Stylet BOTH primary ETT and 1/2 size smaller prior to intubation. Backup not mandatory.

Approve Primary

Backup Equipment ☐

Apneic Oxygenation ☒ Size: 15 L/min AO DEFAULT <1 yr 5L 1-7 yrs 10L ≥ 8 yrs 15L

Medication

Atropine	☐	Midazolam	☐
Glycopyrrolate	☐	Propofol	☐
Fentanyl	☐	Rocuronium	☐
Ketamine	☐	Vacuronium	☐
Other	☐		

Airway Expert Request

	Yes	No
Anesthesia	☐	☒
ENT	☐	☒

Additional Consideration

Risk Factor	Suggestion
Shock/hemodynamic instability	- Prepare Fluid Bolus - Prepare Epinephrine bolus or infusion
C-spine precaution	Prepare video laryngoscope
Obese patient	- Prepare ramp up system, oral airway - Start with two-person bag mask technique

Close without saving Save & Close Save & Start Timeout

Patient Information:
 Test, Kyleadmit
 Male, 3 year old, 8/7/2020
 MRN: 82004334
 CSN: 8200116989
 Bed: 3E25-1
 Cur Location: 7 EAST PICU
 Code: Not on file (no ACP docs)
 Weight: (I) 75 kg
 Dosing Weight: None
 Infection: None
 Isolation: Protective Precautions
 Allergies/Adverse Reactions Not Assessed
 Huang, Elena, MD Attending
 Allergies: Not on File
 ADMITTED: 8/7/2023 (70 D)
 Patient Class: Inpatient
 Myasthenia gravis
 No vital signs recorded for this encounter.
 I/O net 24h: 0

At many hospitals, airway safety checklists have historically been paper-based. While helpful, paper checklists are limited. They are available in only one place at a time, require clinicians to manually add information and do not provide automated decision support during a fast-moving clinical event.

CHOP's Airway Bundle Checklist was developed to address those limitations. Built as an EHR-embedded SMART on FHIR application, the digital checklist uses HL7 FHIR resources to bring relevant patient information into the workflow and support real-time, patient-specific guidance. It is accessible by multiple clinicians at the same time, helping the care team maintain a shared understanding of the patient, the plan and the risks. It supports desktop, tablet and mobile use, making the checklist available where clinicians need it.

The checklist is organized around key stages of care, including planning, timeout and debrief. It provides real-time clinical decision support and supports both rule-based and predictive risk assessments. By moving from paper to a digital, standards-based platform, CHOP also created a more flexible foundation for rapid quality improvement and future EHR integration.



Progress

Since January 2024, the Airway Bundle Checklist has been updated by more than 450 users and used for more than 6,000 patients at CHOP.

The transition from paper to a digital checklist also allows important quality metrics to be tracked more easily, further supporting CHOP's goal of improving patient safety and the quality of care delivered in the PICU. The implementation also spans five other pediatric intensive care units, demonstrating the potential for broader adoption across high-acuity care environments.

Future work includes deeper EHR integration directly from the checklist, including ordering, navigation to other areas of the chart and the ability to pre-populate plans that were effective during previous intubations.

For health system leaders, the Airway Bundle Checklist offers a practical example of how HL7 FHIR can help move clinical decision support from a concept into the real-world workflow. The value is not simply technical interoperability. It is safer, more coordinated care during moments when every second matters.



The checklist gives care teams a clearer, more consistent way to align around the patient, the plan and potential risks before and during high-risk pediatric airway management.

— Akira Nishisaki, MD
Children's Hospital of Philadelphia

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