Akron Children's Hospital Decreases Unplanned Transfers to the ICU with the Pediatric Rothman Index

HIGHLIGHTS
- Akron Children's Hospital replaced PEWS with the Pediatric Rothman® Index (pRI) for overall clinical surveillance
- Results included a 39.2% decrease in Medical Response Team (MRT) calls and 17.8% decrease in unplanned transfers to the ICU
- Other results included improved situational awareness and reduced cognitive workload for clinicians

Akron Children's Hospital is ranked among the best children's hospitals by U.S. News & World Report. The system includes two hospitals in northeast Ohio and fifty urgent, primary and specialty care locations. Since 1890, Akron Children's Hospital, with more than a million patient visits a year, has been leading the way to healthier futures for children through quality patient care, education, advocacy, community service and medical discovery.

CHALLENGES:
Akron Children's needed a common language for the clinical team to discuss patient deterioration. Since a particularly challenging patient group was the "kids in the middle," the organization also sought a method to identify risk of deterioration for children with moderate acuity levels—those who seem fine at the moment but may have an unseen clinical problem brewing.

"The pandemic highlighted that our workflows in healthcare are antiquated and there is a backbreaking 'cognitive workload,'" said Michael Forbes, MD, FAAP, Chief Academic Officer. Cognitive workload is the amount of mental effort a clinician must generate to manage a barrage of information inputs, decisions and technologies for each patient and the overall daily patient load. Dr. Forbes recognized the limited amount of meaningful data to make the case for workflow changes that reduce the cognitive workload. The data deficit also impacted his ability to conduct research that makes a difference for patients and increases the organization's academic profile. For example, although he gets valuable comparative data from the Virtual Pediatric Systems (VPS) Registry, more internal data to help track code blues and reduce unplanned PICU transfers would be helpful.

SOLUTION:
A proven algorithm that automatically derives one simple score from the vast amount of data in the electronic medical record, the Rothman Index creates a picture of any patient's condition over time. Because the data feeding the Rothman Index reflects the real-time status of multiple body systems, it captures subtle changes in patient condition – often hours or days earlier than existing vitals-based algorithms like PEWS.

The pRI is based on the Rothman Index but accommodates age-dependent factors in its computation to ensure it correctly reflects the pediatric patient condition. Calculated from vitals, labs and nursing assessments, the pRI is tailored for clinical surveillance of children. For example, five quantitative variables have significant age dependencies: heart rate, respiration rate, systolic blood pressure, diastolic blood pressure, and serum creatinine.

"We validated the pRI with our team," said Dr. Forbes. "We compared it to PEWS. We foreshadowed that PEWS is going into the Smithsonian. We typically introduce new things and never take away old things. But, I think we did this one right. We've introduced something new. We've demonstrated that it's better. We've sunsetted the prior methodology."

Pediatric hospitalists Anita Raghavan, MD, FAAP, and Sophia Chen, MD, FAAP, are members of Akron Children's Hospital's Situational Awareness Committee. The Situational Awareness initiative is a collaborative quality and safety culture initiative with eight other hospitals in the Ohio Children's Hospital Solutions for Patient Safety (OCHPS). Dr. Raghavan says the pRI has become an important part of the Akron Children's Hospital's core situational awareness framework.

For example, Dr. Raghavan begins her shift by reviewing the pRI of all of her patients on the unit, notes any warnings that have occurred, and then reviews individual pRI graphs and detailed information about the patient. She trains residents to do the same thing. She finds the pRI especially useful on the night shift, when there are fewer hospital staff to monitor patients.

Dr. Chen ensures that when the pRI generates warnings, the clinical team conducts a prompt safety huddle using the pRI as a common language to express concerns. The pRI also helps nurses validate their gut feelings when they feel something it simply not right with a patient.
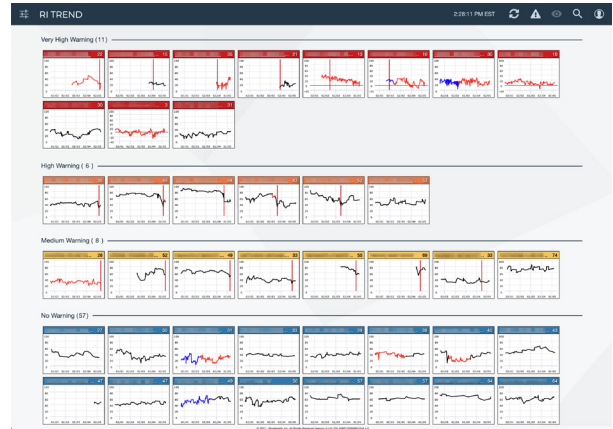

Figure 1 - pRI (Patient Specific View)

Figure 2 - pRI (Array View)

Erin Pitchure, BSN, RN, Quality Initiative Specialist, and Ericka Moore MSN, RN, CPN, Clinical Informatics Specialist, find the pRI has a more objective focus than PEWS. They also appreciate that nurses don't have to do extra documentation to generate the calculations. To further integrate the pRI in clinical workflow, each unit has laminated pRI Decision Trees with warning levels posted and available for individuals to carry for reference.
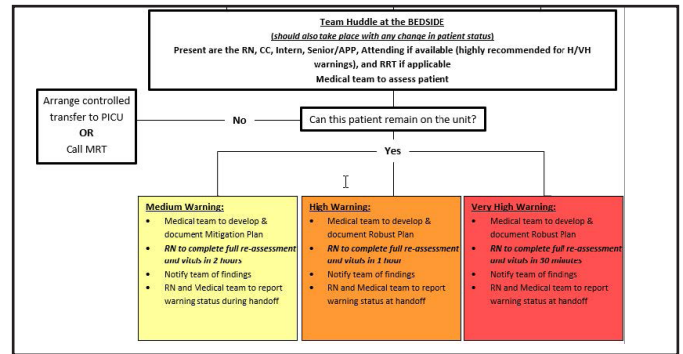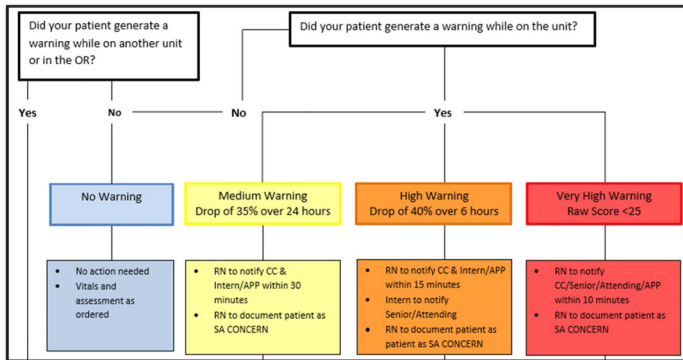

Figure 3 - pRI Decision Trees

SUMMARY:

Today, Akron Children's Hospital uses the pediatric Rothman Index score for overall clinical surveillance to detect deterioration and has strong usage from nurses and physicians, including residents.

Outcomes attributed, in part, to the pRI implementation include:

- 39.2% reduction in MRT calls during pilot and an additional 13.8% reduction in MRT calls after whole house go-live
- 17.8% decrease in unplanned transfers to the ICU
- Improved frequency and content of bedside huddles and safety rounds, with better communication among the clinical team
- Improved situational awareness and reduced cognitive workload for clinicians
- Tracking for expected impact on morbidity, mortality (e.g., standardized mortality ratio), preventable code blues, and unplanned transfers
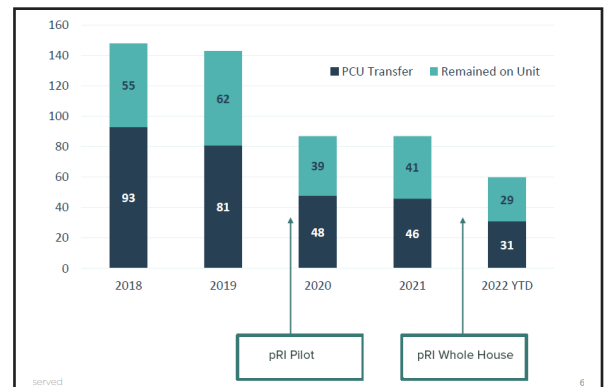

Figure 4
Medical Response Team Call Rates

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