

WHAT WE KNOW...

Design & Usability

CRISS investigators design and evaluate medical devices and health information technology. We have collaborated with the VA, other Vanderbilt centers and outside vendors to develop and improve the user experience.

Teaching & Training

Faculty and staff provide guidance in theories, methods and tools related to human factors through simulation-based training and assessment.

Communication & Decision Making

We investigate team communication, coordination, adaptive problem solving, culture and effectiveness, and individual and group performance-shaping factors.

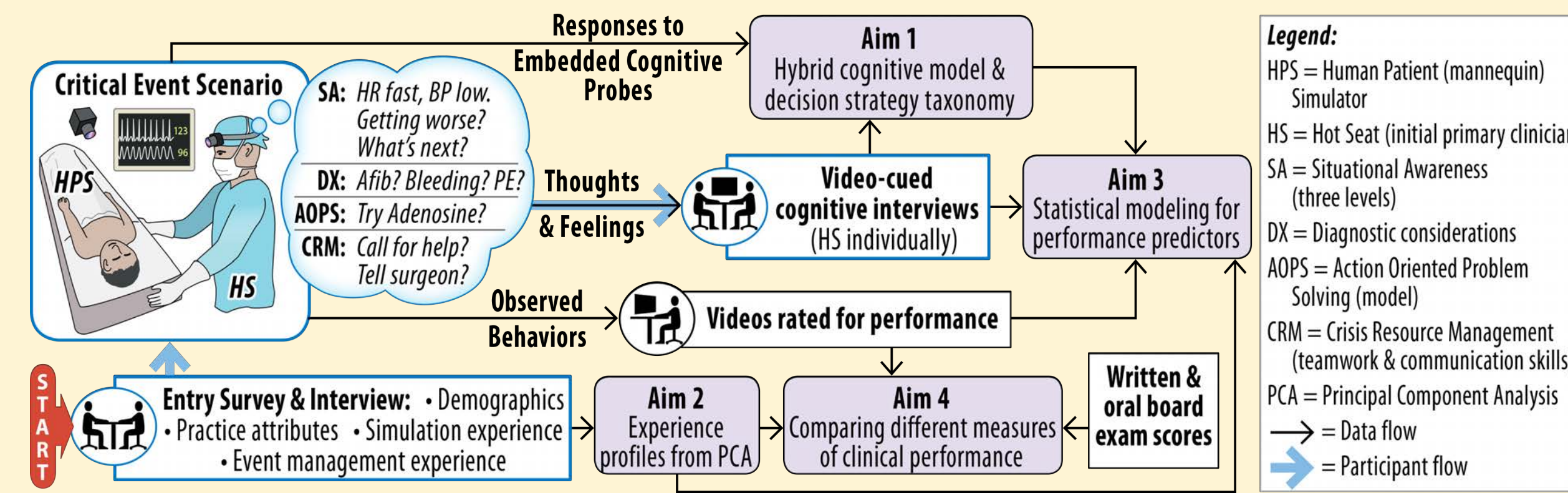
Work Analysis & Improvement

Using human factors engineering, cognitive psychology, biomedical engineering and implementation science, CRISS studies performance during patient care to understand how and why care deviates from optimal.

SOME OF WHAT WE ARE DOING...

Improving Medical Performance During Acute Crises Through Simulation (IMPACTS)

We are the coordinating center and primary investigators for a federally funded five-site study of crisis event decision-making in anesthesiologists. IMPACTS is a sequel to our prior AHRQ-funded study on simulation-based performance of board-certified anesthesiologists (Weinger et al., *Anesthesiology* 127(3): 475-89, 2017). IMPACTS' specific aims are to: 1) Develop and test an updated and unified cognitive model and taxonomy for clinician decision-making strategies used in critical event management; 2) Determine the critical event performance ratings of



physicians and relate them to: a) participants' clinical practice and simulation experience attributes; and b) decision-making strategies; and 3) Explore differences

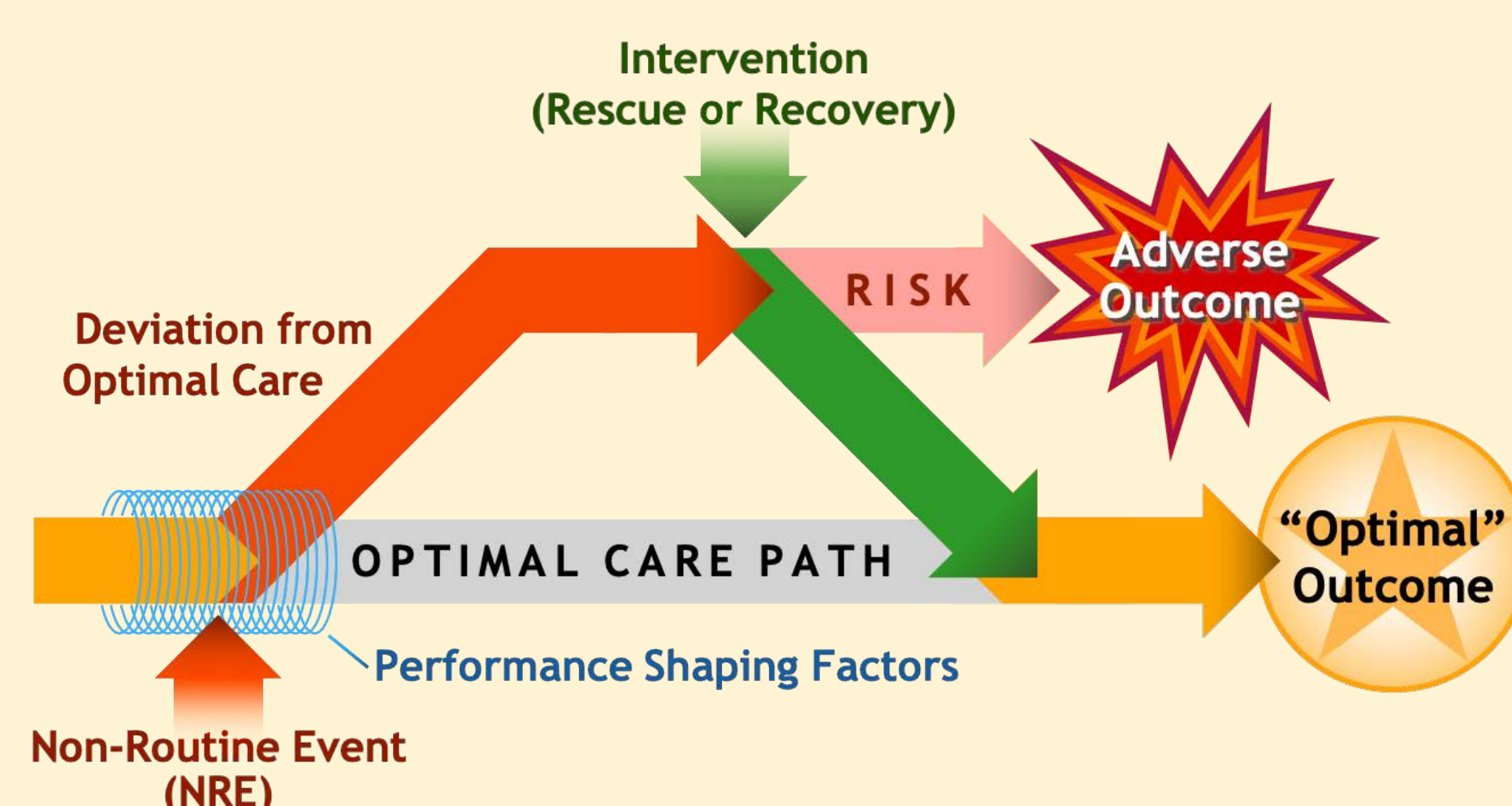
Study schematic (left); Vanderbilt's Center for Experiential Learning and Assessment (CELA), a multipurpose high-fidelity simulation facility (right).



between simulation-based performance and existing validated metrics of physicians' competence (i.e., anesthesiology board exam scores).

Studying Collective Mindfulness in Perioperative Neonatal Care

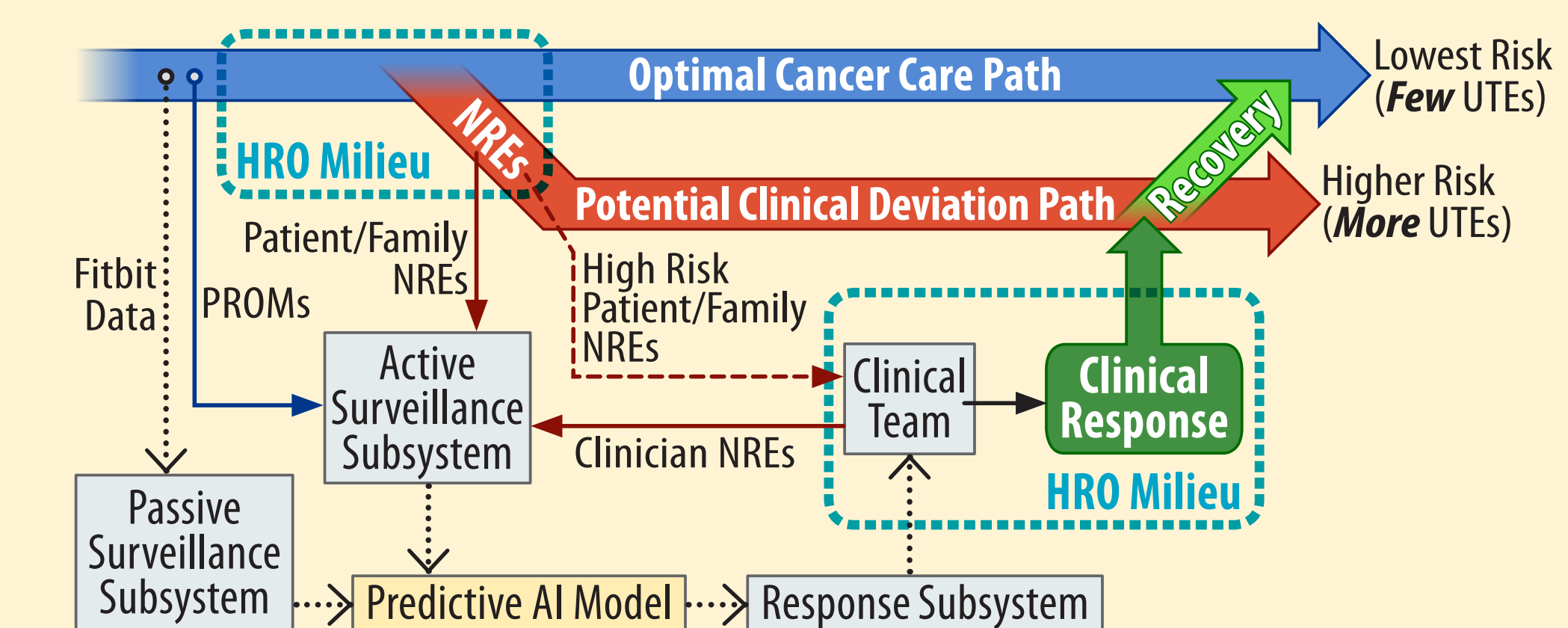
Using a novel event discovery method, based on the construct of Non-Routine Events (NREs), to efficiently capture dysfunctional clinical microsystem attributes and potentially dangerous conditions, we are assessing how Collective Mindfulness (CM) behaviors in neonatal intensive care unit (NICU) and operating room (OR) teams impact patient safety by evaluating the incidence and severity of NREs during NICU-to-OR handovers and subsequent care. Our aims are to: 1) Conduct a prospective observational pilot study of NICU and OR teams to estimate the prevalence of *perceived* CM (i.e., self-reported using the SOS) during neonatal perioperative care; 2) Assess the concordance between expert-rated behavioral markers from video recordings collected during the observational study (*exhibited* CM) and those teams' self-reported SOS scores (*perceived* CM); and 3) Determine the relationship between perceived and exhibited CM and the incidence and severity of NREs occurring during such care.



Preliminary results indicate that perioperative providers perceive high levels of CM in their interdisciplinary teams and these perceptions vary across clinical role (e.g., MD versus RN, neonatologist versus anesthesiologist versus surgeon). The results also show that NREs occur frequently in neonatal perioperative care, and that clinicians and RAs reported and identified perioperative NREs with a full range of severity and a wide variety of contributory factors.

Preventing Clinical Deterioration in Outpatients: Cancer Patient Safety Learning Laboratory (CaPSLL)

In partnership with surgeons, oncologists, nurses, staff, and adult patients with lung and head or neck cancer recovering from and/or undergoing treatment as outpatients, and their lay caregivers, CRISS aims to reliably detect and effectively respond to unexpected clinical deterioration. Specific aims are to: 1) Create and refine software tools and a predictive model for a surveillance-and-response system to prevent harm from unexpected clinical deterioration in outpatients receiving cancer treatment; 2) Develop processes and training that engage patients and their caregivers as active and reliable participants in detecting and reporting potential clinical deterioration using high reliability organizational (HRO) principles; and 3) Implement in the operational environment and formally evaluate the

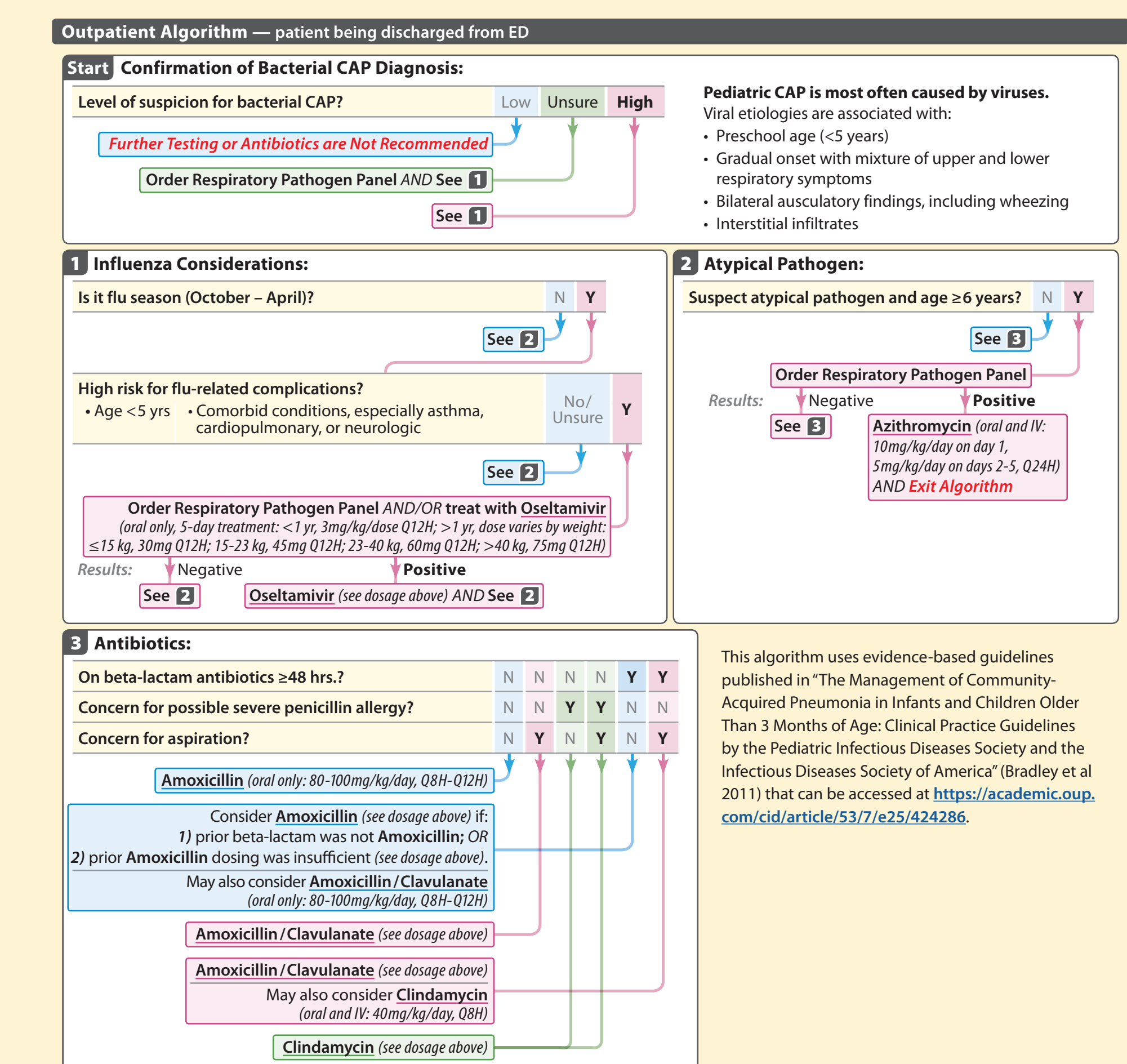


integrated detection and response tools and processes. We hypothesize that this system will decrease the likelihood and severity of unexpected treatment events. Further, with a patient/family focused HRO framework, we hypothesize that the system will increase non-routine event reporting and decrease clinician response time.

Utilizing Risk Stratification and Decision Support to Improve Care and Outcomes in Children with Pneumonia

We are collaborating with pediatric emergency medicine clinicians, hospitalists and informaticists at two academic medical center sites to investigate how technological solutions may reduce variation in both antibiotic use and hospitalization decisions among clinicians caring for children with community acquired pneumonia. Specific aims are to assess whether: 1) Electronic antibiotic decision support increases guideline-concordant antibiotic use compared with usual care in the pediatric emergency department; and 2) The delivery of severity information generated by our prognostic tool leads to more appropriate site-of-care disposition compared to usual care.

A pneumonia radiology algorithm will use natural language processing to identify potentially eligible children and trigger clinical decision support tools within the electronic health record that provide a targeted decision support strategy that emphasizes management in accordance with national guideline recommendations.

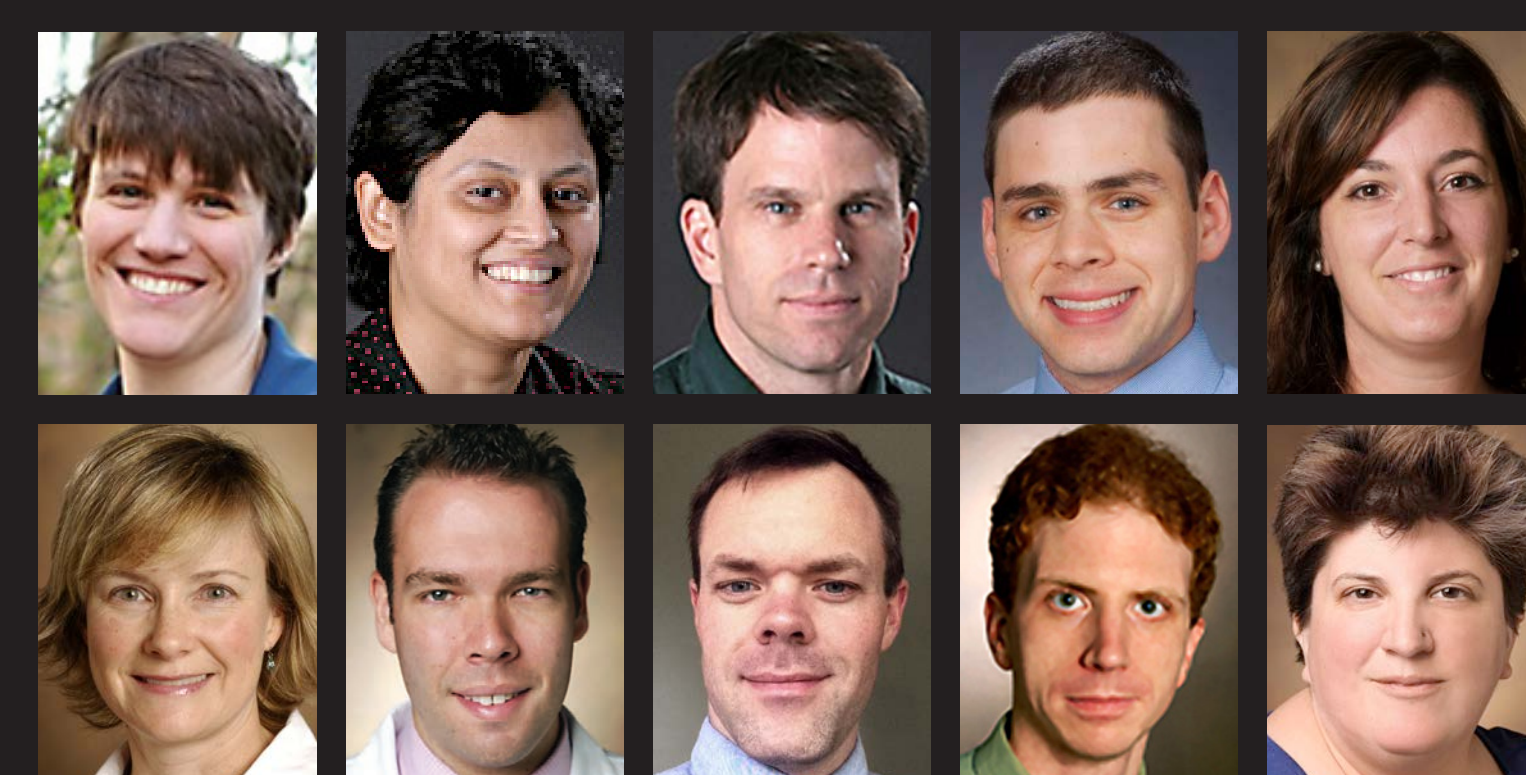


Antibiotic prescribing workflow diagrams assisted programmers and are available for clinicians to reference.



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