

Four Failure-to-Rescue Design Themes to Improve Rescue

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One of the top perioperative safety aims of the Anesthesia Patient Safety Foundation (APSF) is “preventing, detecting and mitigating clinical deterioration in the perioperative period (asamonitor.pub/2Ic9qs9).” Our most recent APSF Stoelting Conference focused on preventing postoperative deterioration and harm (*Anesth Analg* 2020;131:e155-9). This safety area is often referred to as “failure to rescue” (FTR) – a term first used by Silber (*Med Care* 1992;30:615-29) in 1992 when examining elective cholecystectomy and transurethral prostatectomy surgeries.

Silber et al. described the FTR metric as mortality following a major complication, hypothesizing that FTR is associated more with hospital characteristics than with patient illness severity. Ghaferi et al. demonstrated that hospitals with higher mortality rates do not necessarily have higher complication rates (*N Engl J Med* 2009;361:1368-75). Instead, variation in mortality rates across hospitals are associated with higher rates of FTR in patients who experience major complications. More recently, the same association has been shown by Mehta et al. with emergency general surgery (*J Trauma Acute Care Surg* 2018;84:702-10). Simply put, to reduce mortality, we need to rescue better.

Work has been done to study hospital/organizational interventions – e.g., patient monitoring systems (PMS) and rapid response teams (RRT) – in efforts to rescue more reliably. However, it is increasingly clear that these static macrosystem interventions are not enough. The microsystem of care – where the interpersonal and interprofessional communication and collaboration occurs within dynamic, ambiguous, and complex scenarios – is critical (*Health Aff (Millwood)* 2018;37:1870-6).

What are next steps to inform APSF’s advancement of this critical aim? We will frame recent work and interventions around the top four design themes articulated during the Stoelting Conference, themes key to FTR scenarios and, therefore, key to perioperative rescue.



Theme #1: Build an environment that supports and encourages early escalation of care

We live in a culture that expects success every time. When a clinician escalates care, and it is not perfect, it is either too early and perceived as an overreaction, or too late and the patient is already deteriorating.

Since 2005, RRTs have become a widespread intervention in hospitals responding to needs for care escalation. Recently, the Agency for Health Research and Quality (AHRQ) report “Making Healthcare Safer III” (2020) reviewed RRTs as a patient safety intervention (*Making Healthcare Safer III: A Critical Analysis of Existing and Emerging Patient Safety Practices*. 2020). The report says “there is inconclusive evidence as to whether RRT implementation is associated with decreased overall hospital mortality or ICU transfer rates.”

The effectiveness of RRTs is significantly subject to the way team(s) interact with other teams, i.e., the communication and culture.

A strategy to design for Theme #1 is eliminating the worry for perfection –

destigmatizing “questioning” and standardizing triggers for calls. A team at the University of Michigan removed worry and guesswork by implementing an “Expected Postoperative Course” (EPOC) tool (*Surg Clin North Am* 2021;101:71-80). The tool clarifies expected milestones, thus helping clinicians challenge heuristics and identify aberrancies sooner.

A second example of destigmatizing questions is health care adaptation of a military exercise called the blue team/red team challenge (asamonitor.pub/3q3ezDr). A “red team” is intentionally assigned a role to test assumptions and voice alternative diagnoses. The tool flattens hierarchy and limits cognitive biases by creating an expectation to question and challenge a decision.

A third example is standardizing triggers for calls that enhance situational awareness. Risk assessment tools that enhance multidisciplinary coordination (e.g., emergency general surgery risk assessment, frailty scores, preoperative cognitive screening, and postoperative delirium assessments) bring a broader team early into a patient’s care (asamonitor.pub/2LFP9DN). This team assembly can



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build an environment that ensures warnings reach the appropriate decisionmaker and support the right care and expertise at the right place at the right time.

Theme #2: Make technology a meaningful contributor to human workflow

“We can have technology with 100% specificity and 100% sensitivity, but if no one goes to the bedside to respond, we haven’t solved the problem.” (Stoelting Conference participant and executive vice president of safety/quality at a hospital system, personal communication, April 17, 2019.)

AHRQ’s Making Healthcare Safer III also reviewed the patient monitoring system (both continuous and intermittent) for effectiveness as a patient safety intervention (*Making Healthcare Safer III: A Critical Analysis of Existing and Emerging Patient Safety Practices*. 2020). With PMS, “there was moderate evidence of a reduction in rescue events... but study results were inconsistent.” There was also either “no significant effect on mortality (continuous monitoring) or moderate, inconsistent effect (intermittent monitoring).” There was “moderate evidence for improvement in hospital length of stay (LOS) ... but low evidence for improvement in ICU LOS or ICU transfers.”

Emerging studies continue to challenge our understanding of the optimal use of technology. McGrath et al. reviewed a single institution’s 10-year experience, finding that utilizing continuous pulse oximetry monitoring had a significant effect in death from sedative/analgesics administered on general units (*J Patient Saf* March 2020).

It will be imperative to understand the complex sociotechnical interface of how humans and technology work successfully together. The Stoelting Conference design workshop was a testbed for such improved understanding (*Anesth Analg* 2020;131:e155-9). Some prototypes emerged specifically designed for Theme #2. They optimize visual decision-making with both flexible and longitudinal approaches. APSF will continue to support prototyping in 2021.

Theme #3: Make anticipating and planning for deterioration a standard workflow

A system that builds anticipation and capacity is a well-functioning system. This “preoccupation with failure” is a core principle of high-reliability organizations (Managing the Unexpected: Resilient Performance in an Age of Uncertainty.

2007). Simultaneously, health care is a complex system that is optimized when everything runs smoothly and waste is eliminated.

There are times when these conditions are at odds with each other. It is the people in the system, making choices every day, with flexibility and resilience, who enable successful outcomes. This is Safety-II thinking (asamonitor.pub/2LDjb43).

To nurture Theme #3, we must embrace Safety II thinking. Traditional mortality and morbidity conferences can be transformed from a complications-focused review to a focus on resilience engineering (*Ann Surg* 2020;272:678-83), learning from success, “rescue M&M,” (*Surg Clin North Am* 2021;101:71-80), and upstream daily decision-making. Discussing successful (versus unsuccessful) complex cases can explore very similar upstream

decision-making in a non-punitive environment of greater psychological safety.

Theme #4: Create a culture that values all voices equally

Teams are wisest when they encourage psychological safety and where silence does not reign over voice. In rescue, the smallest spark of concern can turn into a forest fire if that concerned voice is not heard. Importantly, central to valuing all voices is the patient’s voice.

In the current COVID-19 environment, our systems may have unintentionally isolated and undermined equal voice. PPE physically distances us from each other and our patients. Visitation policies are severely limited or eliminated. The family’s presence – often the bridge to our patients’ voices and additional eyes and ears – is missing.

Delays in detecting and responding to deterioration may be mitigated with

novel ideas to ensure unfragmented communication. Systems can be designed to leverage digital health with telehealth, continuous PMS, and lower warning system triggers, combined with formal recurrent evaluations or “watch lists” for patients at high risk (Michael DeVita, MD, personal communication, November 20, 2020). Strategies to lower barriers, communicate early, and value voices equally will improve perioperative rescue whether we are in or out of a COVID environment.

Ultimately, as we implement better rescue at the system, hospital, perioperative service line, department, OR team, or individual level, our solutions must be anchored to one or more of these four design themes. In 2021, APSF will continue to place “preventing, detecting and mitigating clinical deterioration in the perioperative period” in the forefront of our aims. ■

The Organization and Execution of a Virtual Anesthesia Resident Research Day

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Anesthesiology residency programs in the United States require that residents be involved in scholarly activities such as research, quality improvement, and literature review, and present the results of their scholarly activities at state or national meetings. Unfortunately, none of this was possible in 2020 due to the COVID-19 pandemic. In response, the California Society of Anesthesiologists created, advertised, and provided staff support and prize money for a Virtual Resident Research Day.

The CSA advertised the Virtual Resident Research Day by calling for abstracts on the CSA website and sending invitations to all 12 California department of anesthesiology program residency directors and chairs. The CSA received almost 100 submissions. The Abstract Review Committee selected 13 of these for virtual research presentations, including the Resident History Essay winner. The CSA posted all submitted abstracts on the CSA web site at <http://csahq.org/events/csa-resident-research-day>.

The Virtual Resident Research Day was run simultaneously on both Zoom and Facebook. Over 100 people attended. The PowerPoint slides, all vetted and rehearsed prior to the meeting, were brought up for each resident, who was given five minutes to present his or her work and one minute to answer



questions. The session was monitored by Rita Agarwal, MD, who introduced the speakers, rigorously kept the presentations and Q&A to the allotted times, and monitored the chat and Q&A screens for questions and comments.

The presentations were scored by nine judges representing multiple academic anesthesiology programs in California. The scores were entered in real time on a dedicated Google sheet so that the final scores were available at the end of the last presenter. As a result, Dr. Agarwal was able to announce the three winners at the conclusion of the abstract presentations.

For the record, first place was awarded to Varina R. Clark, a medical student from USC, for her presentation “In vivo knockdown of snail is a novel therapeutic strategy for right ventricular failure.” Second place was awarded to Sydney Hemphill, a medical student from Stanford, for her presentation “Quantifying virtual reality pain modulation in healthy volunteers through ice immersion.” Third place was awarded to Alexandra Ruan, a CA-3 Stanford resident, for her presentation “The effect of night float rotations on resident sleep, activity and wellbeing.”

A virtual meeting does not have the personal interactions, networking, and



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excitement of an in-person meeting. However, our experience demonstrates that a virtual resident research day can be as successful as in-person oral presentations. Most critically, it provides residents and other trainees an important opportunity to present their research. It also permitted residency programs in California to meet the scholarly activity expectations of the ACGME. ■