# Building and Maintaining Organizational Infrastructure to Attain Clinical Excellence

Kelly Lebak, MD[a], Jason Lane, MD, MPH[b], Richard Taus, MD[c], Hansol Kim, MD[d,e], Michael S. Stecker, MD[d,e], Michael Hall, MD[f], Meghan B. Lane-Fall, MD, MSHP[g], Mark S. Weiss, MD[f,*]

**KEYWORDS**

• Interdisciplinary/multidisciplinary • Protocols • Standardization • Closed claims • Curriculum • Quality metrics • Safety • Adverse event

**KEY POINTS**

- This article describes the considerations for building an organizational infrastructure dedicated to the care of patients undergoing procedures requiring anesthesia services outside the traditional operating room.
- This article brings into focus how to build a leadership team and standardized work environment necessary for the safe and effective provision of non–operating room anesthesia (NORA).
- This article introduces a new paradigm for education of anesthesiology trainees focusing on NORA.
- This article elaborates on the requirements for a robust system of quality assurance and improvement focused on the unique challenges presented by NORA.

[a] Case Western Reserve University School of Medicine, MetroHealth Medical Center, Brecksville Ambulatory Surgery Center, Cleveland, OH 44109, USA; [b] Department of Anesthesiology, Vanderbilt University Medical Center, 1301 Medical Center Drive, 4648 TVC, Nashville, TN 37232, USA; [c] SMG Radiology, Morton Hospital, 88 Washington Street, Taunton, MA 02780, USA; [d] Division of Angiography and Interventional Radiology, Department of Radiology, Brigham and Women's Hospital, 75 Francis Street, Midcampus SR-340, Boston, MA 02115, USA; [e] Harvard Medical School, 25 Shattuck Street Boston, MA 02115, USA; [f] Department of Anesthesiology and Critical Care, Hospital of the University of Pennsylvania, 3400 Spruce Street, 6th Floor Dulles Building, Philadelphia, PA 19104, USA; [g] Department of Anesthesiology and Critical Care, University of Pennsylvania Perelman School of Medicine, 309 Blockley Hall, 423 Guardian Drive, Philadelphia, PA 19104, USA
* Corresponding author.
*E-mail addresses:* Mark.Weiss@uphs.upenn.edu; weissm@uphs.upenn.edu

Anesthesiology Clin 35 (2017) 559–568
http://dx.doi.org/10.1016/j.anclin.2017.07.002 **anesthesiology.theclinics.com**

Modern medicine increasingly distinguishes itself from historical practice in that it depends heavily on collaboration between teams that are both interdisciplinary and interprofessional. The National Academy of Medicine, formerly the Institute of Medicine, recommends interdisciplinary team training to enhance patient safety and the quality of health care.[1] To attain clinical excellence in any realm of medicine, the importance of teams must be reinforced, and resources should be devoted to creation and ongoing support of these teams. Once created, an effective team can establish and implement standards for both patients and the shared work environment. This approach has been well recognized in the ICU to improve outcomes for critically ill patients.[2] Once standards and protocols are established, quality assurance and improvement processes must be enacted to ensure the protocols are patient centered and applied appropriately. Appropriate patient care may require deviation from a given protocol; resilient teams are able to work together to make decisions about when to adjust protocols.[3] This interdisciplinary team approach with structured quality improvement and assurance has been enacted in many areas of medicine since the National Academy of Medicine published its landmark article, "To Err Is Human,"[1] and it is increasingly applied to non–operating room anesthesia (NORA).

This article describes considerations for building an organizational infrastructure dedicated to the care of patients undergoing procedures requiring anesthesia services outside the traditional operating room. First, building a leadership team and standardized work environment necessary for the safe and effective provision of NORA is discussed and then a new paradigm for education of anesthesiology trainees focusing on NORA is laid out. Finally, the requirements for a robust system of quality assurance and improvement focused on the unique challenges presented by NORA are elaborated.

## ESTABLISHING COMPREHENSIVE TEAMS

Medical proceduralists, including interventional radiologists, gastroenterologists, and electrophysiologists, have similar expectations for patients undergoing diagnostic or therapeutic procedures. Proceduralists want patients to be safe and comfortable during the procedure while achieving conditions (eg, lack of movement) adequate for performing a procedure. To provide comfort while minimizing the untoward effects of sedative agents, proceduralists frequently use local anesthetics. Moderate sedation may be used when procedures are too stimulating for local anesthetics alone or when a patient is too anxious or otherwise unable to tolerate the procedure while fully alert. Preprocedural evaluation by the procedural team helps distinguish patient cases appropriate for minimal or moderate sedation from those who may require deep sedation or general anesthesia.

There are multiple drug classes that proceduralists may use as sedatives, such as anxiolytics (eg, midazolam) and opioids (eg, fentanyl). During sedation supervised by proceduralists (as opposed to sedation administered by an anesthesia team), a separate trained staff member, typically a nurse, monitors the patient and administers the sedating medications. Ultimately the proceduralist remains responsible for medication doses and for monitoring a patient's vital signs during the administration of sedative medications.

The task of sedation necessarily draws an operator's attention away from the procedure. This may lengthen the procedure and increase risk to the patient. Provision of sedation by anesthesia staff allows proceduralists to concentrate on the intervention without distraction, but it is impractical for anesthesia staff to be involved in the care of every patient undergoing minimally invasive procedures. The factors that have an impact on provision of anesthesia services within the NORA suite include limited staff availability, increased time required for initiation of and recovery from sedation,