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Setting up a quality program: defining the value proposition for anesthesiology

Richard P. Dutton, MD, MBA^{a,b}, Stephanie Davidson, DO^{c,d}, Aesha S. Shukla, MBA, MHA, CPHQ^a

A robust quality improvement (QI) program is an advantage for any anesthesia practice, whether private or academic. Although the primary goal should be ongoing improvement of patient care, QI infrastructure also enables the group to demonstrate value to external stakeholders ranging from the federal government to commercial payers to local hospital administration.

The QI program enables efficient management of the operating room, response to patient and surgeon complaints, and submission of public performance measures to the Centers for Medicare and Medicaid Services (CMS). A robust QI program supports the professional obligation of anesthesiologists to continually improve the safety of patient care. The QI program creates the measuring stick for improving outcomes over time, both for the group as a whole and for individual members. Collection and analysis of adverse events allow every provider to learn from the experience of others and create a substrate for improving systems of care within a “safety culture” of open and honest discussion protected from legal discovery or public embarrassment of the hospital, the practice, or any individual. The anesthesia QI program will support the health system’s goals related to Joint Commission, Leapfrog, and other reportable patient safety initiatives, providing value to the relationship.

This chapter reviews the steps involved in the creation and support of an anesthesia department QI program, including suggestions for data collection, incident analysis, and reporting. The goal is a department in which every member participates in Continuous Quality Improvement (CQI) as an expected clinical activity.¹

Institutional support

A robust QI program begins with commitment from senior leadership. Quality and performance data are required by the hospital system to meet regulatory requirements, and good performance is tied to incentive pay for hospital leaders. The hospital will ask each department—including anesthesia—to support their global efforts. An effective anesthesia QI program offers a competitive advantage: Groups that measure their performance are best positioned to improve it and can use the resulting data to win and maintain hospital contracts.² Department Chairs are more willing to invest in QI than in years past, but more than money is required. Senior leaders must make

it clear by their actions that participation in QI is professionally valuable, and the Department Chair can emphasize this by selecting the right person to be the QI Director and then mentoring them in the role. Senior clinicians must be willing to acknowledge and discuss their own adverse outcomes and must model the willingness to change practice when needed. Not every member of the group must attend hospital meetings or review adverse outcomes, but those who do must be supported by their peers who stay in the OR. As the saying goes: “If you’re not at the table, you’re on the menu.” Participation in hospital QI meetings is as important to practice viability as providing good clinical service—something that leaders must emphasize.

Leadership and organization

Within the Department, success begins with the designated QI Officer. Most often, this is a mid-career to late-career anesthesiologist, but enthusiasm and motivation for the work are more important than seniority. The QI Officer must be named and then supported by senior leadership, with positional authority established at the outset. Influence begins with visible support from the Department Chair or practice President, and then accrues through persuasion and success. Every member of the practice—and all external stakeholders—should know who the QI Officer is and the job they are asked to do.

The QI Officer is the contact point for all members of the group with concerns about patient safety or clinical quality and is the department’s primary representative to the hospital-wide QI committee. The role of the QI Officer is to gather data from all clinical sites, synthesize it, and report it to all stakeholders. The QI Officer decides what data to collect, how to analyze it, and how to report it to the department. He or she works with peers in other departments to create interdisciplinary process improvement activities. The QI Officer is responsible to the Department Chair and to hospital administration for understanding and explaining the group’s clinical performance, in structured metrics, peer review, and reaction to complaints from patients and other stakeholders.

A good QI program is not just one individual. The first goal of the QI Officer should be to recruit and organize a department-wide Committee of fellow clinicians. This group will define performance metrics, launch focused reviews, and perform peer review for adverse and sentinel events. Diversity of clinical perspective is recommended for forming the QI Committee: the QI Officer should seek representatives from among both established senior partners and new recruits; from the ranks of physicians, nurse anesthetists, anesthesiologist assistants, technicians, and trainees; and from the breadth of anesthesia subspecialists. Participation of the practice business manager—or a delegated

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administrator—is desirable because of the overlap between regulatory requirements and billing compliance, and between clinical performance and operational efficiency. The committee should have dedicated support from hospital and Department IT experts—developers in particular—to facilitate data mining and analytics.

Anesthesia department QI occurs through 2 interlocking mechanisms: top-down aggregation of routine performance data, and bottom-up review of sentinel events and unusual cases. The QI Officer must build infrastructure to gather data and share results; this includes both information technology and a network of human contacts both inside and outside the practice.

Top-down data

Top-down performance measurement is perceived as a daunting task that requires masses of information recorded by aggravated clinicians, but this need not be the case. In the Information Age, every anesthesia practice has access to extensive digital data already collected, and this should be the starting point for the QI program. The efficient QI officer should pursue data aggregation using a 3-step approach: Acquisition, Collaboration, and—only as a last resort—*de novo* Creation.

Acquisition of existing data

Top-down data collection begins with an inventory of what is already available within the anesthesia practice and the hospital, with an emphasis on data already in digital form and thus easy to copy and share. All anesthesia billing information falls into this category because payment for anesthesia in the United States requires electronic transmission of individual case data to the payer. Rare exceptions to this rule may occur in government programs such as the Department of Defense and the Veterans Administration that do not reimburse on a per-case basis, and in pure Health Maintenance Organizations (HMOs) such as Kaiser Permanente, but even in these settings, similar digital records are necessary for internal cost accounting. In all other settings, billing data will provide the first layer of the department's QI database. Usually, this is available internally, but if the practice outsources billing, then part of the contract should include ongoing return of raw and summarized data.

Billing records—also known as “administrative data”—document every activity of the department and every patient who receives care. Billing records include information about the surgical and anesthetic procedure; the date, time, and location of the case; the providers involved; and the patient's age, sex, and ASA Physical Status.³ These data rarely include any information on the outcome of the encounter, but are nonetheless essential for defining the work of the practice. Procedure codes are used to create the denominator for outcome measurement, allowing calculation of rate-based metrics for reporting; one headache out of 10 epidurals paints a very different picture than 1 out of 1000. Surgical procedures are coded using the Current Procedural Terminology (CPT) system of the American Medical Association, and then “cross-walked” to anesthesia CPT codes. For example, “anesthesia for upper abdominal laparoscopic surgery” is an anesthesia CPT code that includes the surgical code for laparoscopic cholecystectomy and dozens of other upper abdominal surgeries. Department or hospital administrative data may also include codes for each case from the International Classification

of Diseases (ICD) system; there are ICD-10 codes for procedures, for active diagnoses, and for comorbidities, and secondary codes indicating whether the condition was present on admission (eg, diabetes) or acquired during the hospital stay (eg, pneumothorax after central line placement).

The QI Officer should be familiar with these coding systems and how they interact. Procedures can be crosswalked from one system to the other, but sometimes, only in one direction: every surgical CPT code is associated with a specific anesthesia CPT code, but each anesthesia code might represent dozens of different surgical procedures with similar anesthesia workload. Knowing which code to search for, of which type, is important when running data queries to facilitate QI projects; some will need very specific surgical codes, whereas others will be better run using the broader (but fewer) categories represented by anesthesia CPT codes.

Other data readily available for acquisition by the QI program include hospital performance measures that are gathered by the hospital QI department, registry information for surgical or procedural services, and reports generated for financial management. A quick trip to the executive suite will reveal reams of information, some of which will be relevant to surgical procedures. Hospital administrators, including QI nurses, are usually willing to share copies of standing reports if asked politely, especially if the data are used to improve patient care. Both hospitals and surgery centers are required to report performance measures to state and federal agencies. Many of these measures are relevant to procedural care and the associated reporting can be useful to the anesthesia QI program. Such reports include Hospital Compare (Medicare) measures, Surgical Care Improvement Project (SCIP)⁴ measures, and Consumer Assessment of Healthcare Providers and Systems (CAHPS)⁵ patient satisfaction data. Not all these measures apply to anesthesiologists, but it is important for the QI Officer to be aware of overall hospital performance, to understand which issues are a priority for administration.

Most hospitals and systems participate in national registry and benchmarking projects, including the University Hospital Consortium,⁶ the National Trauma Data Bank,⁷ the National Cardiovascular Data Registry,⁸ the National Surgical Quality Improvement Project,⁹ and the Society for Thoracic Surgeons Cardiac Surgery Registry.¹⁰ These registries offer a dual opportunity to acquire data for the anesthesia QI Officer, by accessing the data reports that are sent from the hospital to the registry, and then by seeing the benchmarking report returned to the institution from the registry. Even more relevant, many university anesthesia Departments participate in the Multicenter Perioperative Outcomes registry (MPOG), which will provide direct benchmarking of highly relevant measures and ongoing opportunities for big-data research.¹¹ Working with medical or surgical services to improve their benchmarked performance in a given registry is a good way for the anesthesia department to demonstrate value; a surprising number of measures belonging to other specialties can be influenced by changes in operative anesthesia, pain management, or preoperative assessment. Mortality during cardiac surgery, for example, is a shared responsibility between surgeons and anesthesiologists.¹²

Collaborating on data

After the relevant preexisting data in the hospital have been scavenged, the QI Officer should *collaborate* to create new information for patients having anesthesia-facilitated procedural

1 care. The hospital QI office is a good place to start because it has
 3 more resources for chart review and data collection than the
 5 anesthesia department, and may have relevant projects already
 7 underway. The institution has a requirement to report perform-
 9 ance in procedural care and may be willing to devote resources
 11 to joint projects. For example, it is not unusual for nurses in the
 13 postanesthesia care unit to routinely contact patients who have
 15 been discharged after surgery; the QI Officer can collaborate in
 17 this process by suggesting questions to ask (eg, “Have you
 19 experienced nausea or vomiting since you came home?”) and by
 21 helping to interpret and respond to the results. A collaboration
 such as this one, based on direct communication with front-line
 nurses, will almost always reveal opportunities for improvements
 in anesthesia care.

Other opportunities for collaboration include deployment of
 patient satisfaction surveys that include anesthesia-specific
 questions, focused review of oversedation events related to
 postoperative analgesia, and shared metrics based on operating
 room efficiency. In general, the QI Officer should be willing to
 share anesthesia department data with any surgical service or
 hospital division that wants to collaborate around a joint topic.

Creation of new data

Finally, and only after more efficient methods have been
 exhausted, the QI Committee should gather new information.
 This usually means creation of an outcomes capture form for
 completion after every anesthetic; a sample screenshot from one
 such tool is shown in Figure 1. This form—either electronic or on
 paper—will capture outcomes and attestations specific to anes-
 thesia, including the occurrence of events such as postoperative
 nausea and vomiting, inadequate pain management, dental
 injuries, medication errors and reactions, difficult airway man-
 agement, respiratory complications, hemodynamic instability,
 intraoperative cardiac arrest, and perioperative mortality. A core
 set of measures and recommended definitions can be found on the
 Anesthesia Quality Institute website at <http://www.aqihq.org/quality.aspx>. The QI Officer should customize a template based
 on a subset of measures matched to their patient population,
 common surgeries, and issues of concern.

Beginning with a paper form enables adaptation because the
 form will be quick and easy to use. Paper forms are easy to deploy
 rapidly to every site where the practice works. Paper forms are
 also cost effective and easy to update with new measures or
 improved language. On the downside, paper forms are easily lost
 or ignored, can pose risks to patient and clinician confidentiality
 when they get lost, and can be returned with missing data. Groups
 relying on paper QI documentation must devote time and energy
 to measuring and enforcing compliance with universal and
 complete reporting, something that is not necessary in electronic
 systems with mandatory fields.

Creating and deploying an anesthesia-specific outcome capture
 form requires a relatively advanced patient safety culture, in
 which all clinicians recognize the value of capturing data and are
 willing to take the time to report honestly and completely. If the
 form is deployed too early in development of the QI program, it
 may be ignored or misused, creating mistrust and cynicism.
 Cynicism arises because this kind of self-reported data is inher-
 ently limited; it depends on fallible human consistency of purpose
 and is subject to “gaming.” If a clinician does not see the value of
 collecting it, then they will not put in the effort to do it well.

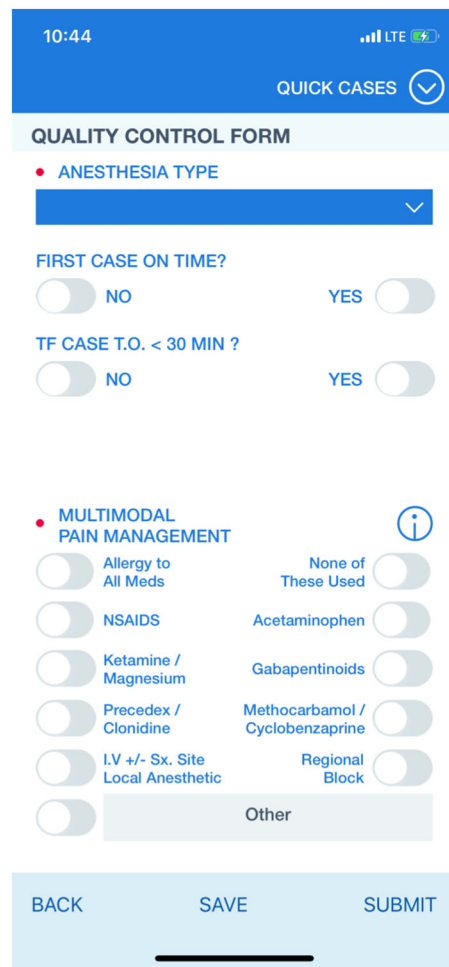


Figure 1. Sample screen from a smartphone anesthesia quality capture app, illustrating typical metric data collected. Copyright [Copyright 2018 by MD Claim, Incorporated], [location of copyright holder]. All permission requests for this image should be made to the copyright holder.

In the long run, the QI Officer should strive to capture most
 anesthesia outcomes from existing electronic data and not self-
 reports. For example, it is more sensible to derive “hemodynamic
 instability” from the objective record of vital signs—the EMR—
 than from clinician attestation. This could be done by calculating
 a deviation exceeding a certain percentage of the patient’s base-
 line heart rate and blood pressure, or by noting the use of pressor
 medications. For many common anesthesia measures, there are
 already templates in place in the common EMRs; the QI Officer
 should make sure these routines are configured and turned on,
 and that the data are being returned to the QI program.

Most anesthesia practices today, even academic departments,
 work across multiple sites and facilities. Different sites may have
 different EMRs—or none at all—which makes it difficult to
 collect quality performance data passively for every case. The
 most common solution in 2021 is to use a non-EMR smartphone
 app to gather QI data. Several companies offer this service; some
 include full clinical documentation systems (useful in paper-based
 facilities) and some are combined with reporting and analytic
 services. When the app is also collecting required billing
 information—start and stop times, personnel present, anesthesia

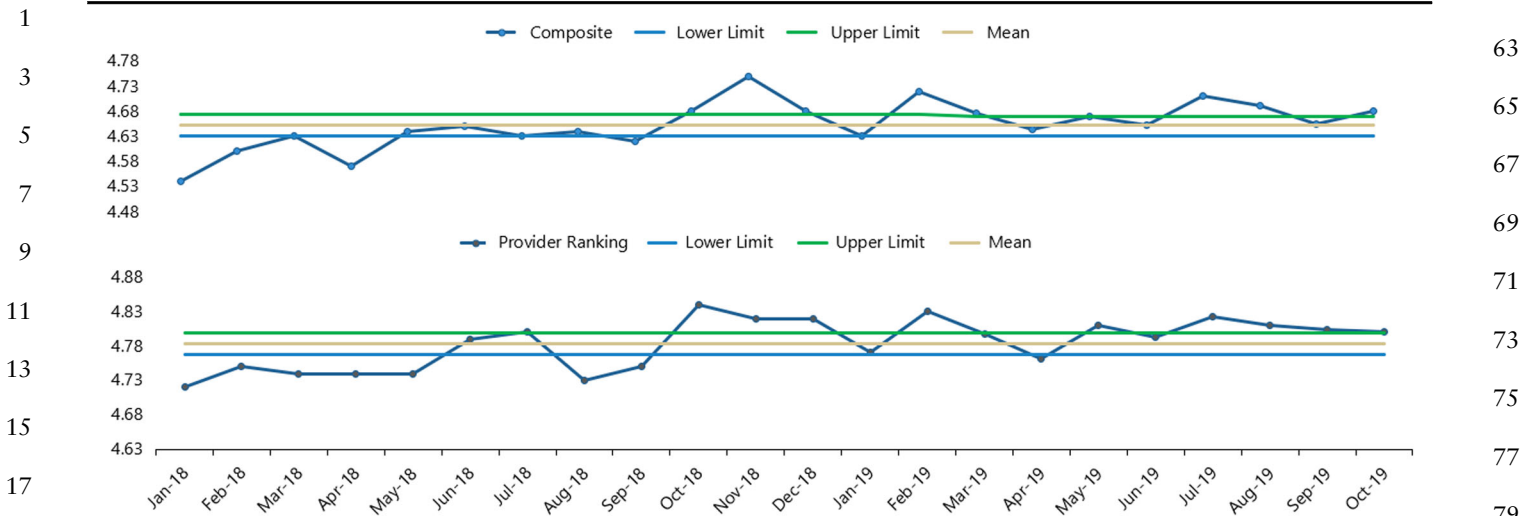


Figure 2. A typical statistical process control chart, showing performance over time in overall patient satisfaction for an anesthesia practice, compared with upper and lower limits (2 SD). Consistent values above or below the control limit show a statistically relevant change in performance. [full color online](#)

procedures, surgical procedures, etc.—the quality performance data can be added as required fields. With the help of collected billing data, the app can be adaptive at collecting corresponding quality performance data; there is no need to ask about a quality measure if the CPT is not applicable for the procedure. Emergency cases, for example, routinely exclude anesthesia-related quality measures. Reducing required fields increases compliance with reporting; the QI Officer should be wary of anything that adds more “clicks” to the documentation burden of harried clinicians and should be vigilant for opportunities to reduce mandatory documentation. In general, the more the data entry required, the lower the quality of the captured data will be.

Data analysis

After data have been obtained and aggregated, the next step is to analyze and report on these. As with other aspects of the program, an effective approach is one that starts with simple reports and works toward greater complexity over time. In some cases (eg, data harvested from other systems), copying the native report will suffice. Billing and economic data may already contain hospital “key performance indicators” that show current demographics and changes over time.¹³ In more sophisticated environments, these reports already include benchmarking information, comparing performance to other organizations and targeted goals.

The simplest way to present data gathered is a raw count: for example, how many patients received care or how many complications occurred. Because case numbers and case mix will vary from month to month, it is usually desirable to take the next simple step and express key data as rates: a number of occurrences divided by a number of opportunities, for example, the number of dural puncture headaches (numerator) resulting from the combined number of spinal and epidurals performed (denominator). This step normalizes the data for different size denominators, and allows comparisons over time, across facilities, and between individual providers.

The first time QI data are analyzed and converted into rates, the Committee will have limited ability to interpret the results. However, the second time, a month or a quarter later, value will

begin to accrue, and even simple reports will gain utility over time. The analytic step after calculating rates is to present them in a time series, showing the change from one period to the next. This will provide immediate information by demonstrating which processes are improving and which are not. When looking at short time series, however, it can be hard to know whether the changes are occurring due to random chance or a real shift in outcomes. As the series becomes longer, more complex statistical methods can be brought to bear. A full explanation of statistical process control charts is beyond the scope of this chapter, but Figure 2 illustrates such a presentation, and there are resources to demonstrate this technique applied to anesthesia QI data.¹⁴

Whether through acquisition, collaboration, or creation of new data, one pitfall to avoid will be untouched data. Health care organizations generate large amounts of information every day, most of which is completely unused; this contributes to clinician cynicism. As the QI Officer contemplates new data collection mechanisms, it is wise to start simple and scale up over time, with periodic efforts to cull out questions and measures that are no longer useful. One example from the days of paper documentation was an internal rule: *no new paper documentation unless an equal amount of old paper is removed*. This principle is just as relevant in the era of electronic documentation, but can be hard to achieve. Close relations with the hospital or practice IT professionals are essential to keep daily electronic documentation as simple and streamlined as process, while still generating the specific data needed to support clinical care, revenue cycle management, and quality reporting. Expertise is required to construct complex relational data warehouses, and ongoing work to develop and sustain the specific definitions and syntax needed for reporting. This includes internal checks to eliminate unrealistic entries (eg, patient age older than 150 y) and derive normalized values from the raw data submitted. Done correctly, an efficient anesthesia clinical data warehouse can include hundreds of elements for each case, built on a minimum of human reporting, and can enable powerful analytic tools for the practice. Figures 3–5 show some examples.

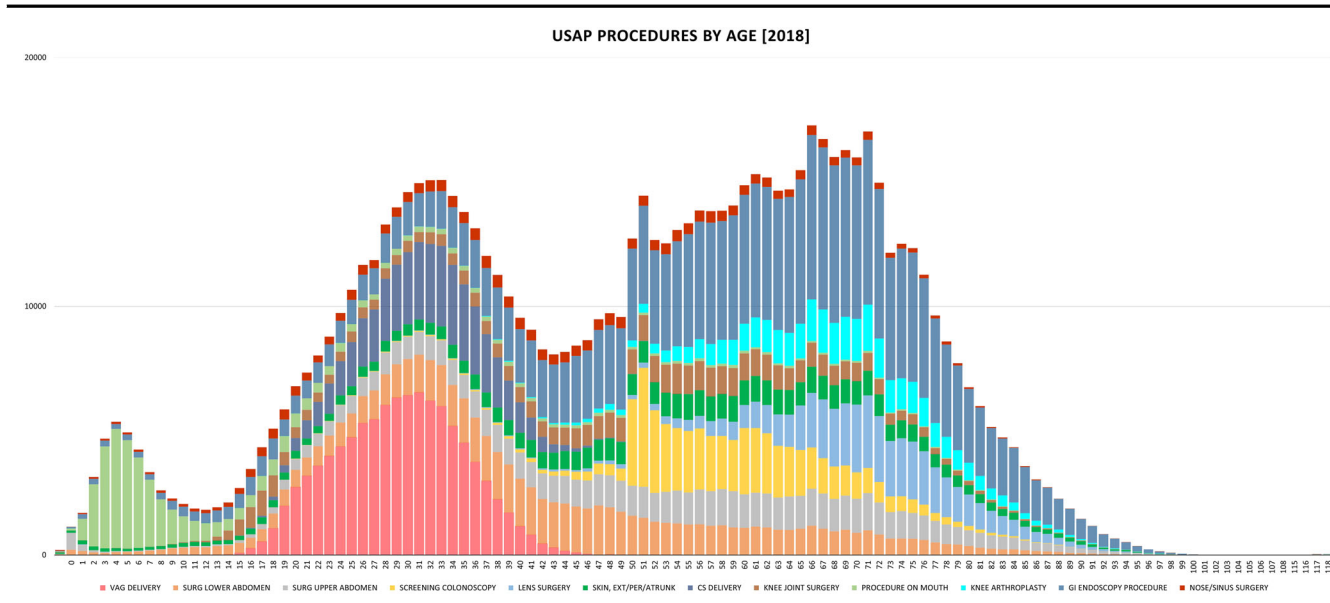


Figure 3. Distribution of common cases by patient age: US Anesthesia Partners national data, 2018; n = 1,800,000 cases. [full color online](#)

Data reporting

Reporting from the QI database can be a sensitive topic and should be carefully managed.¹⁵ Actionable data with large volumes of collection (eg, patient satisfaction, adequacy of pain management, on-time starts, completion of QI outcome forms) can be reported at the level of the individual provider with reasonable statistical confidence in the results. This information is best presented privately, allowing for self-reflection, and should include benchmark data either from national norms or from the aggregate performance of the practice. Maintaining confidentiality of performance information is critical to encouraging active participation and to development of a “culture of safety.” Figure 6 illustrates this kind of report by showing the rate of postoperative nausea and vomiting in a group of clinicians, with

each individual seeing his or her own performance and that of the other providers in the group, but without knowing which peer is which bar. Creating and presenting this kind of performance scorecard may be all that is needed to motivate changes in practice; physicians are inherently competitive individuals and will strive to improve when presented with clear metrics.

Some QI data are not suitable for presentation at the individual level. These include outcomes that occur rarely, because some adverse events reflect random chance rather than statistical significance. Examples include perioperative mortality, cardiac arrest, anaphylaxis, malignant hyperthermia, myocardial infarction, stroke, and postoperative visual loss. Other data, for example hospital length of stay and 30-day patient mortality, are unsuitable for individual reporting because the responsibility for improvement cannot be attributed to just one clinician. In both these cases, QI results are best presented at a team level, for the facility, the practice, or the hospital system, as “shared accountability measures.” Figure 7 shows practice performance for three significant outcomes of anesthesia: postoperative reintubation, intraoperative cardiac arrest, and operating room mortality, compared with the National Anesthesia Clinical Outcomes Registry. With rates <3 per 1000 cases, these events are so rare that even facility-to-facility comparisons may lack the statistical power to demonstrate meaningful differences in performance.

Emerging requirements for public performance reporting are distorting the ability to keep QI data “within the family,” because some programs require that data be made public at the level of individual physicians.¹⁶ Selecting individual performance measures to share with the hospital (for Joint Commission purposes) or Medicare [for the Merit-based Incentive Payment System (MIPS)] is an important task of the QI Officer. The desire to show good results in public is in direct conflict with the core purpose of the QI program to identify opportunities for performance improvement.¹⁷ Further, the use of measures for public reporting that are ‘safe’ because performance is very high—but are therefore not useful to improve safety—undermines the credibility of the program and increases the cynicism of clinicians. For

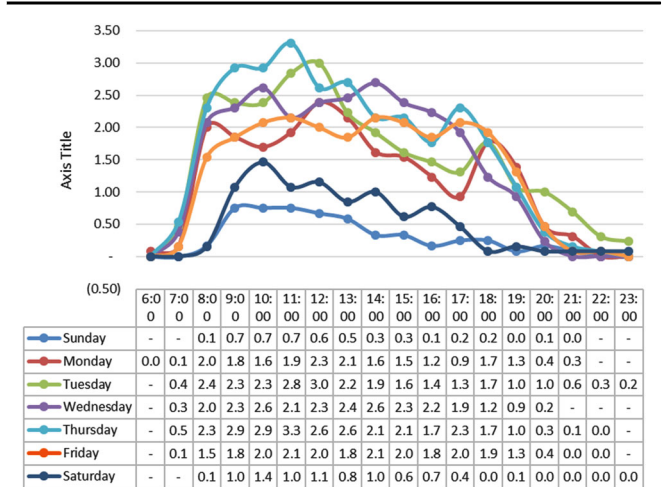


Figure 4. A typical OR coverage graphic, showing the average nurse anesthetist to anesthesiologist coverage ratio for a busy operating room suite, based on the day of the week and the time of day. Analysis like this enables efficient staffing models. [full color online](#)

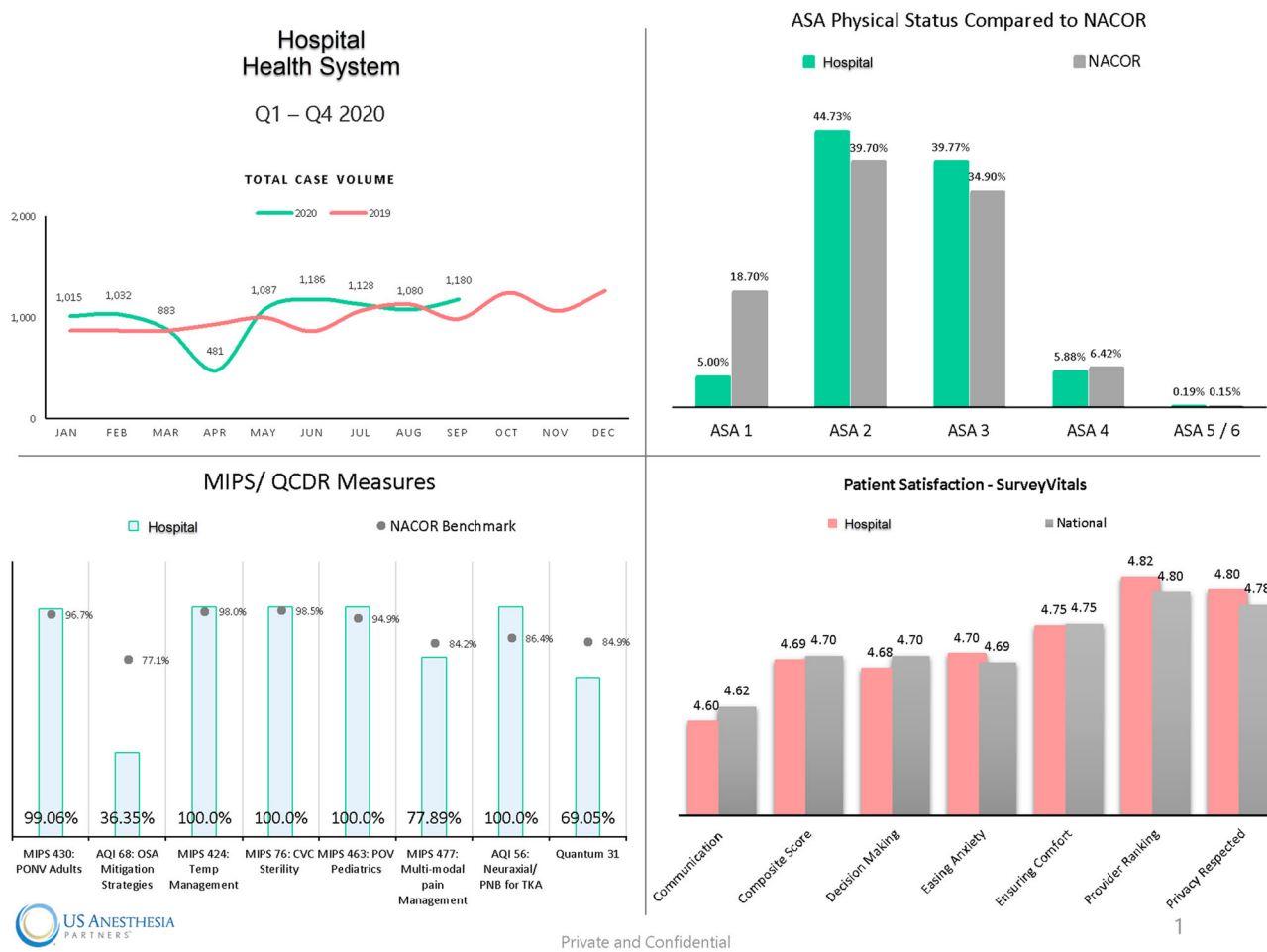


Figure 5. A typical 1page hospital dashboard, showing case volume, patient acuity, quality measure performance, and patient satisfaction. Regular reporting adds value to the relationship between the anesthesia practice and the facility. MIPS indicates Merit-based Incentive Payment System; NACOR, National Anesthesia Clinical Outcomes Registry; PONV, postoperative nausea and vomiting. Copyright [US Anesthesia PARTNERS], [location of copyright holder]. All permission requests for this image should be made to the copyright holder.

example, timely administration of antibiotics at the start of a surgical case is a longstanding anesthesia quality measure. This is an important activity to reduce the risk of surgical site infection,

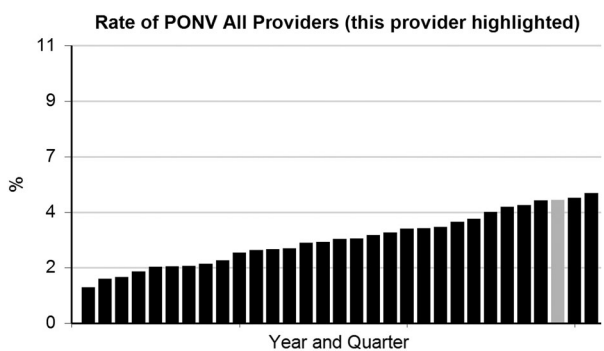


Figure 6. A typical confidential quality improvement report for an individual provider, showing the rate of postoperative nausea and vomiting compared with all anesthesiologists in the group. PONV indicates postoperative nausea and vomiting.

but is not among the core concerns of anesthesiologists. Overemphasis on a collateral activity such as this one, with results that have become “topped out” over time, may waste valuable resources in the QI program. The goal of the QI Officer should be to align the measures that are publicly reported with measures that best demonstrate performance of the department. This may require convincing the Department that publicly reporting less-than-perfect performance will not have negative personal or financial consequences.

Public reporting may also demand that results be risk adjusted to account for differences in patient population, case mix, geographic region, and other factors beyond the control of the anesthesiologist. For internal reporting, most of these variables are similar for all members of the group—because they are working at the same facilities—making risk adjustment unnecessary. However, adjustment is required for high-stakes external reporting, for example, perioperative mortality, to preserve confidence in the credibility of the results. Groups working mostly in university hospitals would be expected to have worse results than those caring primarily for outpatients. Most variance in anesthesia outcomes can be controlled with adjustment for

Clinical Quality Outcomes 2019 & 2020 [Per 1K cases]

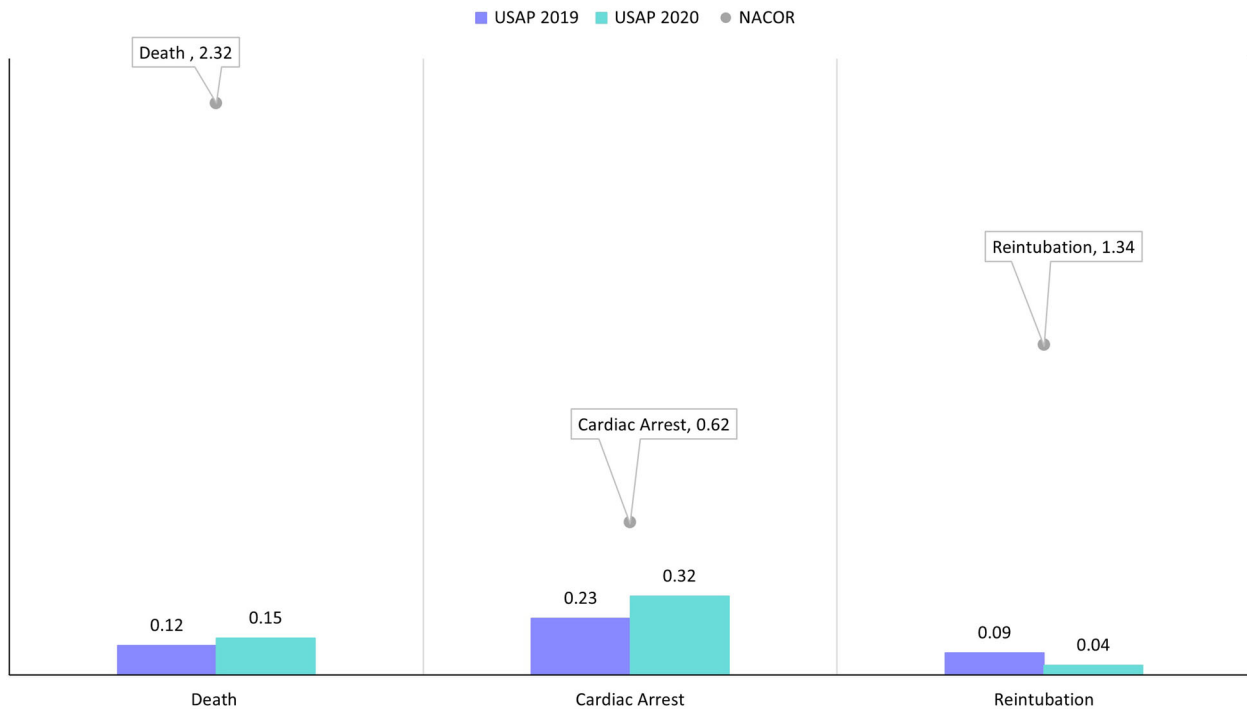


Figure 7. Practice performance over time compared with the National Anesthesia Clinical Outcomes Registry (NACOR) on 3 rare but important outcomes of interest. With fewer than 3 intraoperative deaths per thousand cases, differences in performance on metrics such as these will only be statistically significant when very large numbers of cases are aggregated.

ASA Physical Status, age, and the type of procedure, but this is still a mathematically cumbersome process. Increasing the precision of risk adjustment requires data that may not be readily available, such as accurate patient co-morbidities. Even when carefully performed, risk adjustment is so complicated that methodological issues can always be raised.^{18,19} The QI Officer must be aware of these concerns and their implications and must target the right degree of adjustment for each specific reporting purpose.

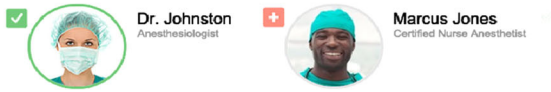
Measurement of patient satisfaction

Direct feedback from patients can empower the anesthesia QI program. After safety, a satisfied patient is the most important goal of anesthesia care. Collection of anesthesia-specific patient satisfaction data does not add a reporting burden—no daily clicks for clinicians—but does require a financial investment by the group to hire an external vendor or establish an internal system. Although relatively few practices are willing to make this investment – including virtually no University Departments – those that have can attest to the significant value it brings. Today’s information technology makes it relatively easy to send a postoperative survey to every patient who has an email address or smartphone number.²⁰ The authors’ experience with a nationwide system—now in use for more than a decade—is that the response rate is surprisingly high, at 30% to 40% of surveys sent to patients with valid contact information. Patients are engaged in their healthcare, and willing to respond to questions about it when presented in an easy-to-use format.

Figure 8 shows questions that might be asked on a patient-satisfaction survey, based on guidance from the ASA (<https://www.asahq.org/quality-and-practice-management/quality-improvement/patient-satisfaction-with-anesthesia-white-paper>, accessed February 24, 2021). Results should be aggregated at the facility and enterprise level, and presented in comparison to national benchmarks. Access to external data is one reason to use an outside vendor, rather than building the system internally. Every individual clinician should have access to his or her own results, but these should not be publicized, both because statistical confidence is lower when smaller numbers are aggregated and because identification of individual performance risks weaponizing the data in a way that will harm group culture. More important is a confidential feedback system that ensures that each clinician directly receives both positive and negative comments from their patients. Anecdotes directly from patients are a powerful motivator for changes in practice, for example, “you never talked to my family when you came in the room.” Sentiment analysis is becoming increasingly popular; this tool helps identify trends in free form or text string data, for example, how many times did patients use the word “exceptional” to describe their care compared with the number of times “afraid” was used (Fig. 9). Patient satisfaction data can be instrumental in shaping the practice’s public reputation, can be used in marketing efforts, and can be used to demonstrate value to hospital administration. Maintaining a high level of patient satisfaction is a federal quality measure for physicians under MIPS and is in use by the authors’ practice to earn incentive payments under contracts with commercial payers as well.

Survey VITALS[®] Anesthesia provider Patient Satisfaction Questionnaire (APSQ2)

1. Please select those providers for whom you remember enough to answer questions about the care provided?



I remember neither of these healthcare providers.

[Continue](#)


Question #	Question Group	Answer Type	Question Text
2	Privacy Respected, Composite	Likert Scale 1-5 w N/A	Your anesthesia provider did his or her best to respect your privacy.
3	Communication, Composite	Likert Scale 1-5 w N/A	Your questions about anesthesia, the process, risks, and possible after effects were answered.
4	Decision Prep, Composite	Likert Scale 1-5 w N/A	You were well prepared to make informed decisions.
5	Ease Anxiety, Composite	Likert Scale 1-5 w N/A	Your anesthesia provider helped ease any anxiety you were feeling.
6	Ensure Comfort, Composite	Likert Scale 1-5 w N/A	Your anesthesia provider ensured your comfort during the surgical experience.
7	Overall	Likert Scale 1-5	Using a number from 5 to 1, where 5 is the best possible and 1 is the worst, please rate your anesthesia provider.
8		Yes/No	Did you experience nausea or vomiting after your surgery?
9		Text Box	Please share additional comments for your anesthesia provider.

Contact me Addendum

10	Addendum	Yes/No	Do you need to be contacted by a representative of your provider to discuss your experience?
11		Yes/No	Confirm contact request.

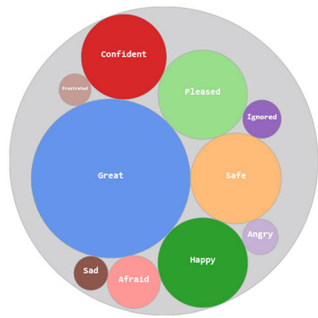
* A low rating for Likert questions will trigger the following question: You have selected a low rating, please provide details to help us improve.

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Figure 8. Mock-up of the Anesthesia Patient Satisfaction Questionnaire, Version 2, based on recommendations from the American Society of Anesthesiologists. Copyright [Copyright 2016, SurveyVitals, Incorporated], [location of copyright holder]. All permission requests for this image should be made to the copyright holder 

The QI Officer should recognize that negative feedback—even when confidential—will inevitably inspire a grieving response from fellow clinicians. These will include denial, anger, depression, bargaining, and eventually acceptance. Leaders must remain supportive throughout the period of adaptation, emphasizing the

benefits of the overall data, modeling personal growth from appropriate comments (like remembering to talk with the patient’s family), and emphasizing the need for a sense of humor when the inevitable—but fortunately rare and random—inappropriate patient comments arrive. As the group matures in



Top 5	Positive	Count	Negative	Count
1	great	13422	afraid	141
2	safe	1211	ignored	40
3	happy	1174	angry	29
4	pleased	1132	sad	25
5	confident	951	frustrated	19

Figure 9. An example of sentiment analysis of comments from anesthesia patient satisfaction surveys, illustrating key positive and negative results.

its response to patient feedback, there is an opportunity for group training in how to improve satisfaction, for work with the hospital to resolve systematic issues (such as a lack of privacy in the preoperative holding area), and even individual counseling if needed. Taking this aspect of QI seriously will lead to improvement in patient satisfaction scores over time, with a corresponding benefit to group morale. Because routine measurement of patient satisfaction generates a large body of data, from a wide variety of cases, it is well-suited to ongoing improvement efforts through the preferred methodology of the quality program.²¹ The Plan-Do-Study-Act (PDSA) cycle is one such approach, based on making small changes incrementally.

Although it requires an up-front investment, a robust system for harvesting and responding to patient satisfaction data is an important business differentiator. Hospitals and ASCs are obligated to collect and report patient satisfaction data to the government under HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) and have financial incentives for good performance. The generic surveys administered by the hospital’s vendor (usually the Press-Ganey Corporation) typically reach only a small number of patients and shed minimal light on anesthesia care. Having anesthesia-specific data is a valuable counterweight to hospital pressure in this area. Demonstration of investment in patient satisfaction methodology and improvement in scores over time will help the department remain on good terms with hospital administration. Using survey summaries to identify common problems can lead to mutually beneficial QI Projects, like improving patient privacy. Finally, early identification of angry and potentially litigious patients enables outreach and mitigation efforts, potentially averting expensive malpractice suits for both the group and the hospital.

Adverse event and incident data

Collection of data for evidence-based decisions is important, but management of unusual cases, adverse events, and serious patient

injuries is equally valuable. Anecdotal occurrences drive hospital policy as much as rational analysis of data, partly because humans are driven by stories more than numbers, and partly because adverse events in anesthesia are both catastrophic and highly visible within the hospital. The first goal of the QI Officer in this area is to build a reporting network—both formal and informal—ensuring that every anesthesia-related adverse event is identified. Formal capture systems may use either paper or digital forms to capture information about events; most hospitals have online “incident reporting systems” and policies about the events that must be reported, but these structured systems catch only the tip of the iceberg, at best. For near misses, it is especially difficult to convince a busy clinician to do additional paperwork. “Hits” or actual adverse events are more likely to be documented, if only to mitigate legal repercussions, but many adverse events still go unrecognized; for this reason, a supplemental network is important. This can be created by visiting OR and procedural suites and talking to clinicians there; nurses, technicians, and residents all spend time at the bedside, and know what is really going on. If approached in a collegial manner, they will share anesthesia-related issues with the QI Officer, especially if they see that reporting leads to peer review that improves patient care.

After systems for capturing adverse events have been developed, the next step is triage of reports. Many incident reports, both formal and informal, are about relatively low-level or repeated events. Anesthesia-related examples include dental injuries, corneal abrasions, and postdural puncture headaches. These should be recorded, but not individually reviewed unless there is a cluster of events or an increase in rate. More serious occurrences such as medication errors, neurologic injuries, unplanned readmissions, and intraoperative cardiac arrests should be brought to the QI Committee for peer review. Members of the committee can take turns reviewing the medical records of assigned cases before each month’s meeting and presenting the clinical details to the committee. Discussion should focus on whether the event is isolated or part of a pattern, whether it was preventable through changes in practice, and whether it should be presented during a departmental Morbidity and Mortality (M&M) conference. Such conferences are a critical tool for ongoing professional education; a well-run M&M conference is one of the most visible and educational features of the QI program, and is highly recommended for every practice.

Serious events, especially those that cause permanent patient harm or death, should be subjected to peer review as soon as possible, while still front of mind. Facts of the case—but not necessarily the subjective discussion—should be forwarded to the hospital risk management department. This is a requirement in most facilities and groups as part of their institutional liability insurance. Keeping the hospital risk manager informed about serious events in anesthesia improves communications and credibility for the anesthesia QI program and will create a reciprocal pathway; with a relationship established, the institutional QI Officer will in turn reach out to inform the anesthesia QI Officer when a relevant event occurs that they hear about first. No matter how good the communications network, there will always be embarrassing events—especially patient complaints from out of the blue—that do not come directly to the anesthesia department. A good working relationship with the facility’s QI professionals can mitigate surprise, and is one more component of a good communications network.

Certain serious events, such as wrong site surgery, major blood or medication errors, and unexpected deaths, will initiate mandatory reporting to external agencies such as state regulators or the Joint Commission.²² These “sentinel events” require a rapid and specific response, typically including a formal root cause analysis (RCA).²³ The RCA is a tool that can be used at many levels of the QI process, and done well, it can be a powerful learning device. The analysis begins with the creation of a timeline of facts related to the case, often developed by one-on-one interviews with the clinicians who were there. The QI Officer should assemble this timeline and then schedule a meeting with key stakeholders to review it in detail and to solicit opinions about what went wrong and what could be improved. Multidisciplinary participation in the RCA is critical to its success. The purpose of the RCA is to look beyond the obvious desire to have individuals make better decisions—something that can never be guaranteed—and seek opportunities to improve systems and practices to make subsequent errors less likely. One analytic approach is the Five Whys. For any given sentinel event, ask the RCA group “why did this happen?” then keep asking until the clinical onion has been completely peeled. Here is an example:

- (1) Why did the patient develop hemorrhagic shock? *Because the laparoscopy trocar penetrated the aorta.*
- (2) Why did the trocar cut the aorta? *Because the new trocars were sharper than the old ones.*
- (3) Why are the new trocars sharper? *The hospital changed brands to get a better deal.*
- (4) Why did the surgeon not notice that the trocar was sharper? *The procedure was done by a new resident, who did not know what to expect.*
- (5) Why was the attending surgeon not aware of this risk? *The OR Manager was on vacation that week and a notice never went out.*

The RCA should not be a “blame and shame” event, nor should it attempt to gloss over critical faults. Instead, it should be an honest attempt to review the policies and practices that might be improved. State laws vary, but most RCA discussions are protected from legal discovery. An RCA is typically followed by an educational presentation at the M&M conference, during which the insights gained are shared with the entire department. Changes in policy or practice might occur as well, to address systematic issues—such as communicating changes in OR equipment—identified by the RCA.

The M&M conference is an important tool for the QI Officer. Not only can it serve as a forum for case-based teaching and for presentation of aggregate statistics for the department, but it also play an important role in advancing the desired culture of safety. Within-the-family discussion of difficult cases and human errors creates an opportunity to detect legitimate interprovider differences in practice (eg, the individual threshold for cancelling a case based on preoperative laboratory values) and can point out the need for systematic discussion of policy and protocol. Further, transparency in identifying and admitting error makes it safe for others to do the same. This is a situation in which the QI Officer (or even the Department Chair) may need to lead from the front, by being the first to openly admit an error and discuss how it might have been prevented. So long as the process is not “weaponized” to lead to penalties for unintended adverse events, openness will make it safer for others to self-report and will increase participation over time in the QI process.

Driving changes in practice

The final major step in departmental quality management is reaction to the information gathered. Whether through quantitative analysis of electronic data or simple aggregation of adverse events, the QI process will identify ways in which practice can be improved. These range from changes in staffing and scheduling to new hospital policies to department or hospital educational efforts. Turning knowledge into action improves outcomes over time and builds momentum for the QI program, but can be a major challenge in the short term.²⁴ There are many methods of doing this, including some name-brand systems reviewed below, but the process itself is deceptively simple. Find a problem, quantify it, gather experts, consider solutions, implement changes, and keep measuring. Small steps taken incrementally work better than grand solutions, and almost any small change in practice can be sold to the group as a pilot or short-term experiment. Do this often enough and continual improvement becomes a normal expectation. Keep it up long enough, and substantial change will occur.

Six-Sigma is one methodology for change management, based on achieving an error rate lower than 1 case in a million (6 SD on a normal distribution curve).²⁵ The terminology comes from the manufacturing world as a desirable goal for manufacturing process, and the application of this method to industry was historically responsible for improvement in the Japanese economy after World War II. Of course, humans are not manufactured goods and there is far more variability present in similar patients having a given operation than there is between widgets on an assembly line. The QI professional must therefore temper the Six-Sigma quest for standard processes and procedures—often derided as “cookbook medicine” by detractors—with flexible application to individual patients and situations. Done correctly, Six-Sigma asks practitioners to follow mutually agreed guidelines and standards and take a common clinical approach, but allows for variation when needed. When enabled by templated electronic records that make the recommended practice the easiest to document, this approach will reduce variability in routine patient care. The rapid adoption of enhanced recovery protocols for patients having major surgery is a good example of this approach.

Six-Sigma is often conflated with Lean Methodology²⁶ and the Toyota Production System, which are other terms for the same basic approach of systems-level thinking, focused and iterative change, and ongoing measurement. A specific discussion of these and other systems for managing change is beyond the scope of this chapter, and in any case, the terminology most important for the QI Officer to know will be that preferred by the hospital system. The QI Officer should take every opportunity to learn about the local system for change management and should actively participate in available courses and projects. Attendance at hospital QI meetings and events is a good way to learn the local methodology and to build one’s personal network to facilitate future multidisciplinary improvement efforts.

Creating and demonstrating value

The focus of a QI program should be continuous improvement in safety and better outcomes for our patients. Although this is the driving principle, it need not be the only purpose. Properly implemented, anesthesia QI built on a robust clinical data warehouse will enable the Department to demonstrate its value. Simple metrics show the work being done by the department and its clinicians, and how that work is distributed across elective and emergency cases,

1 simple versus complex patients, and a variety of surgical and pro- 61
 3 cedural services. Simply knowing when and where anesthesia ser- 63
 5 vices are delivered can add substantial value to discussions with 65
 7 hospital administrators and can bring objective reality to negotia- 67
 9 tions around staffing levels and stipend payments. Anesthesia 69
 11 practices that have not invested in understanding their own practice 71
 13 will be at the mercy of the hospital and the hospital's data. 73

15 Beyond simple economics, moreover, a robust QI program is a 75
 17 tool for creating added value. In many departments, the QI 77
 19 Officer is the leading proponent for new anesthesia techniques, 79
 21 and for changes to hospital policy or practice. In the beginning, 81
 23 these are reactive: for example, peer review of patients who 83
 25 experienced postanesthesia care unit reintubation might lead to a 85
 27 recommendation for selective use of quantitative neuromuscular 87
 29 blockade monitors, judicious use of sugammadex, or even plan- 89
 31 ned postoperative mechanical ventilation. As QI culture devel- 91
 33 ops, however, the committee will have the opportunity for 93
 35 proactive improvement in care, before problems emerge. This can 95
 37 include advocacy for enhanced recovery protocols for common 97
 39 surgery,²⁷ evidence-based techniques for care of specific popu- 99
 41 lations, and “leaning-in” on issues identified by the hospital. One 101
 43 real-world example is a group with a strong QI program that 103
 45 periodically assigns early-career anesthesiologists to work with 105
 47 the hospital (and a senior mentor) to develop needed policies and 107
 49 guidelines. Over the years, this has led to dozens of mutually 109
 developed improvements, good leadership training for the junior 111
 associates, and the daily recognition by hospital administrators of 113
 the value of collaboration with the anesthesia group. 115

31 Conclusion

33 The ultimate task of the QI Officer, a summation of the steps 97
 35 described, is to create a culture of continuous quality improvement. 99
 37 This includes the universal expectation that performance will be 101
 39 measured, reported, and discussed; that emphasis will be placed on 103
 41 system function over individual results; that adverse events will be 105
 43 deconstructed within the group; and that incremental change will 107
 45 occur. Although building this culture can take time, the good news 109
 47 is that it gets steadily easier; new arrivals to the group will have no 111
 49 other expectation. Over time, a reputation for high—and steadily 113
 improving—quality will enhance the brand of the anesthesia 115
 practice, and our profession as a whole. Recruiting high-quality 117
 clinicians will become easier, creating a virtuous upward spiral, 119
 and the group will have an advantage in winning and retaining 121
 hospital business. The result will be a happy, harmonious, and 123
 successful department, working collaboratively with the hospital 125
 to generate the best possible outcomes. 127

49 Conflict of interest disclosure

51 The authors declare that they have nothing to disclose. 129

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