SYSTEMS-LEVEL QUALITY IMPROVEMENT

Anesthesia Report Card – A Customizable Tool for Performance Improvement

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Abstract

Purpose Measuring and providing performance feedback to physicians has gained momentum not only as a way to comply with regulatory requirements, but also as a way to improve patient care. Measurement of structural, process, and outcome metrics in a reliable, evidence-based, specialty-specific manner maximizes the probability of improving physician performance. The manner in which feedback is provided influences whether the measurement tool will be successful in changing behavior. We created an innovative reporting tool template for anesthesiology practitioners designed to provide detailed, continuous feedback covering many aspects of clinical practice.

Methods The literature regarding quality metric measurement and feedback strategies was examined to design a reporting tool that could provide high quality information and result in improved performance of clinical and academic tasks. A committee of department leaders and information technology professionals was tasked with determining the measurement criteria and infrastructure needed to generate these reports. Data was collected in a systematic, unbiased manner, and reports were populated with information from multiple databases and software systems. Feedback would be based on frequently updated information and allow for analysis of historical performance as well as comparison amongst peers.

Results A template for an anesthesia report card was created. Categories included compliance, credentialing and qualifications, education, clinical and operating room responsibilities, and academic achievements. Physicians were able to choose to be evaluated in some of the categories and had to meet a minimum number of criteria within each category. This allowed for customization to each practitioner's practice. Criteria were derived from the measures of academic and clinical proficiency, as well as quality metrics. Criteria were objective measures and data gathering was often automated. Reports could be generated that were updated daily and provided historical information, and information about peers in the department and within each subspecialty group.

Conclusions We demonstrate the creation of an online anesthesia report card that incorporates metrics most likely to engender positive changes in practice and academic responsibilities. This tool provides timely and customized information for each anesthesia practitioner, designed to be easily modifiable to improve the quantity, quality, and substance of metrics being measured. Finally, our tool could serve as a template for a performance measuring tool that can be customizable to a wide variety of practice settings, and upon which both monetary and non-monetary incentives might be based in the future.

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Introduction

Healthcare reform and new requirements by professional agencies have created an environment wherein physicians must track their clinical and academic activities. This has created a push for timely, substantive, and individualized feedback regarding physician performance, quality of care,

and patient outcomes [1–5]. While healthcare reform has brought a focus on this effort to the United States, there is a long history of attempts to measure quality indicators that reflect operating room safety, patient experience, and the effectiveness of interventions [6]. Finding parameters that reflect these endpoints and developing the tools to track them have proved challenging for numerous medical specialties, including anesthesiology. As leaders amongst medical specialties in tracking and improving safety and quality, it is no surprise that anesthesiologists are developing systems for gathering information on performance. For example, the Anesthesia Quality Institute (AQI) and its National Anesthesia Clinical Outcomes Registry (NACOR) were created to improve quality in the clinical practice of anesthesiology [7, 8].

Performance measurement has traditionally assessed three areas, as described by Donabedian: structure, process, and outcome [9]. Structural measures assess whether the infrastructure required to provide quality care is present (i.e. proper equipment, qualifications, and other resources). While structural indicators are certainly measurable in most medical specialties, process metrics are more commonly assessed. Process metrics focus on showing that a physician is using "best practices" in our field. This includes measuring compliance with credentialing, abiding by evidence-based guidelines, and proper use of technology. Engaging in proper processes can improve patient outcome, and, importantly, comply with record keeping required by professional societies and government agencies. The last area, outcome measures, is often difficult to measure. Perioperative outcomes are influenced by a plethora of factors - the surgical team, nursing staff, patient comorbidities, perioperative care - that are beyond an anesthesiologist's control. Because anesthesiologists work so integrally with other specialties when taking care of a patient, it can be difficult to define outcomes for which we are directly and solely responsible. Even when we perform risk adjustment and otherwise correct for patient or surgical factors, the possibility of an unaccounted for confounder is a particular problem for quality outcome measurement in anesthesiology. The outcomes for which anesthesiologists are most responsible lack an easily-administered, validated assessment tool, although there are some notable exceptions. For example, perioperative hypothermia can affect wound infection risk [10], has been incorporated into recent guidelines [11, 12], and is almost exclusively within the purview of the anesthesiologist's management. Though admittedly more difficult to measure, there are now better tools for assessing postoperative nausea and vomiting (PONV), pain control, and perioperative patient satisfaction [13]. Despite progress in developing measurement tools, it is challenging to assess the quality of anesthesia care using outcomes metrics alone.

Studies show that quality metrics must be measurable, improvable, evidence-based, transparent, and reliable [14].

In addition, data must be consistently collectable (preferably in an objective and even automated manner), individualized, specialty-specific, and include enough patients that the data about a physician's performance is an accurate representation of the physician's practice [15]. Therefore, a report card must include metrics that maximize the use of evidence based and objectively measured variables most likely to affect patient outcome and minimize the effect of confounders. The criteria to be measured will to some degree vary by institution depending on what measurement tools and databases they have available. Lastly, choosing metrics that foster achievement of non-clinical goals (such as meeting academic requirements at a university hospital or revenue generating metrics in a private practice) can also be incorporated.

Once one has decided what structure, process, and outcome metrics that comply with the above criteria will be measured, providing feedback is required. Gathering data without effectively providing feedback does little to improve quality or outcomes [16]. Feedback is most effective when it is timely, continuous, provided by a credible source, and combined with effective strategies for improvement [17–19]. Current tools for providing feedback on competence and quality of care are often inadequate in their timing. Objective measures of competence are not specific to specialties and involve infrequent certification and licensure [15]. They occur once at graduation or once every 10 years during board recertification process. More frequent reviews, such as morbidity and mortality conferences or other peer review sessions have been criticized for their lack of objectivity [15].

Providing feedback is not an end in and of itself, however. If a quality measurement tool took measurements and reported data about performance but did not help in achievement of practice goals or improve patient outcomes, the tool might be interesting, but it likely would not be important. The very definition of feedback implies that it influences downstream events [20]. Indeed, a practical reason to use a report card tool is that the American Society of Anesthesiology (ASA), American Medical Association (AMA), the Institute of Medicine (IOM), and healthcare reform initiatives are mandating this information be tracked. Perhaps more importantly, however, gathering this information has the potential to improve patient care when that information is provided via an effective feedback strategy. Effective feedback has a significant effect on clinical outcomes in some studies [21]. Data show that providing feedback positively influences clinical practice [22], and that implementing a plan to improve clinical practice is more effective when the clinician is provided with feedback [18, 23].

Though the best feedback format has not been clearly delineated, there are certain characteristics that have been shown to either improve or decrease the likelihood that feedback will result in positive changes to clinical practice. For example, van der Veer and colleagues noted that the

characteristics of feedback that were more likely to engender positive change included trust in the quality of information, motivated clinicians, infrastructure that allowed for process changes to be implemented, and the expectation that outcomes would improve if processes were changed [24]. The intensity of data gathering and feedback also predicted whether feedback was effective at changing clinical behavior. This means that the time lag between data gathering and feedback had to be short, and the frequency of feedback should be high. Other studies corroborate that the intensity and frequency of feedback availability, as well as the persistence of a monitoring mechanism over long periods of time, were positively correlated with the likelihood that clinical behavior would change [17, 22].

Our study is intended to demonstrate a prototype of a multifaceted report card tool that can be customized for small or large groups of anesthesiologists providing care in multiple locations within all anesthesia subspecialties. The purpose of this study was to create a sample report structure, utilizing existing IT systems, to gather and analyze anesthesia clinician performance. The report card attempted to measure criteria that complied with the above-mentioned characteristics (measurable, improvable, objective, specialty-specific, likely to influence patient outcome and meet academic goals) and provide feedback that was most likely to engender positive change insofar as it was timely, consistent, high quality, and authoritative. We hypothesize that this "report card" can be customized to a variety of clinical practices and used for internal performance improvement, benchmarking, and reporting of information to external entities.

Materials and methods

We sought to create a tool that would measure metrics accurately and provide feedback in a timely manner in order to realize the benefits described above, including improving the quality of clinical care at a large academic institution. Literature on report cards as tracking tools, as well as previous tools used to track quality metrics in anesthesiology, was reviewed [25]. The scorecard system needed to aggregate information in an unbiased and systematic manner such that it could generate timely reports of current progress. Also, a physician should be able to query historic data to see past performance and be able to compare their performance to that of their peers. The department leadership should have access to these reports in order to formulate strategies for improvement for individuals and as a department. Lastly, data gathering could be used for reports required to comply with professional association and governmental agency requirements.

A committee comprised of clinical anesthesiologists, quality improvement officers, the department chairman, and information technology (IT) specialists was tasked with developing the tool. Though not all the metrics are validated measures or have every characteristic described above as part of an ideal metric, we selected items that were regarded as relevant to our department and important in delivering high quality patient care as well as fostering the characteristics a good academic physician. The report card framework was designed such that current metrics could be changed or discarded, and new metrics could be added.

The database underlying our report card was implemented in the PostgreSQL relational database management system, with schema embodying a balanced scorecard. Distinct reporting periods, denoted by date range, are each associated with a set of metrics, allowing the design to evolve over time. The metrics had to be organized under categories representing different perspectives on the attending anesthesiologist's work responsibilities. The system needed to be able to gather data from numerous pieces of software, including OR tracking, the electronic medical record, anesthesia information management system (AIMS), quality control tracking software (electronic anesthesia reports system), ID badge readers, resident evaluation program, and a program used to gather information provided through self-report or by departmental leadership.

The web-based user interface for this system was created by departmental IT staff using the Ruby on Rails® web application development framework. A central departmental web application login system, together with role-based authorization incorporated into the application, rendered views of the data appropriate for either the anesthesiologist, the administrative user enabled to record and validate anesthesiologist achievements, or for the departmental leader with global access to the performance data. Some targets are met by default unless an administrator records a deficiency such as failure to complete safety and compliance training programs in a timely manner. Some targets, though validated by automated data retrieval processes, are shown as met only when the required self-reported information becomes available, as in the case of the annual academic self-report.

Results

We generated an initial report card that includes five categories of proficiency for academic anesthesiologists:

1. Compliance
2. Credentialing and Qualifications
3. Education
4. Clinical and Operating Room Responsibilities
5. Academic Achievements

The categories address both clinical and non-clinical responsibilities associated with an academic appointment at our

institution. Given that the scope of practice and areas of interest vary widely amongst our large faculty, physicians would choose to be evaluated in any three of the five categories. Within each of the categories, there are between four and nine criteria. A general representation of the report card with each category is shown in Fig. 1. Physicians did not have to meet all criteria, but would rather have to qualify for a minimum number of criteria within each category they had selected. Specific metrics used for each of the categories are outlined in Table 1.

Some of the criteria were chosen based on commonly used quality metrics in anesthesia, specific goals that our department sought to meet or had struggled to accomplish in the past, and criteria required to meet regulations by the university, association, or governmental agencies. The Centers for Medicare & Medicaid Services (CMS) recently approved the use of National Anesthesia Clinical Outcomes Registry (NACOR) metrics for its Patient Quality Reports System (PQRS), and we included some of the NACOR metrics in the report card. All criteria were objective measures such that it would be straightforward to determine whether a metric had been completed. Each metric has a single target, expressed in the database as a frequency (e.g., "yearly" or "never") or a quantitative relation (e.g., "> =20" or "90th percentile").

Some of these metrics lend themselves to automated data retrieval for scoring. In our implementation, we have direct database access to reporting data derived from our AIMS, to reports from our online mutual performance feedback system, and to badge-readers used to record attendance at departmental grand rounds and some conferences. This reporting data is provided to the report card application via a number of simple web services. Therefore, we are able to automatically score the achievement of targets such as conference attendance, safety-related attestations in the anesthesia record, and participation in resident performance feedback. For other metrics, electronic access across applications and datasets facilitates self-reporting. For example, an academic self-report is a yearly requirement for all faculty. We have implemented this self-report in our online performance feedback software, and the self-report records significant publications, presentations, and funding awards. Because this self-report is part of a yearly performance feedback process, our Vice Chair for Faculty Development can validate the self-reporting, and the report card application can safely incorporate this electronic data.

Since feedback that is frequent and up to date is most likely to be effective, the report card was designed to query databases daily. A report card can be generated at any time during a quarter that shows how many days are remaining for the

Quarterly Report Card

James Davis, MD, PhD	Quarter 1: September - November 2014	Report Date: 11/2/2014	Days left in Quarter - 28

Compliance	Credentialing	Education	Clinical / OR	Academic
Timely signing of records	Simulation completion	Morning conference attendance	Induction complete within 30 minutes	Publishing
Guidewire attestations	No QCC inquiries	Evaluation completion rate > 90%	Antibiotic administration compliance	Invited presentation outside Harvard
Immunization attestation	ACLS certification	Resident lectures	Dental injury score	Academic self-report and CV update
Pain: Dictation or final note complete in < 14 days.	Healthstream Courses completed	360 Evaluation scores acceptable	Pain: Patient satisfaction score	Receipt of peer-reviewed grant
		Evaluation by resident score	Safety checklist complete prior to procedure	ICU: M&M or Lecture Series Leader
			Epidural hematoma	
			Blood transfusion error	
			Pain: Wrong site, intravascular injection, major complication (<1/yr)	
			ICU: Vent bundle compliance	

Selected Criterion (completed)

Selected Criterion (uncompleted)

Unselected Criterion

Fig. 1 General representation of the Anesthesia Report Card

Table 1 Anesthesia Report Card: sample evaluation categories and explanations

ITEM	EXPLANATION
Category 1: Compliance	
Timely signing of records	Greater than 95 % charts signed within 1 week of case completion
Guidewire removal attestations	100 % attestation rate
Immunization attestation	100 % compliance with the required online immunization attestation requirements
Pain: Final Note Completion	Pain clinic notes complete and signed within 14 days of patient visit.
Category 2: Credentialing and Qualifications	
Simulation completion	100 % compliance with simulation requirements (1 session every 2 years)
No Quality care committee inquiries	Committee investigations resulting in a disciplinary action
ACLS certification	Completion of ACLS course at least every 2 years
Required hospital online courses completed	100 % completion of the required hospital online education and compliance courses once a year
Category 3: Education	
Morning conference attendance	Attend minimum of 20 Grand Rounds or morning conference per academic year
Resident evaluation completion rate >90 %	Greater than 90 % of resident evaluations completed (monthly automated verification)
Resident lectures	Provide at least one lecture for the formal didactic series per year
360 Evaluation scores acceptable	Greater than 95 % of evaluations by non-resident staff achieve rating of satisfactory or better
Adequate evaluation scores	Residents give the attending a score of greater than 8/10 in any 4 categories as reflected in resident evaluations
Category 4: Clinical and Operating Room Responsibilities	
Anesthetic induction completion	Induction complete within 30 min of patient entering room in > 90 % of cases
Antibiotic administration compliance	Correct antibiotic administered within the appropriate time period in 100 % of cases
Dental Injury	One or fewer instances of dental injury per academic year (self report)
Pain management: Patient satisfaction score	For pain management staff, average patient satisfaction score of six or better
Safety Checklist completion	Anesthesia Safety Checklist completion in 100 % of cases prior to anesthetic induction
Epidural hematoma	No epidural hematomas as a result of inadequate verification of coagulation status
Blood transfusion error	Zero ABO incompatible blood product administrations
Pain: Wrong site or major complication	For pain management staff, one or fewer instances per year of a wrong site procedure or avoidable major complication (ex: intravascular injection)
ICU: Vent bundle compliance	For ICU staff, 100 % compliance with vent bundle during time on service
5. Academic Achievements	
Publishing	At least one peer-reviewed paper, chapter or book published per academic year
Invited presentation outside Harvard	At least one poster presentation or lecture outside the Harvard University system
Academic self-report and resume update	Yearly self-report of academic activities and updated resume on file
Receipt of peer-reviewed grant	At least one peer-reviewed grant received every 2 years
ICU: Morbidity & mortality rounds or series lecture leader	ICU staff conducts at least one morbidity & mortality rounds or leads one of the ICU lecture series per semester

chosen goals to be met, and a color scheme that denotes what categories and criteria have been chosen and which of the chosen metrics have been completed (Fig. 1). In addition to a snapshot of current progress, the physician can also generate a report tracking what goals had been tracked, achieved, and missed in earlier time periods (Fig. 2), as well as compare his or her statistics with that of peers within the entire department or a specific subspecialty (orthopedic/regional anesthesia, neuroanesthesia, obstetrics, ICU, pain, etc.) (Fig. 3). Real-time and historic information is thus available to help guide current and future goals. These reports are also available to supervisors so they can tailor the physician's schedule as needed to meet clinical and non-clinical goals. For example, more non-clinical days can be provided for conferences or research, or more time can be provided in a certain clinical area to improve clinical quality metrics.

Fig. 2 Portion of the Anesthesia Report Card tracking what goals had been tracked, achieved, and missed in earlier time periods

	Q2 - 2014	Q3 - 2014	Q4 - 2014	CURRENT
Compliance	100%	100%	N/A	100%
Signing				
Guidewire				
Immunization				
Dictation				
Credentialing	N/A	N/A	N/A	N/A
Simulation				
QCC				
ACLS				
Healthstream				
Education	100%	100%	66%	33%
AM conference				
Eval of residents				
Eval by residents				
Lecture				
360 evals				
Clinical	75%	100%	100%	100%
Induction				
Antibiotic				
Dental injury				
PSS				
Checklist completion				
Epid hematoma				
Blood transfusion				
Pain: Complication				
ICU bundle				
Academic	N/A	N/A	100%	N/A
Publishing				
Presentation				
ASR/CV				
Grant				
ICU M&M/lecture				

Selected Criterion (completed)

Selected Criterion (uncompleted)

Unselected Criterion

Discussion

We created a report card that provides anesthesiologists with the kind of feedback needed to comply with new regulations, and more importantly, help them become better physicians and academicians. Numerous evidence-based characteristics that are likely to result in positive changes in clinical behavior were incorporated into the report card. Feedback is provided

Fig. 3 Portion of the Anesthesia Report Card showing how the ▶ practitioner's performance compares to that of peers in the same subspecialty and all peers in the practice group

CURRENT QUARTER
Q4 - 2013
Q3 - 2013
Q2 - 2013
Q1 - 2013
Q4 - 2012

| Selected Criterion (completed) |
| Selected Criterion (uncompleted) |
| Unselected Criterion |

CURRENT QUARTER	All	Clinical Area
Compliance	75%	60%
Signing	100%	100%
Guidewire	100%	100%
Immunization	97%	100%
Dictation	85%	100%
Credentialing	80%	50%
Simulation	50%	77%
QCC	100%	100%
ACLS	100%	95%
Healthstream	60%	80%
Education	80%	98%
AM conference	90%	94%
Eval of residents	45%	56%
Eval by residents	74%	79%
Lecture	78%	67%
360 evals	90%	95%
Clinical	75%	46%
Induction	92%	91%
Antibiotic	93%	100%
Dental injury	99%	100%
PSS	93%	N/A
Checklist completion	100%	100%
Epid hematoma	100%	100%
Blood transfusion	99%	100%
Pain: Complication	100%	100%
ICU bundle	100%	100%
Academic	90%	87%
Publishing	96%	100%
Presentation	100%	96%
ASR/CV	100%	100%
Grant	85%	79%
ICU M&M/Lecture	98%	60%

in an objective manner, it is constantly updated, and reports are available at any time. There is little time lag between data gathering and availability of feedback.

Before a report card or other feedback mechanism is generated, it is important to get buy-in from those who will be receiving feedback such that they agree that the elements being measured are valid and the quality of the data is high [24]. Although there is positive evidence that report cards and other quality measurement tools improve quality and the fact that physicians perceive a lack of quality in the way care is currently delivered, physicians have been hesitant to adopt report cards and other tools [26]. Their grievances are sometimes due to the fact that some aspects of care are measured while other important ones are not, and thus there is focus on some clinical measures to the detriment of others. Furthermore, we may be improving documentation without improving care, and we are sometimes grading doctors on outcomes beyond their control. Once implemented, however, physicians tend to appreciate the results of a quality measurement and feedback tool. A study of Israeli primary care physicians showed that they considered report cards either an important or very important part of their practice and supported its continuation. Only 9 % stated that it negatively affected their patient relationships, and over half said the reports had influenced them to make positive changes in their practice. Abiding by reporting requirements did detract from attention to clinical care and negatively affected physician's job satisfaction in 20 % of cases [27]. Our report card sought to emphasize areas that faculty and department leadership had perceived to be important quality metrics and allowed faculty to choose what criteria would be measured. This increased buy-in since they were more likely to choose categories that most accurately reflected their practice and goals and thus avoided the perceived problem of measuring one criterion to the detriment of other, less important ones. We also sought to get buy in by incorporating key leaders in the development of the report card and having faculty meetings to obtain feedback on the report card design and criteria. The importance of the tool, as well as evidence supporting the idea that it could improve clinical outcome were provided. Making quality measurement and reporting completely voluntary may at first appear to increase buy-in, but studies assessing this tactic have shown that some measure of compulsory participation is required [15].

When information needed for feedback can be gathered by automated tools, the quality of the data is oftentimes improved and the costs associated with data gathering can be decreased. Automated data gathering increases efficiency and allows for more rapid generation of reports with up-to-date information. Automated queries of databases with a large data pool allow for changing, adding, or removing metrics. Furthermore, self-reporting should be minimized to decrease bias. Indeed, to achieve the benefits of automated data gathering can involve

significant IT challenges. Querying multiple databases and programs, each with a different software infrastructure, gathering the data into a repository, and generating reports from this data may involve significant IT expertise and resources, depending on the size and complexity of the anesthesia group. Our report card requires gathering information from multiple databases and self or administrative reporting of some metrics, as described above.

As discussed earlier, measurement tools seek to assess structure, process, and outcome. The nature of anesthesiology and our academic institution made it such that many of the criteria assessed by our report card are process measures. An advantage to process measurement is that it prevents some of the undue influence from confounders commonly introduced into outcome measurement, particularly in anesthesiology. Insofar as a process is applied to a patient that is expected to benefit from said intervention, one can assess that a quality metric was met. The outcome of the intervention may not be positive because of patient confounders outside of the physician's control. But the fact that he or she tried to do what was best for the patient is a measure of quality. For example, an anesthesiologist who gives ondansetron, an antiemetic commonly used for postoperative nausea and vomiting (PONV) prophylaxis, to patients after inhaled anesthetics is abiding by a quality metric. The fact that a patient vomited in the recovery area because he or she was fed too early, have nausea due to chemotherapy or because of the specifics of the surgical procedure should not negatively influence the PONV treatment score of that anesthesiologist. Measuring process resulted in positive assessment of the physician, while measuring outcome would not have. Research also shows that feedback strategies tend to have more positive effects on process than outcome measures, in part because they provide a direct target for action [24].

The Anesthesia Quality Institute (AQI) has provided specific indicators that could be used in a report card tool. It served as a guide as to what criteria to include in our report card. Some of the AQI criteria not included were intraoperative cardiac arrest, anaphylaxis to a documented allergy, malignant hyperthermia, visual loss, aspiration on induction, post dural puncture headache, ocular injury, post operative nausea and vomiting, and others. Other indicators, including patient satisfaction, adequacy of postoperative pain control, and professionalism scores are potentially valuable but difficult to measure. Both the need for improving quality of care, as well as future regulatory requirements will likely necessitate inclusion of some of these criteria in future iterations of this report card.

Feedback is more effective when combined with an action plan, and action plans are more effective when they have been preceded by quality feedback [6, 21]. At a large institution like our own, making structural and process changes can be difficult, and the areas where changes is most feasible is oftentimes

that which will result in the greatest improvements and involve the least disruptions to a complex system. Though the categories of our report card are varied, the criteria under each category are easily met. This both encourages physicians to use the tool and allows us to more easily identify outliers. Identifying outliers allows for finding those situations or physicians where particularly significant mistakes occur at frequent intervals. This allows us to concentrate our resources toward improving the practices of physicians or groups that consistently exhibit a problem.

This report card tool can be customized to the needs of a specific practice. It allows each physician to adjust his or her measured metrics and allows metrics to be changed as best practices change and evidence for interventions are established or amended. Furthermore, anesthesiology practices vary widely in terms of practice type, size, and goals. Attending anesthesiologists can find themselves in the ICU one month, OB the next, and the OR for a few months thereafter. This tool allows quality metrics to be tracked that are relevant to a dynamic schedule. It allows for individuals to choose the categories and criteria that are most applicable to their practice, as well as allow a department or group to incorporate the measures it thinks will best define high quality care, whether in an academic or private practice setting. Furthermore, the report could be customized to include providers other than physicians at a practice, such as Certified Registered Nurse Anesthetists, Anesthesia Assistants, and anesthesia trainees.

Internal report cards that are used to measure quality and progress of physicians within a department could potentially be made available to physicians' supervisors and contribute to decisions regarding promotions or pay bonuses. Indeed, performance bonuses in our department will be, in part, based on meeting the criteria assessed by the report card. The degree to which bonus or other incentive structures can increase compliance with metrics or improve quality is still being debated [26, 27], but data suggest that incentive structures can be designed in such a way that the probability of quality improvement is increased [28]. For example, bonuses added to the bottom line rather than deductions to base salary are more likely to improve performance, as are metrics that are measure consistently and multiple times over succeeding time periods. We sought to incorporate these strategies into the report card [26].

Conclusion

We created a novel tool for gathering information regarding multiple categories while making a report card that is flexible enough to be useful to a large group of physicians that engage in a wide variety of practices, including preoperative clinic, general anesthesiology, pain clinic, obstetric anesthesia, intensive care, operating room anesthesia, and other areas. These efforts are important because tracking these metrics and providing feedback improves patient care and outcomes, allows physicians to compare their current performance to their previous performance and that of their peers, provides real-time and frequently updated data, and is a vital part of current efforts to improve quality and cost-efficiency of healthcare. Perhaps unique to our efforts is an attempt to tie performance bonuses to scores on this report card so as to provide additional incentive to meet criteria goals. Though we do not have sufficient data to determine what improvements have resulted from this report card, we have sought to incorporate the latest theory regarding data gathering and feedback so as to comply with regulatory requirements and maximize the probability that future studies will show this tool had a positive effect. Further studies will attempt to demonstrate the efficacy of this tool.

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