Quality Assurance in the Emergency Department

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KEYWORDS

• Clinical competence • Emergency department • Emergency medicine • Peer review • Health care • Quality of health care • Quality assurance

KEY POINTS

- Quality assurance of health care involves activities aimed at ensuring that the care provided meets applicable standards.
- Health care delivery is complex, and a wide range of factors affect quality of care; quantification of health care quality is challenging in large part due to this complexity.
- Determination of deviation from acceptable care (and justification of such deviation if applicable) is integral to quality reviews.
- Practitioner competency evaluation is one component of quality assurance, and emergency medicine (EM) physicians should be familiar with that process, particularly (for US EM physicians) the framework defined by the Center for Medicare and Medicaid Services.
- Peer review of cases derived either from direct referral or via triggers remains a fundamental component of an overall quality assurance program.

INTRODUCTION

At the beginning of the twentieth century, Ernest Amory Codman advocated for the "End Result Idea" that hospitals follow their patients longitudinally to see the effects of their treatment and outcomes, which was revolutionary at the time.[1,2] His pioneering work in clinical medicine and quality improvement helped lead to the creation of the Joint Commission on Accreditation of Hospitals to help standardize hospitals (JCAHO), later changing names simply to the Joint Commission (JC). Emergency department (ED) quality assurance (QA) has its historical underpinnings in Joint Commission's mandate to monitor QA in hospital-based EDs.[3] This broad mandate encompassed the clinical care environment, operational and systems issues, and

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physician competency. After the Institute of Medicine (IOM) published *To Err is Human*, the ED was implicated as one "hospital location with the highest proportion of negligent adverse events."[4] This, along with the patient safety and quality improvement movement across medicine, has led stakeholders to focus QA in EDs (**Box 1**). In 2016, American EDs managed 145 million visits, 12.6 million hospitalizations, and 2.2 million admissions to an intensive care unit.[5] Despite the vast effort devoted to improve the quality of care in EDs, publicly reported quality data only captures timing measures such as ED length of stay and specific conditions such as acute myocardial infarction management.[6]

GENERAL QUALITY ASSURANCE OVERVIEW

QA involves a set of activities that monitor a product or service provided, providing confidence that it fulfills its requirements for quality. A cornerstone of QA within medicine is agreement on definitions of the quality of care. In 1990, an IOM study committee addressed this topic through examining key dimensions used to define quality. They settled on 18 dimensions, a select few being the following:

- A scale of quality, nature of entity being evaluated
- Type of recipient identified (individual, population, patient type)
- Technical competency of providers
- Interpersonal skills of practitioners
- Standards of care

The IOM concluded that "…quality of care is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge."[7]

In another landmark work, *Crossing the Quality Chasm: A New Health System for the 21st Century,* the IOM described what is now one of the most influential frameworks for quality assessment. The following are their 6 specific aims of quality, which the

Box 1
Organizations involved in quality assurance in the emergency departments in the United States

American Board of Emergency Medicine (ABEM)
American College of Emergency Physicians (ACEP)
Centers for Medicare and Medicaid Services (CMS)
Accreditation Council for Graduate Medical Education (ACGME) via the Clinical Learning Environment Review (CLER)
Emergency Department Benchmarking Alliance
The Leapfrog Group
Joint Commission on Accreditation of Healthcare Organizations
Agency for Healthcare Research and Quality
National Quality Forum
Institute for Healthcare Improvement
Society for Academic Emergency Medicine
US Department of Health and Human Services

Agency for Healthcare Research and Quality (AHRQ) has adopted as the "Six Domains of Health Care Quality":

1. Safe—avoiding injuries to patients from the care that is intended to help them.
2. Effective—providing services based on scientific knowledge to all who could benefit and refraining from providing services to those not likely to benefit (avoiding underuse and overuse).
3. Patient-centered—providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions.
4. Timely—reducing waits and sometimes harmful delays for both those who receive and those who give care.
5. Efficient—avoiding waste, in particular waste of equipment, supplies, ideas, and energy.
6. Equitable—providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status.[8,9]

Medical errors (MEs) and adverse events (AEs) define a major area of focus for ED QA. The report *To Err is Human: Building a Safer Health System* defines an error as "the failure of a planned action to be completed as intended (ie, error of execution) or the use of a wrong plan to achieve an aim (ie, error of planning). An AE is an injury caused by medical management rather than the underlying condition of the patient. An AE attributable to error is a "preventable AE." Negligent AEs represent a subset of preventable AEs that satisfy legal criteria used in determining negligence (ie, whether the care provided failed to meet the standard of care reasonably expected of an average physician qualified to take care of the patient in question)."[4,10] These definitions help focus on systems of care as well as individuals.

Currently, the 3 aims of the National Quality Strategy (NQS) defined in 2011 from the Agency for Healthcare Research and Quality are

1. Better care
2. Healthy people and communities
3. Affordable care[11]

In order to advance these aims, the NQS outlines the following priorities:

- Making care safer by reducing harm caused in the delivery of care
- Ensuring that each person and family is engaged as partners in their care
- Promoting effective communication and coordination of care
- Promoting the most effective prevention and treatment practices for the leading causes of mortality, starting with cardiovascular disease
- Working with communities to promote wide use of best practices to enable healthy living
- Making quality care more affordable for individuals, families, employers, and governments by developing and spreading new health care delivery models.

EMERGENCY DEPARTMENT QUALITY ASSURANCE OVERVIEW

The ED is critical to accomplishing the 3 aims. Each of the priorities can be summarized as patient safety, timeliness, effectiveness, equity of care, patient-centeredness, and the reduction of MEs and AEs.[8] The ED, in the United States, has a major role in most communities by providing access for the acute needs for those who are ill or injured. It serves as a safety net with 24 hours a day/7 days a week access to emergency

medical care irrespective of the ability to pay due to the Emergency Medicine Treatment and Labor Act.[12,13]

ED QA's original focus to identify MEs and AEs through retrospective review of cases has yielded many of the current processes of QA, used by many EDs throughout the United States.[3,14–16] Popular strategies have included systemic reviews of deaths in the ED, 72-hour returns, patient complaints, and other triggers noted in **Box 2**.[17–20] Recent studies have criticized these measures as low-yield for identifying MEs and AEs,[21] yet they may miss approximately 90% of the AEs.[22]

Academic emergency medicine departments have a mandate from the Accreditation Council for Graduate Medical Education (ACGME) to include quality improvement activities, morbidity and mortality conferences, and patient safety as part of residency training.[23] This requirement has led to the development of more robust, resource-intensive, and complicated systems at academic medical center EDs.[21] In community EDs, QA is often conducted by an ED director or assistant director and may focus only on complaints ("problem" cases specifically referred for review) in a department or the publicly reported measures. The rest of the QA may be instituted at the departmental level or nursing administration, with the publicly reported mandates being reported at the hospital level.

EMERGENCY DEPARTMENT QUALITY COMMITTEE

The structure of a quality committee for the ED is multidisciplinary and has been described by Klasco and colleagues[17] to include physicians, nurses, hospital QA representation, and ancillary staff. This committee receives input from screened cases by trigger processes developed by the department or the hospital. The QA can then refer cases to different parties within the hospital. A diagram of this structure is included in **Fig. 1**. Typically, more parties are involved at academic then community centers. Membership in this committee may rotate and this can be used with mentorship for residents or junior attendings to become involved in the QA processes. A model from the hospital's peer review committee may be used with a term of membership, scheduled meetings, and involvement of stakeholders.

MEASUREMENTS AND METRICS IN THE EMERGENCY DEPARTMENT

The EDs QA measures have focused on several pathologic conditions that entail significant morbidity and mortality and have well-defined standards of care or adopted

Box 2
Commonly used emergency department quality assurance triggers

- Deaths in the ED (within specified time period)
- 72-hour returns (with and without admission)
- Patient complaints
- Internal referrals
- Physician complaints/nursing complaints (external referrals)
- Floor-to-ICU transfers (upgrades in care)
- Procedural sedation
- Review of certain pathologic conditions (ie, Sepsis, Stroke, STEMI)
- Transfer to other facilities

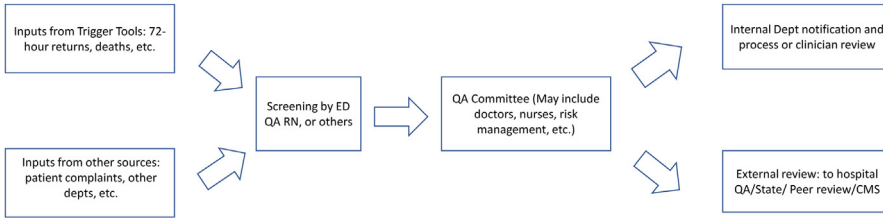

Fig. 1. ED QA process structure. (*Adapted from* Klasco RS, Wolfe RE, Wong M, et al. Assessing the Rates of Error and Adverse Events in the ED. Am J Emerg Med. 2015 Dec;33(12):1786-9; with permission.)

guidelines. Notable examples include acute stroke and ST-elevation myocardial infarction (STEMI). Door-to-balloon time for STEMI and related process measures were originally created by the American College of Cardiology in conjunction with the American Heart Association and involve the coordination of EDs, emergency medical services, and catheterization laboratory teams.[24] This metric was developed in 2006 and its effects have been transformative. The ED is a crucial part of the process, and delays within the ED remain an area of active improvement.[25] In the parlance of QA, *measures* refer to processes that can be measured, whereas *metrics* define a goal for a measured process. For instance, originally door-to-balloon time was measured, and the optimal time of 90 minutes was defined as a metric to meet or exceed for patients with an STEMI (inclusive of a door-to-electrocardiogram time goal <10 minutes).[26] Eventually, metrics may be adjusted or systems may define their own metrics from commonly measured processes.

The defining of metrics and their link to payment presents dangers and opportunities for EDs and emergency physicians. Historically many metrics have been established with minimal participation of the emergency medicine community. Two such examples include the time to initiate antibiotics (within 4 hours of arrival) for community-acquired pneumonia and obtaining blood cultures before the administration of antibiotics.[27] Both recommendations were eventually removed but not before there was widespread criticism that the recommendations were not evidence based and were potentially harmful to patients.

EMERGENCY DEPARTMENT QUALITY ASSURANCE PAYMENT AND SYSTEMS FOR REPORTING

The emphasis on measuring the quality of care has led to more disease-defined metrics. Multiple organizations have released ED quality markers (see **Box 1**)[28]—some attributable to individual providers but many related to systems and the clinical care environment. The Patient Protection and Affordable Care Act in 2010 tied some of these measures into the Quality Payment Program (QPP) most commonly through the Merit-based Incentive Payment System (MIPS).[29] These programs help replace CMS's voluntary physician quality reporting system to report, measure, and reward physician quality.[30] Under the current system, hospitals, clinicians, and groups must report metrics or face penalties and reduced reimbursement.[31]

Clinical Emergency Data Registry is an EM specialty-wide registry supported by the American College of Emergency Physicians (ACEP) designed to measure EM outcomes, identify practice patterns, improve quality of acute care, and meet QPP/MIPS quality reporting for those not in the alternative payment model.[32] The registry now contains about 250 practice groups, more than 1000 individual EDs, and accounts for 25 million ED visits.[33] Its goal is to create new measures and apply big

data analytics to improve patient care. The Emergency Quality Network is another quality collaborative sponsored through ACEP,[34] currently focused on improving quality of care for sepsis, imaging, chest pain, and opioid management.[34]

PITFALLS IN MEASUREMENTS

Future QA measures could revolve around chief complaints,[35] for instance, whether or not a female patient of child-bearing age with abdominal pain receives pregnancy testing. However, even a simple measure such as this can be fraught with error. The measure might be determined by a specific pregnancy test recorded in a single field of the medical record. If this is the preferred indicator, other methods to rule out pregnancy, such as the use of a bedside pregnancy test, surgical status such as hysterectomy, or outside records could unwittingly fail the measure.[36] If physicians then learn they will fail the process measure without a specific test, they may do this just to "meet the measure" and overutilize resources.

Gaps in Emergency Department Quality Assurance

Other issues with QA include incomplete measurement of diagnostic errors, limited outpatient follow-up, and transitions of care. Care can be efficient, fast, and wrong, yet still be rated well by time measures. Because patients do not always present back to the same provider or system, diagnostic errors may elude the first institution. A patient with an obstructing kidney stone who did not have urine collected (visit lasted less than 2 hours) could go to another institution in septic shock. A patient who presents with a cough and has a chest radiograph within an hour may pass a timeliness metric, but if the radiograph shows a pulmonary nodule, and the need for follow-up is not communicated, the patient's preventable cancer could be missed. The current system of time-based fee-for-service productivity would reward both visits despite the clear MEs and AEs.

Efforts to reduce utilization or overtesting have also been difficult to implement. Concerns about limiting clinician decision-making and increasing diagnostic errors are weighed against overutilization.[37] Ultimately, reducing variation and improving the use of evidence-based medicine requires careful attention to what is being measured and how it affects clinicians, systems, and patients. Numerous attempts to game the system are seen in assigning EM service codes,[38] and high-stake measures may experience a Hawthorne effect until their metrics are retired.

Systems-level issues compound these existing challenges. The siloing of information between different hospital systems creates major barriers in clinical care and makes comprehensive ED QA more difficult, as patients transfer between systems.[39] Likewise, the disparate measures that are currently used will likely expand, and payers are increasingly reducing payments to "low performers" and rewarding "top performers." Patient surveys of clinicians are also likely from the basis for further metrics, despite their historically checkered past and lack of validity.[40] Therefore, as more reimbursement is tied to QA metrics, clinicians and other stakeholders will need to selectively champion evidence-based metrics to ensure that they meaningfully improve patient care.

HOSPITAL-BASED PROVIDER PRIVILEGING AND COMPETENCY ASSESSMENT

The Centers for Medicare and Medicaid Services (CMS) is the single largest payer of health care services in the United States and as such, the CMS is highly influential in setting health care standards. Hospitals participating in the Medicare program must adhere to a set of requirements for privileging and competency assessment pertaining

to their medical staff. These requirements include an appraisal of every individual medical staff member's qualifications for each privilege, as well as a system for demonstrating competency in those privileges granted every 24 months or earlier (irrespective of board certification).[41] Hospital participation in the CMS program requires accreditation, either directly from CMS or through a CMS-approved program. This process involves regular surveys to certify compliance with the Medicare requirements.[42] The Joint Commission (JC) is the most widely used CMS-approved accreditation program, accrediting 70% of the hospitals in the United States. Thus, JC requirements apply directly to most of the EM physicians in the United States.[43] CMS and JC requirements are predominantly interchangeable, with JC standards being referenced more specifically.

Among JC-accredited hospitals, physicians (and other medical practitioners) are organized into a self-governing body termed "the medical staff" that oversees the quality of care provided by all members privileged at the organization. Toward that goal, the medical staff is required to evaluate staff members' privilege-specific competency and behavior through the frameworks of "Focused Professional Practice Evaluation" (FPPE) and "Ongoing Professional Practice Evaluation" (OPPE).[42] The JC has integrated into its competency requirements the same 6 core competencies (practice-based learning and improvement, patient care and procedural skills, systems-based practice, medical knowledge, interpersonal and communication skills, and professionalism) used by the ACGME and the American Board of Medical Specialties (ABMS).[23,44,45]

FPPE is performed for all initial privileges granted at a specific organization, the most common scenario being a newly appointed hospital staff member (or ED hire).[44,46] Established, credentialed physicians granted new privileges at that hospital must also undergo FPPE. For instance, if a physician has been practicing at a hospital and then applies for and is granted a new privilege, they must undergo FPPE for that privilege (and OPPE for all existing privileges as per the scheduled review cycle). FPPE processes must be clearly defined by each hospital and must include the following 4 components:

1. Criteria for conducting performance monitoring
2. Method for establishing a monitoring plan specific to the requested privilege
3. Method for determining the duration of performance monitoring
4. Circumstances under which monitoring by an external source is required[44,47]

Although FPPE must be time limited, the JC defers to the organization to define the duration of monitoring and suggests considering monitoring numbers (ie, procedures or admissions) rather than duration in circumstances of a low volume privilege.[48]

Thereafter, OPPE is performed to assess competency for existing privileges and, per JC standards, is "A document summary of ongoing data collected for the purpose of assessing a practitioner's clinical competence and professional behavior. The information gathered during this process is factored into decisions to maintain, revise, or revoke existing privilege(s)…" for the purposes of consideration of privilege renewal at the end of the aforementioned 2-year cycle. Examples of data sources suggested by the JC include chart review, direct observation, monitoring of techniques, and discussion with others involved in the patient's care. Other data recommended for evaluation include compliance with JC Core Measures and patient readmissions (either inpatient or outpatient) for the same diagnosis or problem.[49] The JC have indicated a desire for monitoring that includes at least some measures involving a numerator and denominator, benchmarked against a standard, preferably national, at minimum compared with organizational peers. Such monitoring must occur more frequently than every 12 months. The JC suggests organizations consider an 8-month interval, providing 3 sets of data for the practitioner's 2-year renewal cycle.[44,46,50]

FPPE is also conducted for cause or when questions arise regarding a currently credentialed practitioner's competency. Triggers can be single incidents, such as a sentinel event or significant single complaint, or related to trends, such as (per the JC) "patterns of unnecessary diagnostic testing/treatments". Low volume alone over an extended time period can trigger an FPPE.

Choosing practitioner-relevant FPPE/OPPE measures is challenging. Systems and patient factors can influence results in most practitioners' competency measures. In addition, it can be difficult to prove that a particular measure is a true quality indicator of physician performance. One such example is the rate of unscheduled 72-hour return visits to the ED. This measure has its roots in the Maryland Hospital Association Quality Indicator Project (which began in 1985) and has been used for decades.[51] The AHRQ categorizes such a return visit as a "discharge failure" and the Institute for Healthcare improvement recommends that return visits with admission (48 hours) be a trigger for case reviews.[52,53] Controversy surrounds the utility of return visits as a quality indicator (including with respect to the timing of the return).[21,54–57] A recent study by Aaronson reviewing 413,167 ED visits identified that only 0.48% (n = 2001) of 72-hour returns were admitted to the hospital and only 2.49% (n = 50) of those involved deviation from optimal care. The investigators concluded that simply screening for 72-hour returns with admission has a low yield (<3%) for identifying suboptimal care. They did acknowledge that detailed case reviews can be useful for OPPE, as care deviation events most often represented errors in the diagnostic pathway.[58] Only a small body of peer-reviewed literature directly assesses the topic of FPPE/OPPE, and as of this review, only a single paper (by Walker and colleagues) addresses the implementation of FPPE/OPPE in emergency medicine. This study involved a current state survey, demonstrating considerable variation among respondents, with just greater than 65% using measures pertaining to "quality metrics," whereas 72-hour returns were used by 50% of respondents. Few regarded grading measures as "meaningful," whereas larger groups endorsed the measures as only "somewhat meaningful" or not useful. Further discussion with a subset of respondents noted that the majority were against measures such as ED length of stay for admitted patients and left without being seen rates, whereas peer review (of cases) was felt to be the most useful measure in judging provider competency.[59] So, 100 years after Codman's work, physicians choose peer review as a measure that is the best reflection of patient outcomes.

Perhaps one reason why physicians favor peer review of cases is that despite ACGME, ABMS, and CMS′ focus on nontechnical core competencies such as professionalism and communication skills, there is little agreed-upon structure for their assessment. Furthermore, the 6 ACGME core competencies are not necessarily comprehensive in categorizing skills and behaviors. A comprehensive review out of the United Kingdom of nontechnical skills linked to safety and error in the ED identified a total of 34 skills and behaviors, condensed into 9 broad skills.[60]

Another facet of competency is perspective. The practice of emergency medicine involves considerable interprofessional collaboration, particularly with nurses. One study sought to identify nurses' views on EM physician competency, and the resultant model included aspects of the ACGME competencies but also emotional intelligence, problem-solving and decision-making skills, patient focus, operations management, and team leadership and management.[61]

Although work on a definition of appropriate EM competencies continues, practical ways of measuring them remain elusive. The same United Kingdom group referenced above developed an a non-technical skills assessment tool and includes a behavioral

marker system (Fig. 2). Each assessment involves 1 hour of direct observation and assessment of each subject being evaluated, a cost that may prove too burdensome for EDs to bear.[62]

TAXONOMY OF EVENTS

The importance of a standardized terminology of AEs or incidents was championed by the IOM in their 2003 publication *Patient Safety: Achieving a New Standard of Care.*[63] There are many facets to such a taxonomy, the most basic and critical components are to define what constitutes an "incident," to categorize the level of harm associated with an incident, and to consider associated contributing patient and system factors. Several organizations have developed and promote particular patient safety taxonomy systems; however, consensus is lacking.

Since 2005, the World Health Organization's World Alliance for Patient Safety has undertaken the *Project to Develop an International Classification for Patient Safety* (ICPS) toward these goals and in 2009 published their conceptual framework, which involves the following:

- "Clinically meaningful" categories (incident type and patient outcomes)
- System resilience (detection, mitigating factors, and ameliorating actions)
- Descriptive information (contributing factors/hazards, patient and incident characteristics, and organizational outcomes)

They define a patient safety incident as "an event or circumstance that could have resulted, or did result, in unnecessary harm to a patient," more specifically labeled as a reportable circumstance, near miss, no harm incident, or harmful incident (AE).[64] JC also recognized the importance of standardizing taxonomy and in 2005 produced their own *Patient Safety Event Taxonomy* (Fig. 3), which the JC continues to reference.[65,66] The IHI uses a harm assessment tool adapted from the *National Coordinating Council for Medication Error Reporting and Prevention* (NCC MERP) Index for Categorizing Errors, derived in 1991 and recommends that it can be applied to nonmedication-related events (Box 3).[52,67] This taxonomy is available from the NCC MERP site along with supporting materials.[68] The AHRQ uses a harm assessment framework that grades degree and duration of harm (Table 1).[69] The American Society for Healthcare Risk Management has also adopted the AHRQ harm assessment framework and specifies that with respect to duration of harm, that "temporary" refers to harm with expected duration of less than 1 year and "permanent" means greater than 1 year.[70]

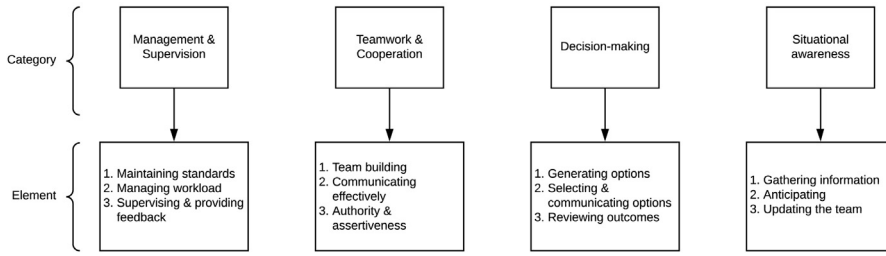

Fig. 2. Behavioral marker system. (*Adapted from* Flowerdew L, Brown R, Vincent C, et al. Development and Validation of a tool to Assess Emergency Physicians' Nontechnical Skills. Ann Emerg Med. 2012 May;59(5):376-385.e4; with permission.)

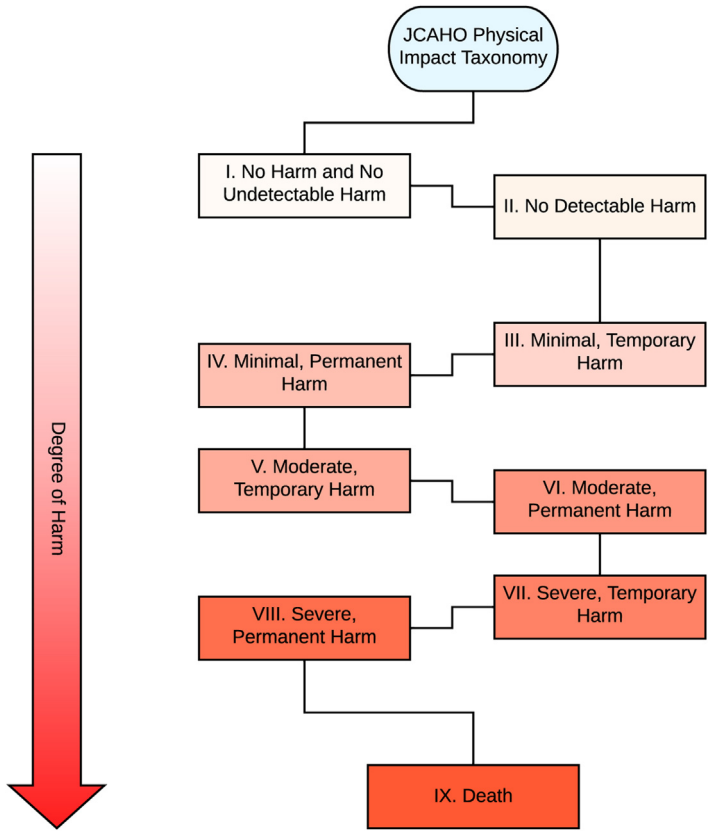

Fig. 3. JCAHO physical impact taxonomy. (*Adapted from* Chang A, Schyve JCAHO Medical, Physical Classification of Impact Taxonomy; with permission. And *Adapted from* Chang A, Schyve PM, Croteau RJ, et al. The JCAHO Patient Safety Event Taxonomy: A Standardized Terminology and Classification Schema for Near Misses and Adverse Events. Int J Qual Health Care J Int Soc Qual Health Care. 2005; 17(2):95-105; with permission.)

DEVIATION AND DETERMINATION OF QUALITY OF CARE AND CAUSATION

The concept of "deviation" in health care delivery is also critical but nuanced. Deviations occur when care does not adhere to a standard of care, which may include evidence-based or consensus guidelines, relevant policies or protocols, or a "reasonable person comparison"—what most of the clinician's peers might do in a similar circumstance.

However, deviation alone is not synonymous with harm or a lower quality of care. Deviations may be justifiable in particular situations. When harm to a patient has occurred, unjustified deviation serves as the basis for determining preventability. In assessing for deviation, it is also important to use a framework that considers factors of the surrounding system in which the deviation took place. Too often, focus is on "human error," fault and blame rather than a system analysis framework that considers all factors that may have contributed to an event.

One such framework is *The London Protocol*,[71] which is based on research outside of health care in aviation, oil and nuclear industries, and involves an "accident" investigational model. The accident causation model uses a "Framework of Contributory Factors Influencing Clinical Practice":

Box 3
Taxonomy of outcome

I. No Error
   a. Category A: circumstances or events that have the capacity to cause error

II. Error, No Harm
   a. Category B: error occurred but did not reach patient
   b. Category C: error occurred, reached patient, but did not cause harm
   c. Category D: error occurred reached the patient and required monitoring to confirm that it resulted in no harm to the patient, no intervention required

III. Error, Harm
   a. Category E: an error occurred that may have contributed to or resulted in temporary harm to the patient and required intervention
   b. Category F: an error occurred that may have contributed to or resulted in temporary harm to the patient and required initial or prolonged hospitalization
   c. Category G: an error occurred that may have contributed to or resulted in permanent patient harm
   d. Category H: an error occurred that required intervention necessary to sustain life

IV. Error, Death
   a. Category I: an error occurred that may have contributed to or resulted in the patient's death

Adapted from National Coordinating Council for Medication Error Reporting and Prevention. *NCC MERP Taxonomy of Medication Errors.* https://www.nccmerp.org/taxonomy-medication-errors-now-available 1998.

1. Patient factors
   a. Condition (complexity and severity)
   b. Language/communications
   c. Personality/social factors

Table 1
The agency for healthcare research and quality extent of harm

Death	Dead at Time of Assessment
Severe permanent harm	Severe permanent harm: severe lifelong bodily or psychological injury or disfigurement that interferes significantly with functional ability or quality of life
Permanent harm	Lifelong bodily or psychological injury or increased susceptibility to disease. Prognosis at time of assessment
Temporary harm	Bodily or psychological injury but likely not permanent
Additional treatment	Injury limited to additional intervention during admission or encounter and/or increased length of stay but no other injury. Treatment since discovery and/or expected treatment in future as a direct result of event
Emotional distress or inconvenience	Mild and transient anxiety or pain or physical discomfort but without the need for additional treatment other than monitoring (such as by observation; physical examination; laboratory testing, including phlebotomy; and/or imaging studies). Distress/inconvenience since discovery and/or expected in future as a direct result of event
No harm	Event reached patient, but no harm was evident
Unknown	

Adapted from Agency for Healthcare Research and Quality. *Extent of Harm*. U.S. Department of Health & Human Services; 2013.

2. Task and technology factors
   a. Task design and clarity of structure
   b. Availability and use of protocols
   c. Availability and accuracy of test results
   d. Decision-making aids
3. Individual (staff) factors
   a. Knowledge and skills
   b. Competence
   c. Physical and mental health
4. Team factors
   a. Verbal communications
   b. Written communications
   c. Supervision and seeking help
   d. Team structure
5. Work environmental factors
   a. Staffing levels and skills mix
   b. Workload and shift patterns
   c. Design, availability, and maintenance of equipment
   d. Administrative and managerial support
   e. Environment
   f. Physical
6. Organizational and management factors
   a. Financial resources and constraints
   b. Organizational structure
   c. Policy, standards, and goals
   d. Safety culture and priorities
7. Institutional context factors
   a. Economic and regulatory context
   b. Links with external organizations

For a more comprehensive understanding of "human error" or rather the role of systems factors in contributing to "human error," the reader is referred to *The Field Guide To Understanding 'Human Error', Third Edition*.[72]

QUALITY REVIEW STRATEGIES—CURRENT STATE, LIMITATIONS, AND FUTURE DIRECTIONS

An ideal QA process would involve manual review of all cases in which there was harm or deviation of care with the potential for harm, and only those cases, as well as mechanisms for monitoring the surrounding processes of care for deviation from acceptable standards. Unfortunately, this is an ideal state, rather than a feasible goal for many departments.

Current strategies of case review include identifying cases based on triggers and random auditing. Triggers for review may include individual referrals, such as the filing of patient safety events, or consensus-derived triggers (such as 72-hour return visits to the ED, transfers to higher level of care, or deaths). The yield of true AEs from this traditional surveillance-based strategy is low. It is essential that reviewers do not conflate crude rates of triggers with the prevalence of AEs or care defects. The IHI, in their *Global Trigger Tool for Measuring Adverse Events*, acknowledges the complexity of this topic, stating "…only 10 to 20 percent of errors are ever reported and, of those, 90 to 95 percent cause no harm to patients."[52] The ED module of the *Global Trigger Tool* includes only 2 triggers: return visits to the ED resulting in admission and ED

length of stay greater than 6 hours, although some of their universal care triggers, such as transfusion of blood, restraints, falls, procedure complications, and transfer to higher level of care are applicable to ED patients.

Unplanned intensive care unit transfer (UIT) is another trigger of doubtful utility as an independent quality measure. The use of UITs involves multiple assumptions that have not been thoroughly validated. For instance, there is no standard determining the need for intensive care unit (ICU) level of care. Although cases involving acute initiation of mechanical ventilation or vasopressor therapy almost universally require ICU level of care, considerable practice variation exists for other reasons (such as "close monitoring"). In examining 108,732 non-ICU admissions from a single center's 520,202 ED visits, only 923 patients (0.9%) were identified as having either expired (n = 86) or were transferred (n = 837, 0.76%) to an ICU within 48 hours of initial ward admission. The investigators developed a list of 25 "critical interventions" (CrIs), which require ICU level of care. They excluded patients with active comfort-measures-only, do-not-resuscitate, or do-not-intubate orders on admission, postoperative complications, and planned ICU transfers. After applying these exclusion criteria, only 6% were judged to involve an ME, whereas 7% transfers that did not undergo a CrI involved an ME. Overall, for 108,732 patients admitted to a non-ICU setting, only 0.03% were transferred to an ICU within 48 hours and involved an ME. Although review of UIT with CrI may have some utility, crude rates of UIT are a poor measure of quality,[73] and its use as a performance marker may lead to over-utilization via "prophylactic" ICU care for patients. The use of more sophisticated, statistical approaches to identifying cases with AEs is a promising venue for improvement, but requires further research.[74]

SUMMARY

Indisputably, QA is critical to modern medicine. The principals of evidence-based medicine and elimination of preventable harm are widely accepted. Although there is no longer disagreement (such as during Codman's time) about the importance of QA, there remains little consensus about the most effective means toward achieving these goals. It is important for the emergency physician to understand the current state of quality measurement in the ED, particularly the FPPE and OPPE processes as they affect individual providers. Future directions may include the development, validation, and implementation of more effective and efficient strategies for monitoring and reviewing quality of care, while simultaneously analyzing and characterizing contributing factors (provider, patient, system) to important care processes.

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