Managing quality in hospital practice

NORMAN S. WEINBERG1 AND WILLIAM B. STASON2

1 Patient Care Improvement Council, Partners Community Health Care, Inc., Boston and Primary Care Service, Emerson Hospital, Concord and 2 Department of Health Policy and Management, Harvard School of Public Health, Boston, MA, USA

Abstract

Background. While routine clinical decision-making has a substantial effect on quality, most practising physicians do not routinely examine their outcomes.

Objectives. To set up a practical process for identifying problems in hospital practices of primary care physicians, examine their causes, and develop a quality improvement process that intimately involves practising physicians in problem-solving.

Design. All hospital admissions to the Primary Care Service were screened over a 14-month period using simple prespecified criteria. Quality problems were verified by medical record reviews carried out by two physicians. These problems were discussed at monthly meetings of physicians to characterize the problems fully, identify their causes, and document adverse effects on patient outcomes.

Setting. One community hospital.

Participants. Primary care physicians from three group practices and four solo practices who admit patients to the Primary Care Service.

Interventions. Monthly group discussions plus discussions with individual physicians when time did not permit all quality problems to be discussed at group meetings. Certain issues of high sensitivity were also discussed with the individuals rather than in an open forum.

Outcome Measures. Missed or delayed diagnoses, inappropriate treatments, and complications and their root causes.

Results. Quality problems were identified in 6% of all admissions. Of these, 60% were missed or delayed diagnoses, 22% were iatrogenic complications and 18% were inappropriate treatments. Root cause analysis suggested that physician behaviors led to 75% of problems; systems problems to 20% and inadequate knowledge to 5%. Process improvements included development of a call-in system to reduce delays in obtaining X-ray reports; implementation of an anticoagulation monitoring system in one group practice; and a protocol of regular feedback of errors in diagnosis to emergency room physicians. Participating physicians reported increased awareness of common errors and greater attention to detail in patient evaluations.

Conclusions. Knowledge of root causes of quality problems is essential for improving quality of care. A simple routine approach to examining adverse outcomes and how care might be improved in the future was set up. Active participation of practising physicians is essential. Other organizations could use this process for routinely reviewing and improving quality.

Keywords: Medical outcomes, quality improvement, quality management

Quality improvement is an important goal in all clinical practices. Basic ingredients are the commitment of clinicians, systematic monitoring of data on the processes and outcomes of care, and the active support of management. Evaluation of trends in practice patterns and the causes of problems close the loop and provide the essential link to cause specific actions. However, many practising groups do not routinely identify or examine their quality problems.

Most studies to date have focused on documenting problems, but few have taken the next step to evaluate their causes and tailor actions accordingly. For example, one widely quoted study of patients with unstable angina concluded that undertreatment contributed to deaths and that ‘many patients may have died because of errors in diagnosis’ [1]. Another study concluded that 9% of all cardiac arrests might have been prevented by stricter attention to the clinical history, physical examination, and laboratory results [2]. The investigator in this study responded by conducting educational programs that emphasized the importance of patients’ symptoms and physical findings, drug use and drug interactions.
The quality improvement movement in Japanese industry applies a concept termed the 'Five Whys' to the analysis of defects in a production process [3]. The goal is to gain a thorough understanding of a problem by asking a series of 'layered whys' or derivative questions that try to get closer and closer to the underlying root causes. The same approach can be used to assess quality problems in health care.

This paper describes the quality improvement program in a community hospital that systematically identifies quality problems and involves primary care clinicians in examining their causes and effects, and several concrete changes that have resulted from this process.

Methods

Participating physicians

Participants included 30 of the 41 physicians (73%) who admit to the primary care service of the community hospital. Most physicians practised in one of three group practices, although four were solo practitioners. The average age of the participants was 45 years (range 30–69). All but two physicians were board certified or board eligible, and all but two received their medical education in the USA.

Screening hospital admissions

Each month two medical record coding specialists from the Medical Record Department generated a list of all hospital admissions by participating physicians and, for each admission, recorded admission and discharge diagnoses, the date the principal discharge diagnosis was first mentioned in the medical record, and the first two secondary diagnoses. The list was reviewed by the project director (NW) and a physician coordinator from each group practice. Screening criteria were: (i) discrepancies between the admission and discharge diagnosis; (ii) delays of more than 2 days until the final diagnosis was first mentioned in the differential diagnoses; or (iii) secondary diagnoses that suggested complications of treatment (for example, fluid overload, hyperkalemia, non-steroidal anti-inflammatory drug-induced gastritis, and drug toxicity).

These screening criteria were selected by the author (NW) in an attempt to improve the efficiency of discovering quality problems. The use of broad categories (such as complications) as opposed to specific diagnoses was chosen to increase the population of admissions screened.

Verifying and classifying quality problems

The medical records of admissions that met one or more screening criteria were reviewed independently by both physicians. Objectives were to identify possible quality problems and to obtain preliminary information on their causes and clinical consequences. Identification of a quality problem required the consensus of both reviewers. Monthly meetings of physician practice groups or meetings of the program director with solo practitioners were used to verify quality problems, determine their causes, and to document any adverse effects on survival, symptoms, vital signs, or laboratory parameters.

Regular meetings of the physicians' groups were being held to discuss issues of patient management, administrative problems, or utilization of resources. This format was used to introduce discussions of the quality problems discovered by the review process.

Definitions of quality problems

Missed diagnosis

The principal discharge diagnosis was not included in the initial differential diagnosis or in subsequent clinical notes by the admitting physician, covering physicians, or consultants and was not implied by physician orders. (In these cases, cues were present that should have allowed the diagnosis to be considered.)

Delayed diagnosis

The eventually established diagnosis was not considered for at least 48 hours where cues were present that should have evoked it.

Treatment problems

(i) The drug or other treatment was inappropriate; (ii) the dosing or route of administration of an appropriate drug was inappropriate; or (iii) a complication resulted from a failure to monitor responses to treatment before or during the hospital admission. Idiosyncratic drug reactions were excluded. Problems were attributed to outpatient care if an erroneous admission diagnosis, inappropriate treatment, or failure to monitor treatment responses had preceded admission.

Classification of all quality problems was made by the principle investigator (NW). When more than one problem was discovered, each was analyzed separately.

Analysis of the chart

Once the type of problem was determined, the next step was to determine why it occurred. Generally, there were three types of issues frequently identifiable through record review.

(i) Insufficient data acquisition: essential questions were not asked (according to the chief complaint and corresponding differential diagnoses), or important aspects of the physical examination were not performed. This also includes cases in which diagnostic tests which should have been done were omitted. Example: a patient presents with black stools, nausea and light headed feeling. The impression is an upper GI bleed. The admitting physician does not ask about current use of non-steroidal anti inflammatory drugs or take orthostatic blood pressure.

(ii) Inadequate hypothesis generation: a complete differential diagnosis was not considered. Example: a patient presents with dyspnea on exertion without
cough or chest pain. Pulmonary embolus is not considered.

(iii) Inattention to or misinterpretation of cues: various symptoms, physical findings or laboratory and/or X-ray findings appear to suggest a diagnosis which is not considered.

Determining the root causes of quality problems

Following the approach of the ‘Five Whys’, the next step in evaluating the medical record is to determine why there was insufficient data acquisition, inadequate hypothesis generation or inattention or misinterpretation of cues. This usually cannot be determined from the medical record alone. The clinician(s) involved must be interviewed. The root causes can be divided into three types.

Physician behaviors

(i) Lack of thoroughness. Precipitating factors may be inadequately supported; (ii) preconceptions or misleading initial diagnostic impressions. For example, inaccurate diagnosis from the emergency room physician or covering physician which was not objectively assessed by the attending physician. This may also be due to misleading impressions or supposed diagnoses from the patient, family, or nurses; (iii) inadequate hypothesis reevaluation. The initial impression has been ruled out by diagnostic testing but the working diagnosis is not reconsidered; (iv) inadequate attention to one or more problem areas in multisystem disease; (v) inadequate evaluation or treatment in a patient with advanced, end-stage disease in which a decision has not been made to provide comfort care only.

Inadequate knowledge

An error in diagnosis or treatment due to lack of knowledge of an aspect of an illness or treatment.

Systems problems

Problems in structure of the health care system, for example: (i) results of laboratory or radiology not available or delayed; (ii) inadequate or inaccurate information from outside agencies, nursing homes or consultants; and (iii) inadequate or inaccurate information from nurses or other hospital staff.

Physician group meeting

The issues raised by this process were felt to be appropriate for discussion in several settings. Those issues having broad implications in management were brought to the entire group. Examples might include deviations of practice from national guidelines, communication difficulties with specialists, or availability of certain procedures or test results. In this setting, physicians were asked to support practice patterns with evidence-based medicine. If problems in the delivery of health care services or with certain specialty services were identified, the group dynamic offered an excellent forum to arrive at proposals for solutions.

Other issues were more appropriate for one-on-one discussions with the physicians involved. This was particularly true for sensitive matters such as lack of thoroughness, misinterpretation of cues, or physician bias. In exploring the root causes, systems problems such as busy schedules or interruptions may have been found. In these instances, the group setting could be used to pursue solutions to these ‘systems’ problems.

Results

Screening and record reviews were carried on over 14 months. A total of 1578 hospital admissions were screened; medical records were reviewed in 507 (32.1%) admissions; and quality problems were verified in 92 (6.0%).

The method of analyzing medical records and arriving at root causes of quality problems is best illustrated by the review of a case and the thought process behind the evaluation of each of the issues raised.

Example of a case analysis

An elderly man was brought to the Emergency Department by his family with a 3-day history of constipation and mild increase in confusion. He had an indwelling urinary catheter and a history of Alzheimer’s dementia, but otherwise had been well. On examination, he was afebrile, lethargic, and moderately confused. His abdomen was distended but with no tenderness or palpable masses. Bowel sounds were hypoactive. A white blood cell count was normal except for a left shift. The urinalysis revealed moderate bacteria and 30–40 white blood cells per high-powered field (400×). The blood urea nitrogen was slightly elevated. An abdominal X-ray showed mild distention of the small intestine and a large amount of stool. The Emergency Room physician’s impressions were obstipation and dehydration. The case was reviewed by telephone with the attending physician, and admitting orders were given for laxatives and enemas.

Two days later at 2 a.m., the patient developed a temperature of 38.9°C and hypotension. A presumptive diagnosis of ruptured bowel due to repeated enemas was made by the cross-covering physician after reviewing the case with the nurse by telephone. Blood and urine cultures were taken, and parenteral antibiotics were commenced. Cultures of the urine and three out of three samples of blood grew Escherichia coli. At this point, the diagnosis of urinary tract infection with sepsis was made. The constipation was felt to be secondary to a paralytic ileus from the bacteremia. The patient recovered with appropriate antibiotics and was discharged home.

The first quality issue was the missed diagnosis by the Emergency Room physician as well as by the admitting doctor and the cross-covering colleague. From reviewing the record, this appears to be due to: (i) inattention and misinterpretation of cues (change in mental status, hypoactive bowel sounds, left shift of the white blood cell count, pyuria and bacteriuria); as well as (ii) inadequate hypothesis generation (occult infection – UTI and paralytic ileus).

Why the cues were missed cannot be determined without interviewing the physicians involved. This must be done one-on-one to minimize the defensiveness of clinicians. Ideally it should be done by a group leader for each of the physicians involved (for example, the Emergency Department quality
### Table 1: Types of quality problem

<table>
<thead>
<tr>
<th></th>
<th>Missed or delayed diagnosis</th>
<th>Treatment problems</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>%</td>
<td>$n$</td>
</tr>
<tr>
<td><strong>Group practice</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>22</td>
<td>52.4</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>65.2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>60.9</td>
<td>9</td>
</tr>
<tr>
<td><strong>Solo practices</strong></td>
<td>4</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>55</td>
<td>59.8</td>
<td>37</td>
</tr>
</tbody>
</table>

leader and the coverage group leader of the admitting and cross-covering physicians).

The questions must be explicit and probe why cues were missed or diagnoses were not considered. It must be done in a non-judgmental way expressing simply a desire to know what factors contributed to the quality issues and how they can be avoided in the future. Examples: (i) What was the reason for the pyuria and bacteriuria? (ii) Why were there no bowel sounds? (iii) Was there any significance to the left shift? (iv) What was the reason for the change in mental status? (v) Why was the diagnosis of urinary tract infection not considered?

In this case, the principal reasons given were as follows:

- the emergency room physician was influenced by the diagnosis offered by the family – constipation;
- the doctor was not familiar with the fact that seriously ill, elderly patients may have only subtle signs of infection: afebrile, normal white blood cell count with left shift only, and subtle changes in mental status;
- the cues present were therefore ignored because the clinician had jumped to conclusions about the diagnosis after talking with the family;
- the pyuria was attributed to the chronic catheter;
- the absent bowel sounds were simply overlooked;
- the admitting physician was influenced by the presentation of the case by the Emergency Department physician;
- the cues which did not fit into this preconceived diagnosis were ignored;
- the next day, the case was not viewed in an objective manner because the diagnosis was considered established;
- the differential diagnosis was not reconsidered.

The cross-covering physician had only the nurse's impressions of the acute problem based on an inaccurate diagnosis. Moreover, the nurse did not explain that the blood pressure, although still within normal range during the septic phase (100 mmHg systolic) was 50 mmHg lower than it had been 2 hours before. The cross-covering physician did not realize that the patient was going into septic shock.

Using the information from these interviews the case may be presented to the group without divulging the names of the physicians involved. The same questions should be posed to the group at various stages of review of the clinical course. This will emphasize the issues which were most relevant and explore whether similar problems might arise in the future. For example, after presenting the chief complaint, examination and laboratory data, the leader could ask if the diagnosis is reasonable, and if not, why not. If someone does raise the correct diagnosis, the leader could ask why there was no fever or elevated white blood cell count. The group discussion heightens awareness of all the quality issues involved including the inappropriate influence of the family's diagnosis.

#### Types of quality problems

Missed or delayed diagnoses accounted for nearly 60% of quality problems and treatment problems for 40% (inappropriate treatments 18.5% and iatrogenic complications 21.7%) (Table 1). Types of quality problems did not differ significantly among the three group practices.

#### Causes of quality problems

Physician behaviors accounted for 75% of quality problems, deficiencies in knowledge for 5%, and systems problems for 20% (Table 2). Patterns were similar in all group practices. The total number of causes exceeds the number of quality problem cases (111 causes in 92 cases) because of multiple physicians or multiple causes in some cases. Multiple causes were especially likely to occur in complex cases that involved frequent interactions among the admitting physician, cross-covering physicians, and consultants.

The most frequent physician behaviors associated with quality problems were lack of thoroughness (41%) and misinterpretation, preconception or misleading initial impression (30.1%) (Table 3). Lack of thoroughness was often ascribed to the time pressures of a busy practice and the complexities of coordinating care for hospitalized patients with the demands of office practices. Hence, the 'system' may well have played a role. Preconceptions created by previous diagnoses made by emergency room or cross-covering physicians contributed to errors or delays in diagnosis when physicians failed to take adequate steps to corroborate them. Incomplete differential diagnoses were problems especially for infrequently encountered diseases or atypical clinical presentations. Misleading or negative X-ray
Table 2 Causes of quality problems

<table>
<thead>
<tr>
<th></th>
<th>Physician behavior</th>
<th>Lack of knowledge</th>
<th>Systems problems</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n )</td>
<td>%</td>
<td>( n )</td>
<td>%</td>
</tr>
<tr>
<td>Group practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>32</td>
<td>76.2</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>65.6</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>26</td>
<td>78.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Solo practices</td>
<td>4</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td>83</td>
<td>74.86</td>
<td>6</td>
<td>5.4</td>
</tr>
</tbody>
</table>

Table 3 Physician behaviors associated with quality problems

<table>
<thead>
<tr>
<th>Behavior</th>
<th>( n )</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of thoroughness</td>
<td>34</td>
<td>41.0</td>
</tr>
<tr>
<td>Preconception or misleading initial impression</td>
<td>25</td>
<td>30.1</td>
</tr>
<tr>
<td>Inadequate hypothesis evaluation (failure to reassess initial diagnostic impressions)</td>
<td>11</td>
<td>13.2</td>
</tr>
<tr>
<td>Multisystem disease with inadequate attention to one or more problem areas</td>
<td>7</td>
<td>8.4</td>
</tr>
<tr>
<td>Inadequate evaluation or treatment in a patient with advanced disease</td>
<td>6</td>
<td>7.2</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>99.9</td>
</tr>
</tbody>
</table>

or laboratory results contributed to diagnostic errors. An example was a patient with a high fever; cough and rales in the left lower lobe in whom treatment with antibiotics was delayed because the initial radiograph was negative. A diagnosis of pneumonia was made 2 days later when an infiltrate appeared after the patient had been rehydrated.

Patients with advanced diseases who were admitted with superimposed acute illnesses raised particularly difficult questions. The consensus of reviewers was that diagnosis of the acute problem should be established in such patients and an explicit decision made whether or not treatment was justified. Otherwise, the patient should have been managed in an outpatient setting or hospice.

It is important to note that all physicians involved in the process were found to have cases with quality problems. However, the type of problem tended to cluster for individual physicians independent of the diagnosis.

Most systems problems could be traced either to gaps in communication between physicians, laboratories, or outside organizations such as nursing homes or to delayed or unavailable laboratory or radiology results. Barriers to obtaining timely consultations that contributed to delays in diagnosis were also classified as system problems.

Lack of knowledge was felt to be responsible for quality problems in only six patients. An example was a patient with digoxin toxicity in whom the physician was not aware that the antibiotic, Clarithromycin, could increase the serum level of digoxin.

Outpatient care as the source of inpatient quality problems

Previous outpatient care contributed to 17% of quality problems. Inappropriate treatment or iatrogenic complications occurred in 14 patients and incorrect diagnoses in two patients. Treatment-related problems included:

- medications given to patients with known allergies (two patients);
- encephalopathy due to excessive doses of psychotropic drugs (two patients);
- gastrointestinal bleeding from non-steroidal anti-inflammatory agents (two patients);
- drug-induced electrolyte imbalance (four patients);
- orthostatic hypotension from antihypertensives (two patients);
- Coumadin excess (one patient);
- Aminophyllin toxicity (one patient).

Lack of thoroughness and systems problems were the most frequent causes of quality problems originating in outpatient settings. System problems were more common than in the study population as a whole (39% versus 20%).
probably due to the greater difficulty of coordinating care among multiple providers in outpatient settings.

**Effects of quality problems on patient outcomes**

Evidence of clinical deterioration was detected in 49% of cases, death resulted in six patients (7%), and no measurable clinical effect was found in 44% of cases. In five deaths, the quality problem was the failure to pursue the diagnosis or treatment of an acute illness after admission of a patient with far-advanced disease. In each case, a ‘do not resuscitate’ order had been written in the medical record. In these instances, the quality issue was considered to be in admitting these patients to an acute care hospital and not in the fact of their deaths. The other death occurred in a patient with far-advanced polycystic kidney disease who had been admitted for hemodialysis and evaluation for renal transplantation. The quality problem was a delay in recognizing the neurological signs of a ruptured aneurysm. The diagnosis of intracerebral hemorrhage was confirmed by computed tomography scan 6 hours after the onset of symptoms, but the patient died before surgery could be performed.

**Discussion**

We found that a quality improvement process in which practising internists examined cases on a routine basis was both well received and resulted in a number of specific quality improvement efforts. Physicians spend progressively more time on the administrative and financial aspects of practice. However, their primary interest is patient care and the response to this process was generally enthusiastic. Many significant problems were discovered which often had implications beyond the immediate case being considered. Although exploring quality problems openly was at times difficult, the discussions were productive. The physicians felt that better care was the end result.

**Evaluating quality problems**

Several common principles emerged that define a successful group process to evaluate quality problems.

**Group leadership**

An effective group facilitator is essential. This individual needs to be a respected clinician who has good interpersonal and professional relationships with colleagues and is able to lead discussions in an open, non-judgmental manner.

**Case selection**

Options were to discuss all problems in a highly focused manner or to select a few important problems and discuss them in greater depth, leaving the remaining problems for later one-on-one discussions between the involved physician and group coordinator. Both methods had advocates, but thorough discussion of fewer cases with broader clinical significance received stronger support.

**Case preparation**

The efficient use of group discussion time was extremely important to physicians. Prior distribution of case summaries and prior review of the medical records by the involved physicians proved very helpful. Succinct presentations of cases up to the point of defining the quality problem was very important.

The physicians in groups with effective leaders demonstrated important changes in their practice styles. The emergency department physicians have become circumspect when listing specific diagnoses in their impressions. This was due to a better understanding of the impact of their differential on the admitting physicians. Many of the physicians give a more complete differential diagnosis and show a greater awareness of detail during patient evaluations. The group discussions served as a stimulus to better performance for many of the clinicians. These meetings were one of the few formats where they were expected to justify many of their clinical decisions.

The success of this program is based on several important concepts:

(i) Physician participation: understanding the root causes of quality problems involves exploring aspects of care which are not found in the medical record. The clinicians must be involved in the discussions of medical decisions before reaching conclusions as to why or even whether a quality issue exists. This will allow physicians to be accountable for their diagnostic and therapeutic decisions. Handling physicians a predetermined opinion about a case may evoke a defensive posture and make appropriate changes in behavior less likely. If the goal of the process is to improve care, alienating or angering the physicians will be counterproductive.

(ii) Determining the root cause of problems: according to the philosophy of the ‘five whys’, the most effective way to correct a quality problem is to understand its root cause. In this study, physician behavior was a frequent cause. Studies have shown that in order to change behavior most efficiently, one must be explicit in the focus of what must be done [4]. Pursuing diagnostic or therapeutic quality problems with the clinicians involved may reveal issues in either practice style, system structure (organization of the health care delivery system), or lack of knowledge of specific aspects of a disease or treatment.

(iii) Ability to acknowledge errors: all humans make errors, and errors are thus intrinsic to medical practice. Misguided concepts of infallibility imparted during training, fear of embarrassment, and the risk of malpractice litigation interfere with the willingness of physicians to accept errors and address them forthrightly [5,6]. When the issues are raised in a group of colleagues with whom the atmosphere is one of a working relationship and trust (such as a cross coverage or medical group), these barriers are more readily overcome. The natural tendency to
defensive posturing is minimized, in part because all members of the group will have their cases discussed sooner or later, and because the quality problems are being discussed against a background of mutual respect.

(iv) Reinforcing key messages: questionnaires were sent to all participating physicians and responses were received from 88%. Recurring responses to the questionnaire indicated increased awareness of common types of mistakes, the potential for biases and preconceptions to lead to erroneous diagnoses, and the importance of detailed medical documentation. Several physicians emphasized the collegiality of group discussions, relief from the sense of isolation in their practices, and the stimulus these discussions provided to improve performance.

(v) Criteria for case selection: in this study, we chose diagnosis-neutral criteria, and certain patterns emerged for specific physicians as causes of quality problems independently of the diagnosis. One can focus on adverse reactions or outcomes providing the method of analysis remains uniform. We did find that adverse outcomes were only a subset of all quality problems and that the root causes remained the same no matter what the outcome. The criteria for case selection should be tailored to meet the needs of the individual institution.

(vi) Preventability: most quality problems identified in our study were judged to be preventable. This finding is consistent with Bedell who concluded that 64% of iatrogenic cardiac arrests were preventable [2], the Harvard Malpractice Study that concluded that 69% of iatrogenic injuries were preventable [7,8], and Bates who concluded that 28% of adverse drug events were preventable [9]. It is often hard to determine whether ‘gray zone’ decisions are errors; however, the open format of group discussion allows each side to defend its position. This is an effective way to deal with the issues involving the ‘art’ of medicine. This process should address, in part, the observation that when confronted with bad outcomes, reviewers are more likely to say there is a quality problem.

The issue of retrospective review should be addressed. The effect of this is to create a high standard against which the decision process is held. Knowing the final diagnosis and sitting in a quiet room reviewing the record does remove the real life time restraints, detractions and system problems. However, we did not find that this reduced in any way the appropriateness of the observations that quality problems may have occurred. In fact, the method may expose these factors as being the root causes of problems.

The reliability of verifying quality problems was enhanced by having two physicians review each case and by having any disputes resolved in the group setting. Medical quality is often determined as a community standard. Wherever possible, evidence-based medicine was used to set the standard of care. If decisions deviated from the published standards, the group format allowed a forum to determine whether the deviation was an acceptable alternative.

Leape has described a systems analysis approach to medical error [10]. He states that successful accident prevention efforts must focus on root causes – errors in design and implementation of systems – not on the errors themselves. He feels that most errors result from failure to use basic human factor principles in the design of tasks and systems. The authors recognize that the classification of errors as either physician behavior (human factors) or systems problems is arbitrary in that the root cause of some of the physician problems were related to ‘systems’ problems such as heavy workloads or interruptions. The justification for attributing a lack of thoroughness because of a busy schedule to physician behavior rather than the system is that the clinician had the authority and the obligation to prioritize his or her time on the more critically ill patients. On the other hand, an error due to inaccurate transcription of a drug dose may be beyond the control of the physician and therefore solely approached by changing the design of the system.

Because the physician is the source of all activity surrounding the patient, it is fundamental to focus on this individual. This does not infer that the clinician is the root cause of the problem discovered. Rather, it is going to the architect of the patient’s management to understand what factors underlie the proximal cause of the quality issues identified. From the physician, one may discover the problem to be a behavioral, a systems or an educational factor. In this way, the efforts to improve care will be based on data which lead to the most effective solution.

The focus of these efforts was to assist good physicians in improving their care. Although those who practise substandard care will be exposed, the greatest impact will be the improvement of the average physician practising good medicine. In other words, we are trying to shift the bell-shaped curve, not eliminate those few outliers. The ‘Theory of Bad Apples’ [11] refers to the belief that quality is best achieved by discovering bad apples and removing them from the lot. The assumption is that quality problems are due to greed or to incompetence. Modern theories of quality improvement focus not on the outlier but on the average worker. The average physician is caring and practising at his or her best and will respond to a constructive process which emphasizes making a good clinician better. ‘Bad Apples’ theorists who publish mortality and morbidity data serve to alienate and anger the average clinician. In industry, this has been shown to be counterproductive to improving quality and the same has been true in our experience.

We predict that the approach we used with primary care physicians in our hospital may be generalizable to other settings, although this remains to be demonstrated. This process was practical, identified a wealth of opportunities to improve health care processes and outcomes, and was well accepted by physicians. Such approaches are urgently needed for improving quality, particularly in this era of cost reductions.
Acknowledgement

The authors thank David W. Bates, for helpful comments and suggestions in the preparation of this manuscript.

References


Accepted for publication 15 April 1998