

Continuity and Change in the Study of Medical Error

The Culture of Safety on the Shop Floor

Charles L. Bosk

The Occasional Papers of the School of Social Science are versions of talks given at the School's weekly Thursday Seminar. At these seminars, Members present work-in-progress and then take questions. There is often lively conversation and debate, some of which will be included with the papers. We have chosen papers we thought would be of interest to a broad audience. Our aim is to capture some part of the cross-disciplinary conversations that are the mark of the School's programs. While members are drawn from specific disciplines of the social sciences—anthropology, economics, sociology and political science—as well as history, philosophy, literature and law, the School encourages new approaches that arise from exposure to different forms of interpretation. The papers in this series differ widely in their topics, methods, and disciplines. Yet they concur in a broadly humanistic attempt to understand how, and under what conditions, the concepts that order experience in different cultures and societies are produced, and how they change.

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Charles Bosk's project takes up this emergence of the new profession of "ethicist." He argues that if every major institutional domain in American society has undergone a crisis of trust, responsibility, authority, and ethics, only in medicine has the response been to create a new hybrid specialty to restore confidence. Bosk's interests are as much in the perspective of the theorization of ethics as they are the specific contents. Rather than beginning from paradigms of applied ethics, Bosk makes use of the more ethnographic tool of the case study. In his first book, *Forgive and Remember* (University of Chicago Press, 2nd edition 2003), he carefully observed the training and lives of young surgeons. His second book, *All God's Mistakes: Genetic Counseling in a Pediatric Hospital*, is the result of three years spent as a "guest" witness observing a team of genetic counselors in an unidentified children's hospital. A volume of essays, *What Would You Do? The Collision of Ethics and Ethnography*, is scheduled for publication by the University of Chicago Press in the fall of 2005. The new project engages a series of case studies to understand the emergence of the ethicist. They serve as an entrance wedge into the question of how moral authority is constructed and legitimated in American society, and how that authority influences the choice of which issues are put on the public agenda, and which solutions receive consideration as "reasonable."

Continuity and Change in the Study of Medical Error: The Culture of Safety on the Shop Floor

With its report, *To Err is Human: Building a Safer Health System* (Kohn, Corrigan, and Donaldson 2000), the Institute of Medicine's Committee on the Quality of Health Care in America performed a commendable public service. The report dramatized the extent of a hitherto unappreciated public problem—harm to patients because of medical error—presented a diagnosis that located the problem in the failings of systems rather than individuals, and forwarded a set of treatment recommendations.¹ The report's recommendations comprise a triad familiar to those who study safety and post-hoc accounts of accidents: training to improve the performance of personnel, new technologies to improve the performance of the fallible human operators, and new procedures to improve the functioning of the system (Cook and Woods 1994). These changes, if implemented, will bring to medicine both the philosophy and work routines of "total quality improvement" so far as patient safety is concerned.² The Institute of Medicine report sets for itself the operational goal of cutting in half the amount of medical error over the next five years.

One striking feature of the IOM report is the degree to which it applies, and perhaps misapplies, one tradition of the human sciences for studying errors and mistakes while entirely ignoring a second approach that has been used to understand those same phenomenon. The approach that the report embraces is *normal accident theory*, a blend of organizational theory, cognitive psychology, and human factors engineering (see, for example, Perrow 1984 and Reason 1990 and 1997). This theory holds that modern technological systems are "error-prone" and that we should think of certain catastrophes, of which the most dramatic example would be mishaps at nuclear power plants, as "normal accidents." In this view, accidents and mistakes, with all their baleful consequences, are not produced by individual human failings—what Charles Perrow, a leading proponent of this approach, calls "ubiquitous operator error."³ Rather, certain accidents and catastrophes are an inevitable result of features embedded in the organization of many enterprises of the modern world. The two features most important to the production of normal accidents (for medicine read "preventable adverse events") are interactive complexity and tight coupling; that is, each component part is intrinsically complicated at the same time that each component part's performance affects the functioning of other system components. As a result, small errors ramify through systems creating large consequences.⁴ This is simply an unpleasant fact for many of our complex technological undertakings (such as medicine), but it is also normal or, as Perrow says: "If interactive complexity and tight coupling—system characteristics—inevitably will produce an accident, I believe we are justified in calling it a *normal accident* or *system accident*. The odd term *normal accident* is meant to signal that, given the system characteristics, multiple and unexpected interactions of failure are inevitable. This is an expression of an integral part of the system, not a statement of frequency" (Perrow 1984, 5). The IOM report focuses on the "system nature" of medical error and suggests that through better system design, which will be produced when better reporting leads to knowledge of "latent" system defects, error will be reduced.⁵

However productive the "systems approach" is for first understanding and then

preventing medical error, it is, as I mentioned, but one of two distinct social science approaches to understanding medical error. A second tradition for understanding error is largely unrecognized in the IOM Report. This approach is complementary to a systems approach and a consideration of its findings promises to yield policies that are more effective in promoting patient safety than a system approach unmindful of the cultural context of the workplace. This second approach relies largely on first-hand observational studies. Rather than start with the question, "How might adverse medical events be prevented?" it asks instead "How do workers in a medical setting define what is an error? How do they understand what causes error? And how do they respond to errors?" In this second view, which concentrates on the negotiation of the meaning of the term error on the 'shop floor,' 'harmless error,' 'preventable error,' 'negligent error,'-all are terms negotiated in interaction.⁶ Their meanings are not fixed but are fluid and flexible, highly dependent on context.

The lack of attention to this second approach is itself quite surprising given the goals of the IOM report. The report seeks to break through taboos of silence that surround medical harms and to change a culture of "naming and blaming and shaming" that surrounds medical error. Save for these spare remarks, the IOM leaves the occupational culture that it seeks to change unspecified. Hence, the report neither identifies leverage points that would promote change nor sticking points that inhibit or resist it. The approach to the medical workplace to which the IOM report pays no attention describes the professional culture of medicine. It provides the specification that would allow for the kind of adjustments at the "sharp-end" of everyday judgment and performance that the IOM report seeks. (Cook and Woods 1994).

I have three goals for this essay. First, I re-present and recover this second approach to medical error. Next, by so doing, I highlight the link between medical error, on the one hand, and uncertainty as an omnipresent feature of medical work, on the other. I demonstrate the connection between the medical profession's understanding of error and its obligation to the collectivity. By making these links explicit, I underscore how professional culture contributes to or impedes patient safety. Finally, I discuss how the culture of medicine creates the need for and barriers to a culture of safety and provide some suggestions for how these barriers can be overcome. This paper focuses on four studies that are exemplary of this second approach to accomplish these goals. These works are: Everett C Hughes's "Mistakes at Work" (Hughes 1951), Elliott Freidson's "Processes of Control in a Company of Equals" (Freidson and Rhea 1972 and Freidson 1975), Donald Light's, "Psychiatry and Suicide: The Management of a Mistake" (Light 1972), and my own *Forgive and Remember: Managing Medical Failure* (Bosk 1979, 2003).

From this survey emerge a set of themes not fully considered in the original IOM report. These include the inherent uncertainty of medical action, the essentially contestable nature of medical error, and the profession's tolerance of that "normal error." Consideration of these themes makes clear both how the IOM Report is an attempt to reduce the tolerance for normal error among the medical profession, and also how difficult this task is.

The Production of Error on the Shop Floor

EC Hughes's "Mistakes at Work. A classic orienting statement for understanding medical error is Everett C. Hughes's essays "Mistakes at Work." For Hughes, all work can be divided into routines and emergencies. Routines, or frequently encountered work-place problems, are situations in which workers recognize a common problem, know what to do, are able to do what they need to do, and expect success for their efforts. When routinely attend-

ed to, with success as the outcome, routines reinforce a sense of mastery, a feeling of “I’ve done it before and I can do it again.”⁷ Routines that do not yield the expected success create emergencies. A second type of emergency presents itself as the rare, never before encountered, unique problem. Emergencies, when handled with aplomb, create routines and thereby reestablish a sense of competence and mastery. Emergencies that spiral out of control, like routines where mishandling begets emergencies, create a sense that a culpable error or mistake was made, and that sense is a threat to the integrity of the work group or individuals involved. Action gone awry, with its implication of mistakes and errors made, creates the impression that those involved do not know what they are doing, that competence and mastery are not to be taken-for-granted. Hughes suggests that we can create a calculus for mistakes and errors out of the experience of the worker and the routine nature of the task.⁸

Because academic hospitals often involve front-line workers at the sharp end (students, residents, and fellows) who may have little experience, and because many of the clinical problems encountered there are often far from routine on any standard index, we might expect to find a fair number of mistakes and errors in such institutions.⁹ But, says Hughes, hospital work is organized in such a way as to control and limit the occurrence of mistakes and to filter out any recognition of individual responsibility, or accountability, for them. Hughes describes the organization of hospital work as a set of “risk-sharing” and “guilt-shifting” devices that make it difficult to say if or exactly where in the chain of events the error or mistake occurred. These work practices include supervision, consultation, cross-coverage, and case conferences. All of these devices make it harder to see individual mistakes or, for that matter, system errors. A course of action is not any one individual’s property or the result of any individual’s agency, but rather it is shared within a community of fellow workers who second decisions all along the way. For Hughes, errors are normal, and an elaborate division of labor keeps errors and mistakes from coming plainly into view. In his discussion of training for certainty, Paul Atkinson (1984) has clearly restated this position and given it greater empirical specificity. Marianne Paget (1988) and Candace West (1984) have provided two leading accounts detailing how mistakes are embedded in the everyday order and language of the work group. Not only are mistakes normal, they are hard to isolate from the ongoing stream of interaction. The old folk adage, “Doctors bury their mistakes,” describes better the social process that surrounds mistakes and errors than it does the literal fate of patients. Not all mistakes are so meaningful, so fateful.

Eliot Freidson’s Processes of Control in a Company of Equals. Hughes’ student, Eliot Freidson, describes, in a paper with Buford Rhea (Freidson and Rhea (1972) and more fully in a later monograph (1975), the social processes used in a group practice of physicians to bury mistakes socially, to sustain a “structured silence” about mistakes that the IOM report notes is all too common within the medical profession.

The group that Freidson monitored was a central administrative authority which organized medical practice within a multi-specialty clinic. It was, he notes, an ideal site for a study of how members of the medical profession interpret their obligation to the public to monitor the quality of practice. The scope of that administrative authority included the organization of patient records in a single, central location. The duties that physicians owed to patients, and to the clinic, measured in terms of hours of availability were spelled out contractually. Further, the standards for admitting physicians into the group practice were quite high. Overall, Freidson concludes, if ever an organizational structure favored the collective monitoring of behavior, the impetus to make suggestions for improving practice, and negative sanctions for practice falling below a group standard, this group displayed it. Nor

was this accidental: Freidson tells us that the group was designed self-consciously along those lines advocated by contemporary policy makers for the delivery of the highest quality care and maintenance of the highest imaginable professional standards.

In light of this organizational design, Freidson's findings somewhat disappoint the expectations of policy makers. First, in a setting designed to maximize surveillance amongst colleagues, Freidson found that peer monitoring and surveillance were unsystematic at best. Referral relations structured colleagues' knowledge of one another's performance. Those colleagues in specialties that had exchange relations tended to know something about one another's performance. Those colleagues in specialties without such relationships tended to know nothing of each other's performance. What knowledge of colleague performance physicians did gather from their referral relations was haphazard. There were two main sources of information. First were patient complaints, generally of rude or callous treatment. Then there were the instances, of course, when certain specialist physicians returned patients to referring physicians such that the quality of work was available, in some cases, for direct inspection and, in all others, for indirect inspection through the notes entered on the chart. The second source of knowledge was colleague gossip. When physicians began to have doubts about the practice standards of colleagues in the group to whom they referred patients, they could take those doubts and questions to other physicians within their specialty who were then able to confirm or deny them. Knowledge of poor performance thus built up slowly over time. Regular procedures or mechanisms for evaluating colleague performance and sharing the results of that evaluation did not exist.

Once knowledge of, and dissatisfaction with, poor performance had grown to the point that some threshold for action had been crossed, few options were open to physicians in the group. The most immediately available sanction Freidson labeled "the talking to." When affronted physicians confronted their colleagues, a "talking -to" occurred. On some occasions, when the confronted physician admitted a problem, revealed a hitherto unknown extenuating factor, or responded in a generally non-defensive manner, "talking-tos" cleared the air. A positive response was able to turn a tense situation into a positive one where one colleague's suspicions about another dissolved. On other occasions, when physicians responded angrily, brought counter-complaints to the physician who initiated a "talking to," or generally responded defensively, "talking-tos" increased bad feelings and distrust. When this occurred, referring physicians could make a formal complaint, a resort used so infrequently as to be non-existent, or they could engage in private boycotts. Private boycotts occurred when either individual physicians or physicians in a specialty group refused to refer to a colleague because they were dissatisfied with his or her performance with past referrals, his or her response to a "talking-to," or both.

On very rare occasions, attention to those whom Freidson calls "egregiously poor performers" was brought to the attention of central administration. Even so, dismissals were very rare events. The tenure regulations of the clinic stipulated that three-quarters of the entire clinic practice had to vote in favor of dismissal before it could occur. The very same factors that prevented colleagues from developing systematic knowledge of each other's performance inhibited votes favoring dismissal. This left central administration with few options in the face of repeated, and egregiously poor performance. Those rewards left to the discretion of administration could be withheld; it was hoped that the offending doctor would experience this withholding as a punishment. Office hours and the scheduling of procedures could be made burdensome. In general, all the tactics that enable an administration to send a message to those whose performance falls below standards were available. Of course, all those tactics for ignoring or neutralizing negative messages were likewise available to those

to whom messages were being sent. The goal of all this administrative message sending was to achieve a “face-saving” resignation. Such resignations were reciprocally face-saving: the group does not have to face up to its difficulty regulating colleague performance nor does the individual physician have to own his/her particular clinical deficiencies. In Freidson’s study, we can see that notions of error, mistake, and competence are, within the work group, conceived at the level of the individual and that there is a general reluctance to deal with these issues directly. Most social process prevented knowledge from being made public and openly acted upon. Instead, individual physicians gossiped with colleagues, vented their feelings to offending colleagues when they felt behavior warranted it, and organized private boycotts when all else failed.

Donald Light’s Psychiatry and Suicide: The Management of a Mistake. Both Hughes’ and Freidson’s work display how the social organization of work allows the medical profession bury mistakes from public view. In Donald Light’s description of the *post hoc* review of a putative error, while the patient was buried, the case, with its implication of preventable error, could not be hidden from public view. In medicine, some unexpectedly negative and publicly visible outcomes of care raise a strong, if refutable, presumption that serious error has occurred. Not only are these outcomes public and visible, so are the social accounting practices and collective rituals employed to rebut the more serious implications of fateful error. Light extends Hughes’s discussion of mistakes at work by looking at a negative outcome that is not so easily hidden from view, not so easily folded into the life of the group. He develops Freidson’s discussion of processes of social control by looking at processes of social control that do not occur in a private, backstage region but are instead self-consciously staged in front of the whole community. The error that Light examines is a suicide; he looks at it from the perspective of the treating physician (a resident) and the work group (the ward team and training program.)

Light’s account of suicide review sounds a number of important points for our understanding of mistakes at work. It recognizes suicide review as a workplace ritual that serves a number of group needs. First, the artful discussion of the case models professional standards at precisely the moment that the event being reviewed—the successful suicide of an inpatient judged well enough to be released on a weekend pass—might seem to make a mockery of claims to artful practice. Second, the faults of the individual therapist handling the case are pointed out in so gentle a way as to suggest that these misjudgments could (indeed would) have been made by anyone, that the errors involved were inevitable and unavoidable, and hence the error need not weigh too heavily on the head of the therapist or supervisor.¹⁰ And third, the lessons taken away from the review, in Light’s words, provide “a reaffirmation of how fine psychiatry is; for in its darkest hour, a clear lesson can be drawn by a model of the profession (the reviewer)” (Light 1972: 835).¹¹ Errors are inevitable and unfortunate, Light concludes, but they also serve as an occasion for reviewing behavior and correcting faulty practice. Unfortunately, the perforce *ad hoc* and episodic nature of suicide review prevents us from making broad generalizations from the lessons of any particular suicide. By the time of the next suicide review, the composition of the group will be so changed that its historical memory, which would have enabled connection with lessons drawn from the prior review, will be compromised.

Charles Bosk’s Forgive and Remember: Managing Medical Failure. This study concentrates on those dimensions of mistakes that can be generalized in the social accounting for error. Discussion of these dimensions is organized around three themes. The first is how a professional group draws a boundary around itself and determines its own identity through selection and rejection of recruits. The second is how superordinates (attending surgeons)

attempt to control performance, and how subordinates (residents) accept or evade such controls, in a professional training program. Of particular importance to our understanding is how norms of responsibility to patients and colleagues are articulated and how their violations are sanctioned. The third question is how a professional copes with the existential problem of the limits of his or her skill and knowledge. In the course of things, a surgeon's best efforts will sometimes fail and he or she must explain this failure to him or herself, his or her colleagues, and the family of his or her patient. I was interested to note how surgeons achieved accountability to each of these significant audiences and in which situations surgeons failed to achieve this accountability. These three issues taken together—membership in a professional group, social control of performance in that group, and shared patterns for the recognition, understanding, explanation, neutralization, and disciplining of error—are critical not only to our understanding of surgeons but indeed to the entire medical profession. To understand how the profession makes the distinction between unavoidable and culpable failure is tantamount to an analysis of the structure of the profession's conscience, its sense of right and wrong, and its sense of how large might be the gray area between them.¹²

An ethnographic study, *Forgive and Remember* examines how surgical residents learn to separate blameless errors from blameworthy mistakes in the course of their training. Errors appear blameless, by and large, if they are seen as a part of the normal learning process. Inexperienced residents are expected to make some technical or judgmental mistakes—recall Hughes' calculus of skill and experience. These errors are considered a normal consequence of providing opportunities to the unpracticed. Such difficulties have the following characteristics: the resident quickly recognizes the problem; the resident seeks appropriate help for it; the resident signals by his or her subsequent behavior that he or she has learned a valuable "lesson" from the entire incident; and the resident does not repeat that mistake within a rotation.¹³ These blameless errors, like Perrow's normal accidents which are built into systems of technology, are built into the system of training. These normal errors allow the attending physician and resident to take the role of teacher and student, respectively. Attending physicians say they "forgive and remember" the normal errors of their residents. They forgive because such errors are inevitable in a field like surgery. They remember just in case such errors are repeated, become part of a pattern, and thereby indicate that something in addition to the normal fallibility of a diligent and scrupulous resident is causing these errors.

If error that can be seen as part of the educational process is seen as both normal and blameless, then errors are blameworthy when the reading of events makes it difficult to sustain a claim that the resident acted in good faith. Errors are blameworthy when they involve normative breaches, that is, when they break universal rules about how a doctor acts. Also blameworthy are quasi-normative breaches or the failure to abide by an attending physician's cherished, but often unannounced, way of doing things. A source of great confusion to residents is the fact that attending physicians treat breaches of personal preferences as seriously as they do those of universal rules.¹⁴ Hence residents' views of egregious error are often at odds with those of attending physicians, especially when attending physicians equate their personal preferences with the natural or moral order. Difficulties coded as normative have the following characteristics: the resident failed to recognize problems sufficiently early or attempted to cover them up; the resident failed to seek appropriate help; the resident failed to improve his performance over successive trials; and the resident had the misfortune to repeat the same mistake on the same rotation. These errors are not seen as a normal part of the educational process but rather signal that a resident lacks the skills, or fails to honor the commitments, that surgery as a profession requires. When such mistakes occur, attending

physicians approach offending resident as wrathful and righteous judges eager to root out heresy. In the short run, residents guilty of these offenses are subject to public dressings-downs. They are forced to suffer the public humiliation of being caught in an attending physician's "affect storm." In the longer run, these residents are seen as beyond remedial help, they are often dismissed from programs. In the short and long run, the public punishments meted out by the attending faculty, function, as Durkheim (1938 [1895]) long ago suggested punishment works, as a general deterrence for the not yet corrupted, to reinforce the norms of the community, and to increase solidarity among those that share a commitment to the same rules.

One striking feature of the way that attending physicians categorize residents' errors into the blameless and blameworthy is how easily the process may turn into a self-fulfilling prophecy. A resident's good reputation exerts a protective or deviance-reducing effect while a bad one generates a destructive or deviance-amplifying effect (Wender 1968). If a resident is considered trustworthy, monitoring by attending physicians is decreased. Deficiencies are therefore less likely to be discovered. Conversely, if a resident is considered suspect, monitoring increases. Convinced that a resident's deficiencies are there for the finding, an attending physician is more likely to look for, and to find, evidence of sloppy work. When the attending physician finds these deficiencies, he or she increases surveillance, which again increases the probability of finding other mistakes. Clearly suspicion alone does not create residents who are judged unfit: after all, something creates the initial suspicion. Nonetheless, being suspect is for a resident a very vulnerable and demoralizing position. Being above suspicion provides a fair amount of protection, especially when adverse events need not be seen as the result of innocent error. Given these dynamics, it is not surprising that those who fall short when evaluated (or their attorneys) often characterize the process as arbitrary and capricious.

This sense of unfairness is symbolized for residents by what I call quasi-normative errors. These are breaches of the attending physician's personal preferences that are read as if they were absolute, universal rules. Residents who make such mistakes often find themselves locked into personality conflicts with attending physicians. Invariably, when these conflicts occur, residents are the losers. In the first instance, the seriousness with which these breaches of personal preferences are punished undermines the seriousness of the more universal norms attending physicians seek to reinforce when they react to normative error. The confusion introduced by treating personal preferences as if they *were* universal rules allows residents to confuse their profound and their trivial lapses, and to excuse too easily their serious ones. Second, this confusion is only made worse when the quasi-normative errors of residents are simply considered as the personal style or signature of the attending surgeon. To be sanctioned severely on one service for what is acceptable practice on another only reinforces the sense that the coding of mistakes and error is arbitrary and capricious.

Common Themes in the Study of Medical Error on the Shop floor

Each of the studies reviewed above has a different focus and emphasis.¹⁵ But, when assessed together, a number of themes emerge to which the current policy discussion seeking to reduce "preventable adverse effects" does not give sufficient weight. These themes include the uncertainty of medical action, the essentially contestable nature of error itself, and the medical profession's toleration of "normal errors." This assessment therefore underscores, for all that the IOM report is an attempt to encourage the medical profession to take more responsibility for its obligations to the larger society, just how difficult that task is.

The Inherent Uncertainty of Medical Action. A major theme in the sociology of medicine has been the inherent uncertainties of medical action (Bosk 1980, Davis 1961, Fox 1959). In the articles surveyed above, uncertainty impacts the professional control of error in two ways. First, it is unclear exactly how actions and outcomes are related. Diagnosis and treatment are both assessed in prospect and probabilistically: “There is an 80% chance that this is the problem;” or, “54% of patients that receive this treatment regime make a full recovery.” After implementation, thus in retrospect, diagnosis and treatment are viewed in absolute terms. Simply stated, after action is taken and results are known, uncertainty evaporates. The relation between action and outcome that was once so unclear now appears to be overdetermined.

Second, attempts to monitor, report, and reduce error need be sensitive of not only to the inherent uncertainty built into treatment algorithms, but also to how features of practice in this country magnify that inherent uncertainty. For a variety of reasons, some of which are linked to cultural values that celebrate the individual as well as honoring behavior that displays “instrumental activism,” while others are linked to structural features of the organization of health care such as an absence of global caps on spending or political ones such as an inability to ration health care in an explicit fashion, health care is often marked by a spirit of “aggressive intervention.” If nothing else, this commits physicians to risky procedures on the already compromised. When risky interventions are commonplace, adverse events, whether preventable or not, are predictable. As one of my subjects once told me, somewhat ruefully, “you can lead a long and happy life without deaths and complications, you just have to give up major surgery to do so.”

One way to reduce error simply involves less forward pressure on the clinical frontier. The standard objection to this is, I suppose, that “when we fail those cases on the clinical frontier, which have so little chance of success, we don’t count that as error or as a preventable adverse event.” No doubt this is so; however, it is a very individualized way to look at the issue. A systems approach recognizes that those desperately ill with multiple-systems problems are not only difficult cases in their own right but drain attention, a scarce resource, from those with more mundane problems. The heightened attention that goes to “interesting cases” may make life in the hospital riskier for those with prosaic problems.¹⁶ In any case, a system of care that is committed to risky interventions will inevitably produce some error as a result.

The Tolerance of Normal Error. Physicians and nurses have an artful appreciation of all the factors that can create negative outcomes in the face of what otherwise looked like flawless technical performance. For Hughes, the professional’s emphasis on theory and process rather than outcome is an expression of nothing so much as an appreciation of how unreliable outcomes are as a performance measure. For Freidson’s physicians, the fact that the patient who complains about your colleague today may complain about you tomorrow creates a reluctance on the part of physicians either to monitor too closely each the other’s performance or to judge each the other’s behavior too harshly. For Light’s psychiatrists, the suicide of an inpatient allowed a weekend pass is the type of unpredictable event that could happen to anyone. In my book, surgeons divide mistakes into the ordinary and the unforgivable. For the mistake of a physician to become unforgivable, moral failing needs to be added to technical or judgmental shortcomings.

What all these examples have in common is tolerance for the unexpected negative outcome and a set of beliefs about work that allow that outcome to be neutralized.¹⁷ The IOM report tries to reduce the comfort level of physicians with bad outcomes, to create a less tolerant atmosphere. One tactic for accomplishing this goal is to lodge the cause of mistakes

in systems rather than individual behavior. If this attempt is to succeed, occupational beliefs about individual physician responsibility will require some modification. Some forces, such as the third party oversight of physician performance, favor the development of professional attitudes consistent with a systems approach. However, medical specialties vary in the degree to which the individual efficacy of individual performers is considered a critical element. So, for example, surgery with its hierarchical organization and its task organization which views the individual surgeon as “the captain of the ship” may find the tenets of the system approach harder to adopt than other specialties.¹⁸ The irony here, of course, is the extent to which surgery is, in practice, a systems activity.¹⁹

Error as an Essentially Contested Concept. The IOM Report makes hinge a great deal of change and improvement on better reporting of adverse events and “near misses.” The theory behind this is simple and unarguable. With better knowledge of the system factors that lead to adverse events, better procedures and new technologies can be put in place to prevent these adverse events from occurring.

For such reporting to be effective, however, the participants in the current system have to be able to “see” the events that they need to report for system performance. What we have seen from the review of the workplace study of error, however, is that worker’s ability to do this should not be taken for granted. Errors are essentially contested. Everyone knows that errors are an untoward event whose occurrence need be minimized. What workers do not agree on as events unfold is what happened and why. They do not agree on whether a specific event was an error. The more neutral language of adverse event helps some. But, even here, to be reported, an event needs to be perceived and whether such “seeing” occurs in the current system is an open question.

Conclusions: Toward a Culture of Safety.

The IOM report, *To Err is Human*, documents the need for, and proposes steps toward, a culture of safety in medicine. The report proposes a number of ways to bring this about: by reducing the tolerance for and the incidence of “normal error” in medicine, by creating generative organizational structures that “learn” from past mistakes and prevent their recurrence through better reporting, and by attempting to remove the defensive reactions of individual practitioners to error identification and correction.

There are in place a number of readily apparent barriers to IOM’s attainment of its goal of cutting in half the number of preventable adverse events in five years. I will discuss only three of the most important here. The first is the professional dominance of physicians within the organization of care : although the clinical autonomy of physicians is not what it once was, although third party payers, patients, and nurses all feel freer to question physician decisions than previously, nevertheless, the tradition of decentralized decision-making and teamwork that marks highly reliable organizations is relatively underdeveloped within medicine. The second is that the cost of redundant or new monitoring systems may, in an era of cost containment, discourage the necessary steps to curtail preventable adverse events. In the long run, little doubt exists that error reduction is cost efficient. However, the question remains: What incentives exist for managers in an increasingly competitive system to incur these costs in the short-run? While preventing adverse events is a sentiment on which all agree, how much we are willing to invest in error reduction remains an open question. Finally, errors are inevitable in a system committed to aggressive interventions. Care needs to be taken that more is not promised than can be delivered. A policy preoccupation with “error” runs risks, in terms of public trust and support, that need to be attended to more

carefully than they have to date. Somehow, reasonable expectations of performance need to be communicated to the public-at-large.

There is, as well, a more covert barrier to the IOM goal of error reduction: namely, the IOM definition of error is not well articulated with one used by workers. The IOM report tries to import an engineering culture—characterized by standardized procedures, uniform raw materials, and stable technologies—and its definition of error onto the shop floor of medicine. The professional culture of medicine celebrates individual clinical judgment, the uniqueness of each patient, and an ever-changing array of diagnostic and therapeutic intervention. The dynamic quality of diagnosis and treatment within medicine may be a source of error. In the airline industry, accidents and errors are highest when new technologies are introduced; they tend to drop dramatically when experience in operating the new machinery is gained. In medicine, new machinery, pharmaceuticals, and procedures are introduced at such dizzying rates, that those on the shop floor of the hospital may never experience the familiarity with the equipment, the routines for operating it safely, and the limits to safe operation that characterizes the introduction of new technology in other domains.

Another key sticking point is how, precisely, error is defined in an engineering culture as opposed to the professional culture of medicine. The IOM report notwithstanding, in medicine, what is and is not an error, how errors occur, who is culpable, and what needs to be done to prevent their occurrence are never simply matters of finding a definition, ever more rigorous and objective, of a discrete empirical event, something capable of being captured by an ever more sophisticated outcome measure. Rather, culpable error and its control are a matter of occupational morals, of situations defined this way rather than that, of administrative classifications that determine how causality works in this instance, and of implicit social rules that make it clear to all but the most obtuse when further questions are not welcome. The social constructedness of error matters, in fact very fatefully, for system participants. Ignoring this dimension of error runs the risk of designing policies to prevent error that make perfect sense to administrators and regulators but appear wrong-headed, foolish, self-defeating, or burdensome to workers at the “sharp end.” When this occurs, workers are just as likely to evade new rules and procedures as follow them.²⁰ The hidden danger of the IOM Report is that, by ignoring the shop floor culture of medicine, it has solved the problem of error before it has defined that problem.

Nonetheless, the IOM Report has, as we said, performed an important public service. Like all first steps, it is incomplete and open to criticism. But the benefits of a culture of safety can hardly be overstated. First, a culture of safety promises a more genuine partnership among all stakeholders—patients, providers, and third-party payers. Such a partnership can lead to more realistic goal-setting for health care policy in general. Next, a culture of safety promises to be more efficient—higher quality care at ultimately less cost. Another dimension to this efficiency is likely to be a less adversarial system with less confrontation among participants. Finally, a culture of safety ultimately provides to workers a less stressful work environment. This leads to fewer problems with burnout, turnover, and impairment among health care workers. Less stressed workers, in turn, are better able to care for patients.

This paper does not wish to argue with the goals of a culture of safety nor, for that matter, to quarrel with the idea that a systems approach to adverse medical events yields greater dividends than a focus on individual actors. Rather, it has focused on the complexity of the system that provides medical care. In so doing, it has emphasized the extent to which the culture of the workplace needs to be taken into account if we are to develop realistic policies of error prevention that match the goals of administrators and policy makers at the “blunt end” with the needs of workers at the “sharp end.”

ENDNOTES

- 1 Students of how public problems make their way into the various arenas in which problems are debated and solutions are proposed have commented that one successful strategy involves a combination of vivid, personalized accounts that make sensible the nature of the problem and of authoritative statistics that document its extent (Gusfield 1981, Hilgartner and Bosk 1988, Best 1990). Some critics of the IOM report have suggested that this rhetorical strategy has, in this case, worked all too well. The critique suggests: (1) for a variety of technical reasons, many of which are related to the absence of “controls,” the IOM report relies on studies that “over-count” the number of preventable adverse events” (McDonald, Weiner, and Hsui 2001); and (2) the inference that preventable adverse events are “errors” can not reasonably be drawn from the data (Brennan 2000). The debate is not an entirely academic one. If the IOM report exaggerates the dangers that medical care currently presents to safety, then the resources diverted to improve safety potentially make a more significant contribution to the health of the public if used in alternative ways. This debate is not likely to be resolved anytime soon since it depends more on cultural and political judgments—for example: “this is a serious problem,” and “this is a preventable error”—than it does on measurement of phenomena about whose definition and significance there is a broad consensus.
- 2 For a review of the historical and philosophic foundations of a systems approach to medical harms, as well as a comprehensive review of the empirical literature on medical error utilizing such an approach, see Sharpe and Faden 1998.
- 3 Students of the aftermath of accidents in a variety of domains—airlines, shipping, chemical plants etc.—have noted that post-accident reviews explain action going awry, 60 to 85% of the time, as a consequence of operator error or simple human fallibility. There are a number of reasons why this is so. Once accidents have occurred, reasoning backward from the point of disaster, the folly of what might have at the time been reasonable judgments is obvious. In such circumstances, hindsight bias is difficult to control (Cook and Woods 1994, Lipshitz 1989, Caplan et al. 1991). Second, for almost all accidents, there is at the end of the causal chain some operator of whom some analyst can now say “if only, if only.” Third, in many accident reviews, operators are no longer around to defend their actions. Fourth, “operator error” as the resting point of an investigation spares upper levels of management and administration for faulty training, poor equipment, conflicting directives, or untoward production pressures. A great contribution of the IOM report is its attempt to decenter the explanation of error in medicine, to move the focus from individual operators to the system in which care is embedded. However, it is surely a weakness of the report not to explore why American culture, generally, and certain sectors of American medical culture, more particularly, find explanations of individual operator error so compelling. Beyond that, the report does not explore the very real possibility that however compelling system level explanations may be intellectually that there is both at the level of individual psychology and of cultural/political sense-

making a need to identify, blame, and punish those responsible for errors that bring harm to others.

- 4 Normal accident theory emphasizes tight coupling and interactive complexity. Perrow, at times, seems to despair of any reliable control of dangerous and dangerously complex technologies. He seems to suggest that the best we can do is to decide which technologies and risks to embrace and which to abandon. Perrow's pessimism about the safe use of inherently risky technologies is countered by theorists of high reliability organizations who examine risky technological undertakings and ask what organizational features allow them to move forward with so few incidents (Weick 1987, Weick and Roberts 1993, Roberts 1990, Rochlin, Roberts, and LaPorte 1987). Sagan (1993) has assessed which of the two theories better explain the operation of our nuclear weapons systems. Snook (2000) has demonstrated how it is that normal accidents are a feature of high-reliability organizations. For all their emphasis on sophisticated technology, interactive complexity, and tight coupling, there is still a sense in which accounts of normal accidents have an ancient, folkloric character: "for want of a nail. . . for want of a horse. . . a kingdom was lost."
- 5 Latent defects are those that have either not yet been noticed, or been noticed and ignored, because they have not yet produced serious consequences. A feature of accident reviews is that we are often shocked to find that the dangerous conditions that led to some highly public catastrophe had been operating unheeded for some considerable length of time (Vaughn 1996). The IOM report is a document marked both by a certain gloominess—"preventable adverse events are now the eighth leading cause of death"—and a certain relentless optimism—"however, if we adopt the policies advocated herein we can reduce the number of preventable adverse events by half." This optimism is made possible by ignoring that part of normal accident theory that discusses the limits of system design as a strategy of incident reduction. Perrow and others have cautioned that we cannot prevent normal accidents by simply building more elaborate warning and back up safety systems. These systems add to the complexity and tight coupling of the organization of the original enterprise. They became as likely to malfunction as any other part of the system. Safety devices then multiply the possibilities for normal accidents. Any reduction in the probability of error is more than offset by the new component with its own unique possibilities for failing and then sending mistaken signals to other components of the system, creating in their wake troubles that system designers never imagined. As Cook and Woods (1994) remind us trying to design safety into systems through procedures or more complex technologies is as likely to produce system that are brittle with unforeseen vulnerabilities as it is to produce safety. Moreover, we are likely to remain unaware of this new defect—the added system brittleness or vulnerability—since accidents of just the type we have now taken steps to prevent recurring are, by definition, rare events. So, in addition, to not measurably improving safety, we have also created a sense of false confidence, efficacy, and control.
- 6 The term "shop floor" is more than a rhetorical conceit. My intentions in using it are two. First, I want to draw the reader's attention to the fact that some of the earliest studies of error in work groups featured industrial settings: production crews in the aircraft industry (Bensman and Gerver 1963), workers in a machine shop (Roy 1952 and 1960) or managers in an industrial plant (Dalton 1959). Next, I want to remind the

reader that interns, residents, and nurses are very much front-line workers in a production process, subject to ever greater and greater production pressures.

- 7 In his classic study of the social organization of dying, *Passing On*, David Sudnow (1967) provides an interesting operational measure of worker experience and work routines. Sudnow says that inexperienced workers track closely how many times they have seen or done events of type 'x.' When asked, inexperienced workers can give a precise ordinal measure of their experience ("three others"). Experienced workers, on the other hand, when asked them same question have lost track ("so many, I can't count them all"). Routine tasks involve, for experienced workers, situations so familiar that each new trial is no longer marked cognitively unless things go awry. In general, experience inhibits error. However, when new problems present with old cues, experience can create "garden-path" blunders and inhibit fresh thinking. For an interesting discussion of how experienced workers, such as fire fighter crew chiefs, size up problems, see Klein (1998).
- 8 Here Hughes could have gone further with his calculus. There is a calculus of experience and status that determines how vulnerable one is when action goes awry to accusations of having erred. Residents, as we shall see later, are quite vulnerable; attending physicians, less so. One thing that nurses fear is that, even with a systems approach, the burdens of increased attention to patient safety will fall most heavily upon them and that they will continue to be more vulnerable to disciplining and sanctions when actions go awry than physicians, the current nursing shortage notwithstanding.
- 9 For all the discussion of system error and patient safety, there appear to be some features of the current organization of the health care system that are under-discussed. First, shorter lengths of stay assuming constant personnel means that the same number of workers treating more acutely ill patients have much more work to do than they would if lengths of stay were longer and, on the average, patients were less sick. Second, the number of workers has not stayed constant. There have been sharp cutbacks in nursing and floor personnel in hospitals. The stress from these working conditions, as well as the demoralization of working in an "insecure" environment can add to mistakes and errors at an individual level; instability in teams can lead to error at a group level. At a minimum, we need to recognize that the only safe system is a properly staffed one (Aiken et al.). We need to recognize as well that adding additional administrative reporting requirements to an over-burdened system may not pay immediate dividends in terms of safety. To all this there is one caveat: some safety experts (see Snook 2000 for a fuller discussion) have suggested that slightly under-staffed systems are safer than over-staffed ones. Over-staffed or redundant systems diffuse responsibility too thinly while under-staffed ones promote greater levels of vigilance. The key word here, of course, is slightly. Administratively, the distinction between slightly under-staffed hence optimally performing versus badly under-staffed hence incapable of performing is a fine one.
- 10 This aspect of the discussion of the suicide is particularly interesting in light of the contemporary debate of system vs. individual error. Light notes that a major goal of the discussion is to have the individual therapist feel less responsible for the suicide. For the therapist, to feel too great a burden for the patient's action is tantamount to having the therapist engage too freely in "rescue" fantasies or "inappropriate" feelings of omni-

potence. Part of the goal of suicide review, according to Light, is to teach the resident psychiatrists which outcomes they are responsible for, and which outcomes they are not. One criticism of a systems approach for the reduction of errors in medicine is that it will somehow undercut individual feelings of responsibility and the sense of professionalism that goes along with these feelings. The counter argument to this line of thought, that “systems” thinking undercuts an individual’s feelings of responsibility for safety, is found in theorists of high reliability organizations. These authors find that so long as workers are socialized into a “culture of reliability,” systems perspectives are compatible with and reinforcing of individual conceptions of responsibility (Roberts 1990, Weick 1987, Weick and Roberts 1993).

- 11 There is a second lesson to be drawn as well: namely that what Hughes identifies in a marvelously evocative metaphor as “the rough edge of practice,” that place where lay and professional expectations and evaluations fail to line up, is always with us. Lay clients, says Hughes, are pragmatists who focus on results while professionals are theorists who focus on process. Nowhere is this more obvious than in the case where the professional extracts valuable lessons from the tragic event of suicide. From this point of view, the surgeon’s self-mocking adage, “the operation was a success but the patient died” is a rueful commentary on the gulf between lay and professional perspectives. One important implication, that hardly needs to be stated, is that professionals are much more aware, tolerant, and forgiving of normal error than lay clients. One goal of the IOM report appears to be to get the medical profession to be less accepting of performance that fails to meet expectations, to search harder for reasons to explain the gap between expectations and actions, and to implement changes that will bridge the gaps. Debate here cannot possibly be about the goals of policy but rather only about its likely efficacy.
- 12 One finding of *Forgive and Remember* anticipated the current debate about the need for a more developed “systems” approach to error. The text concentrates on how young surgeons, during their training, internalize a powerful sense of individual responsibility for their patients. At the same time, the text notes that there is a relative dearth of “role-learning” about the collective responsibilities of surgeons as a group for the welfare of the entire class of patients. I label this pattern a “hypertrophy” of individual conscience and an “atrophy” of collective or social conscience, and conclude with some admittedly vague recommendations about the need for greater corporate responsibility and the inevitable limitations of placing both too much responsibility and too much blame on individuals. I end my discussion of recommendations for improvement by calling, albeit somewhat unknowingly, for a “systems” approach to controlling error.
- 13 Training in postgraduate medical education is organized by “rotations.” Residents spend time on a service working under, and learning from, specific clinical faculty for a specified period of time. They then rotate into the next service.
- 14 From the attending point of view, not following the attending surgeon’s preference does breach a universal rule about the proper delegation of authority—it is rank insubordination. Of course, things look different to the resident who may have acted innocently unaware of the preference. One fact that *Forgive and Remember* probably does not underscore strongly enough is that this arbitrary feature of authority is important to its

constitution as authority. If authority were always rational, if its dictates always compelled us to do that which our reason compelled, then authority would not have much force. The ability of those in authority to compel us to act in ways other than those that we would choose for ourselves make the operation of authority powerful and somewhat mysterious.

- 15 Beyond the differences among the studies reviewed above, there is the issue of the selectivity of the review itself. I have confined myself to four central pieces of research each of which takes error and its control as an explicit focus. A fuller picture of the shop floor is possible. In this fuller picture, some of the themes related to error would even be more heavily underscored. For example, in an interesting pair of papers Burkett and Knafl (1976, and Knafl and Burkett 1976) discuss how residents learn during training to develop their own "personal style." Stelling and Bucher (1972) discuss how resident autonomy is related to patterns of monitoring and surveillance by attending faculty. The norms for monitoring, as well as the appreciation of, or at least the tolerance of, "style" are two issues related to what is perceived as an error and when such judgments are appropriate professionally.
- 16 The residents who were subjects for *Forgive and Remember* used to say that the best and worst thing that could happen to a patient was to be an "interesting case." It was the best thing because, undoubtedly, a lot of attention would be given to the patient whose care would have all the benefit of "fresh thinking." It was the worst thing because all this attention and fresh thinking was likely to be futile. To be "interesting" meant to have a condition that was thought to be not treatable.
- 17 The tolerance of medical workers for their errors is not different from the tolerance of any organized group of its shortcomings. WJ Goode (1967) has argued that all organized social groups have mechanisms to "protect the inept." Goode discusses the functional significance of these mechanisms. Most strikingly, all groups, says Goode, need the inept. For, without them, the floor for acceptable performance would be raised uncomfortably high for the mediocre. What is true at a group level is true as well at an individual level. Think how much more tolerant we are of our own lapses, slips, and social clumsiness than we are of that same behavior in others.
- 18 Safety theorists have long noted that the "captain of the ship doctrine" does not promote safety in the maritime domain or any other field in which it is held. Specifically, the captain of the ship doctrine is said to impede communication, especially about obvious dangers, remove any effective sense that safety is the entire crew's responsibility, and prevent the decentralized responsibility and deployment of expertise that the theorists of highly reliable organizations claim is the key to successful performance.
- 19 One specialty that has led the way in researching and advocating a systems approach to error is anesthesia. There are many reasons why this might be so. First, anesthesiologists function as part of an operating team but are not in charge of that team the way that surgeons are. This may encourage thinking about the system they work in. Second, even when they are in charge, i.e., in the critical care units, the organization of care perforce involves many different specialties: critical care medicine requires careful coordination of a team. Third, the unconscious patient of surgery permits thinking about stan-

standardized operations of the kind that safety experts focus on more than do other, more-typical patients and problems. Fourth, when anaesthesiological adverse events occur, they are devastating. In the operating room surgeons are not likely to display the tolerance for normal error that we claimed earlier is a common feature of medical culture.

- 20 If workers are truly intent on showing an administration how counter-productive new rules and procedures are, they can “work to the rule,” which generally frustrates any work getting done at all (Hirschhorn 1993).

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