Insights Into Successful Change Management: Empirically Supported Techniques for Improving Medical Practice Patterns

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This article identifies empirically supported techniques for improving medical practice patterns by relying on both Comparison's professional change management experience and a thorough review of the literature relating to the essential characteristics of successful change management programs in health care. The purpose of this article is to provide health care professionals with an overview of the various change management techniques that have been widely regarded as having the greatest impact on the clinical and financial success of improvement programs before health care professionals initiate change management activities within their own organization.

Key Words: Administrative policies, change management, feedback, outcomes, participation, statistical process control.

Without adapting to change, organizations like civilizations fail to prosper. Few industries have experienced more intense change than the health care industry. In recent decades, hospitals and physicians have experienced fundamental shifts in reimbursement methods, treatment protocols, delivery settings, and medical technology. The combined effects of these shifts have placed hospitals and physicians at greater financial risk at a time when health care quality reporting and consumerism are rapidly gaining momentum. Unless health care professionals are able to embrace change management techniques for improving the efficiency and effectiveness of medical care, dwindling margins will continue to undermine their mission to provide quality health care services to the communities they serve. The purpose of this article is to provide health care professionals with empirically supported techniques for creating and sustaining superior clinical and financial performance through the appropriate management of medical practice patterns.

The first, and perhaps simplest, step toward improving medical practice patterns is the generation and evaluation of severity and risk-adjusted profiles of the cost and quality of care across the organization's medical staff. What is more difficult to understand is which change management techniques should be incorporated into process improvement initiatives to promote improvement in both the cost and the quality of care. Although the primary focus is often on physicians because they are the primary caregivers responsible for an estimated 80–90% of resource allocation decisions (1) and are readily profiled using UB-92 data, the reality is that change management principles should be applied to other important participants in the care process. These participants should include nurses, case managers, laboratory technicians, radiological technicians, and pharmacists. A successful change management program will include representation and participation from each of these clinical areas (2).

Although evidence suggests that the transmission
and monitoring of performance information may improve provider behavior (known as the "Hawthorne effect"), feedback is most successful when it is offered face to face by a respected health care professional, when it is individualized for each physician (eg, an individualized, severity adjusted profile of each physician's outcomes performance by diagnostic-related grouping (DRG) compared with the performance of peers and industry benchmarks), and when it represents current, or at least recent, data (ie, quarterly or semiannually). The 6 general ways in which medical practice patterns are typically altered include medical education, feedback, participation, administrative policies, financial incentives, and penalties (3). Our experience would suggest using a combination of recurring feedback, participation across caregivers, and specific administrative policies. Medical education is usually beyond the process improvement team’s sphere of influence, and reviews of continuing medical education delivery methods have concluded that they have little impact on improving medical practice (4). Additionally, inducements, such as financial incentives, have generally not been successful in changing utilization habits except when they have been designed to increase productivity, not reduce costs (5). Penalties, on the other hand, clearly increase the risk of alienating physicians and other caregivers who might otherwise comply with a more collaborative process improvement initiative.

FEEDBACK

The use of feedback to alter medical practice patterns has been described as an application of "cybernetic control." According to cybernetic theory, the primary means of achieving control over the performance of any system is through feedback (6). By providing feedback, the system can be made to regulate itself. Many of the successful programs using feedback to improve physicians’ practices have suggested that this approach can improve the quality of care as well as reduce its cost.

The first issue to address in developing a successful change management program is the proper use of feedback. As seen in Figure 1, historical studies show that computerized pharmacy feedback increased the use of generic medications from 21% to 58%, which was a significant increase compared with that of the control group (7). Feedback should not be confused with the use or dissemination of information. For instance, research shows that the distribution of explicit printed guidelines for the management of services is usually not effective. This approach has been shown to be generally unsuccessful for decreasing the utilization of diagnostic tests, medications, and other services such as blood transfusions (8, 9). Moreover, research at Cedars-Sinai Medical Center indicated that practice guidelines should be evaluated, whenever possible, in prospective trials before they are disseminated for widespread use (10). On the other hand, research indicates that clinically validated guidelines can influence physician practices when they are provided to physicians in a timely manner and cross-tabulated to include patient histories, results of previous diagnostic tests, a problem list, and a list of the known diseases being treated (11). Note that when the information is communicated by mail, it is typically less successful than when it is communicated personally by respected health care professionals or influential physicians (12). However, there is evidence that in an organization with well-organized and well-integrated quality management, discharge planning, and social work departments under a single director, mailing of physician profiles can still positively affect physician utilization habits. This finding is important because significant reductions in lengths of stay were achieved without the use of economic credentialing (13).

The literature on persuasive communication identifies 5 characteristics of successful feedback: its source, the channel or medium of presentation, the attributes of the audience, the message itself, and the setting (14). Again, recommendations are accepted most readily when they are delivered personally by a respected source. This suggests that the most potent legitimizing force for influencing medical practice is professional, face-to-face contact. An effort to use this principle found that face-to-face communication with physicians by trained pharmacists led to decreased use of 3 types of medications: cerebral vasodilators, oral cephalosporins, and propoxyphene (15). In another case, personal visits by pharmacists were more successful than letters.
in changing physicians’ prescribing habits, but meetings with another physician were even more successful than were those with pharmacists. Although pharmacists were not as successful in changing prescribing patterns as were physicians, their professionalism and knowledge were important in accomplishing the significant effect they had. In one study that used doctoral-level pharmacists for educating family practitioners on the increased use of nonsteroidal anti-inflammatory medications for inflammation signs, statistically significant differences ($P < .05$) were observed between the one-to-one interventions and the group interventions. Furthermore, the effectiveness of the one-to-one interventions was shown to increase even more when the education was presented together with written material (6). It should be noted that in managing the use of prescription medications, physicians are more amenable to efforts to improve the quality of their prescribing to reduce side effects and optimize medication efficacy than they are when cost containment is the primary goal (6). Consequently, as with any process improvement activity, cost reduction strategies should always strive to reach appropriate types and levels of utilization so that the quality of patient care is actually maintained or improved. Furthermore, physicians are more likely to adopt change when clinical evidence supports a simple change in practice patterns, such as a reduction in the prescription of the antibiotic chloramphenicol, for which preferable alternatives usually exist (16).

The provision of quarterly peer comparison feedback for a specific clinical area also has been found to be a key aspect in improving and maintaining medical performance. In one study, interventions were compared, and it was found that when regular feedback included individual physicians’ performances ranked with those of their peers, significant improvement occurred when compared with educational meetings of the medical staff or impersonal retrospective feedback of group compliance rates (17, 18). Provider-profiling efforts that have proven to be unsuccessful seem to share the same characteristic: they all provided feedback in an impersonal manner without soliciting the active participation of clinical leadership in personally delivering individualized peer comparison feedback (19–22).

Last, the use of computerized feedback using timely administrative profiling data has been shown to be more cost-effective than labor-intensive chart reviews. One chart review program concluded that the declines in ordering of selected services were not sufficient to suggest a significant impact. Out of an average laboratory bill of US$3,000, the program was responsible for saving US$65 per patient, whereas the intensity of the intervention cost US$62 per patient (82% of which was labor cost), essentially nullifying the savings (23).

It is further suspected that electronic access to external line-item comparative detail (e.g., laboratory tests, prescriptions) may generate similar results because most of the transactional data must be mapped to a uniform unit of measure and nomenclature before accurate comparisons can be made across external norms and benchmarks. Another inherent limitation of using transactional-level detail for external comparisons is that by the time the data are generated and uniformly mapped (normally during a 12- to 18-month period), they no longer reflect prevailing practice patterns. Feedback that is no longer current not only frustrates medical practitioners but often misdirects process improvement activities. In general, the more detailed the feedback the more timely the information should be.

In summary, when feedback is used to improve medical practice patterns, it is most likely to be effective if the data are individualized, if doctors are compared with their peers, and if the information is delivered personally by a respected person in a position of clinical leadership. Feedback is most likely to be successful when it is frequent, current, and focused on a single clinical problem.

PARTICIPATION

Efforts to change physicians’ behavior have often been imposed by third parties who are insensitive to physicians’ personal and professional concerns, even though change management theory (23) indicates that physicians will oppose changes that threaten their livelihood, sense of competence, autonomy, and delivery of quality patient care. Hence, techniques that reduce physicians’ income, challenge their professional judgments, decrease their decision-making authority, or appear to compromise patient care are likely to fail. It is especially important that physicians understand the proposed changes in care delivery to be beneficial (or at least not harmful) to patients (24).

One way to involve physicians in changing their own practices is to include them in setting objective standards (industry and peer norms) and benchmarks (reproducible best practices) against which their practices can be judged. Change management programs that have taken this participative approach have achieved significant reductions in lengths of stay and emergency room wait times as well as lower rates of historical admission cost increases (25). One health care organization used group decision making to develop a new policy for preventive care, which included the use of
screening tests that resulted in more than US$150,000 in cost savings. There was a fivefold decrease in "non-indicated" chest radiology (from 29.8% to 6%) and a reduction in the use of multichannel chemistry tests for routine office examinations from 36% to 15% (26). Physicians involved in group decision making also reported higher satisfaction with their work (27).

Another common way to involve physicians in the change management process is by applying statistical process control (SPC) techniques that incorporate a multidisciplinary, systems-oriented approach to change management. SPC techniques, pioneered by independent researchers such as Deming (28), Juran (29), and Shewhart (30) and implemented by health care practitioners such as Batalden (31) and Berwick (32), all incorporate similar statistical principles for identifying and managing "special-cause" or "unintended" variation. These techniques are commonly referred to as total quality management (TQM), continuous quality improvement (CQI), industrial quality management science, and statistical quality control.

The general philosophy of SPC is embodied in the use of control charts as displayed in Figure 2, where the vertical axis measures readmission rates and the horizontal axis measures performance across time. The solid line represents the mean of observed readmission rates. The dashed lines represent the upper and lower control limits, which are normally set at 2 or 3 standard deviations (SDs) above and below the mean. The control limits indicate the amount of variation that is expected for the readmission rates to be considered "under control" or "stable." The use of a control chart allows rapid and accurate analysis of whether the variation in readmission rates is assignable due to special-cause variation (outside the upper or lower control limits) or unassignable due to random or "common-cause" variation (within the upper and lower control limits).

The narrower the control limits (eg, 2 SDs) the more predisposed the analysis will be to type I errors, where a process may be identified as statistically unstable when it is not. The wider the control limits (eg, 3 SDs) the more prone the analysis will be to type II errors, where a process may be identified as statistically stable when it is not. In this example, the control limits have been set to 2 SDs, which means that the confidence interval (CI) is set at 95%. A 95% CI indicates that there is a 5% chance that readmission rates outside the upper or lower control limits could be due to random variation (in this case, rates for September 2000 and July 2001). This is the same as saying that there is a 95% probability that the variation in readmissions is due to special causes. The value of a control chart is not in the novelty of the statistical principles underlying it but in the ease and reliability with which it converts data into actionable information and conveys it effectively to end users (33).

Evidence of the rapid spread of SPC as a technique to manage and monitor performance in health care is plentiful. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has adopted CQI principles for monitoring of health care institutions participating in its ORYX core measurement project. A national survey by Hospitals magazine estimates that 3100 US hospitals with more than 50 beds now use some level of CQI in their quality management programs (34). The use of CQI for improving medical practice patterns is important, and naturally appealing to physicians, because the purpose of CQI is to focus on improving the system to improve the quality of patient care (not merely to control organizational costs). In fact, one suspects that experienced physicians use the equivalent of a control chart when they mentally pose the question: Is this blood pressure (or weight, or prothrombin level, serum glucose, or peak flow rate) significantly different from previous measures? Do I need to do something about this value? The answer is usually inferred from a quick review of historical records (35). Another reason why physicians generally find CQI appealing is that there is no presumption that physicians' practices are the primary or sole cause of poor outcomes of care. Instead, the focus of Deming's TQM research (36) revealed that poor outcomes are normally a result of various failures across a multifactorial process or system rather than due to a single cause. Nonetheless, poor medical outcomes are frequently blamed on physicians or managers, when in reality the primary cause is often the result of a faulty clinical process. Consequently, a multidisciplinary, systems-oriented approach to change management is appropriate and should concentrate on the clinical sys-
tem and its various process components such as the interaction between
- Physicians-pharmacy-microbiology;
- Dietary-nursing-physicians;
- Nursing-physical therapy-orthopedic surgery;
- Social services-physicians-outpatient services.

One type of multidisciplinary, systems-oriented change management technique that uniquely integrates SPC methods for improving quality and reducing variation with Lean management principles for minimizing complexity and eliminating waste is a breakthrough approach known as Lean Six Sigma. Lean Six Sigma holds great promise for optimizing the delivery of health services because it maximizes stakeholder value by achieving the fastest rate of improvement in customer satisfaction, cost, quality, process speed, and invested capital. Stanford Hospital and Clinics have successfully completed implementation of Lean Six Sigma in cardiology and cardiac surgery by using a multidisciplinary cardiac care team that included the chair of the surgery group (referred to as a physician champion). Also included were nurse managers from the units that cared for the cardiac surgery patients, the operating room manager for cardiothoracic surgery, a clinical nurse specialist representing units that handled cardiac patients, and a pharmacist, a respiratory therapist, and a physical therapist who cared for those patients, as well as social workers and case managers. The team was co-led by a physician and the vice president of program and service line development. Stanford’s team achieved the following results:
- Reduction in material cost of US$25 million;
- Cardiac surgery cost savings of US$1.8 million on average per year;
- Cardiology cost savings of US$4.4 million;
- 48% reduction in coronary bypass graft surgery (CABG) mortality rate (from 7.1% to 3.7%);
- CABG cost savings of US$16,000 per case (from US$40,000 to US$24,000) (37, 38).

Clinical pathways are another type of change management initiative that incorporates a multidisciplinary, systems-oriented approach by organizing the integration and implementation of various processes and clinical actions to achieve desirable clinical, financial, and functional outcomes for specific diagnoses or procedures. For instance, a clinical pathway for the treatment of congestive heart failure (CHF) is a well-established plan organizing and integrating different multidisciplinary processes necessary for CHF care; nursing service for monitoring and ambulation; pharmacy for diuretic, ACE-inhibitor, and beta-blocker utilization; respiratory care for oxygen use and subsequent discontinuation; and nutritional services for low-salt diets and nutritional education to improve outpatient compliance (39). Singularly, these individual services do not meet the total needs of CHF patients, but organized into an integrated system, these services produce favorable clinical outcomes. Although clinical pathways are one of the most comprehensive types of change management programs, they also can be one of the most complex and may not be suitable for all hospital settings. Consequently, change management programs such as clinical pathways, clinical benchmarking, TQM/CQI, and Lean Six Sigma need to be matched for appropriateness with an organization’s specific resources and circumstances (40).

Overall, an approach that includes system-oriented participation has a greater potential for success because it:
- Diffuses the tension between medical staff and hospital managers;
- Interrupts the cyclical argument of blame;
- Directs attention to the clinical system of specific patient groups;
- Underscores a multidisciplinary team-oriented method that integrates administrative staff, medical staff, ancillary department heads, nurse coordinators/case managers, and social services;
- Distributes responsibility to all participants involved in the care process.

In fact, in an ongoing study in upstate New York, a randomized controlled trial is being conducted on the effects of a collaborative quality improvement program on practice patterns and patient outcomes for CHF. Preliminary results from the study indicate that even in community hospitals that have no extensive experience in clinical investigation, collaboration among caregivers in designing and implementing a change management program resulted in a much greater understanding of the process of care and determinants of outcome for patients with CHF than did those programs that did not include the participation of all caregivers (41).

So how do hospital managers and medical staff begin to establish a successful, collaborative change management program?

The first step requires the development of mutual goals and objectives to channel differences between hospital managers and physicians into a commitment to a systems-oriented change management program. This commitment benefits from endorsement by the Board of Directors (or Trustees) and necessitates that the goals and objectives of the change management program become incorporated as a mission of the hospital. The development of this mission statement
should involve providers from all departments and functional areas of the hospital.

Second, physicians will respond constructively to modification in their ordering and prescribing habits if they derive a clinical benefit. These clinical benefits should be end products of the change management program’s goals and objectives and should result in a reduction in laboratory, radiology, and pharmacy response times, and improvement in discharge planning and prehospital and posthospital services. If a system improves these important processes, then physicians feel supported, they make decisions more quickly, and they readily participate in the change management process.

Third, clinical and financial outcomes data must be clinically adjusted for differences in patient severity, intensity, complexity, and risk so that useful provider-profiling information can be shared with members of the medical staff. The information must be reliable, credible, and presented in a clear, concise format. The goal of information sharing is to establish a foundation of understanding from which physicians and managers can identify achievable standards and benchmarks for performance monitoring. To assess the effectiveness of a change management program, severity and risk-adjusted outcomes (or the end products) from the system need to be measured and compared with achievable standards and benchmarks. Outcomes may be categorized as:

- Functional (those that improve physical capabilities);
- Financial (those that result in cost savings through reductions in length of stay and ancillary utilization);
- Clinical (those that address improvement in the quality of patient care, such as lower rates of complications, readmissions, and mortality).

Outcomes analysis plays an important role in change management programs because outcomes reveal whether or not the system is generating the desired results. If outcomes are approaching or achieving benchmark performance, then the system is integrated and working well; if outcomes are falling significantly short of standards or benchmarks, then the systems need to be reevaluated and redeveloped. Quantified results derived from the successful use of provider-profiling tools are numerous. As shown in Figures 3 and 4, a tertiary-care referral center located in the “Stroke Belt,” a southeast section of the United States with the highest stroke-related deaths, achieved statistically significant \( P < .05 \) reductions in length of stay \( (10.7 - 7.8 \text{ days}) \), costs per case \( (\text{US}$7360 - 6246) \), mortality rates \( (12.5 - 6.5\%) \), and aspiration pneumonia rates \( (8.5 - 2.7\%) \) over a 24-month period of ischemic stroke cases \( (42) \). In another group-randomized trial conducted over a 2-year period, setting achievable benchmarks significantly enhanced the effectiveness of a multimodal intervention for increasing influenza vaccinations, where vaccination rates increased 45\% \( (P < .001) \) in the experimental group as compared with only 15\% \( (P = .02) \) in the control group \( (43) \).

Fourth, designating a physician advisor and recruiting champions from the medical staff across clinical specialties is critical to integrating physicians into an effective change management program. These physician leaders help in the dissolution of a potentially adversarial relationship and aid in reestablishing the medical staff as a leadership group in the improvement process. Working with these opinion leaders and providing performance feedback has been shown to accelerate the adoption of beneficial acute myocardial infarction therapies such as aspirin and beta-blockers and eliminate the use of outdated practices such as prophylactic lidocaine \( (29) \).

Fifth, the creation of a change management program is a natural result of the first step of establishing mutual goals and objectives. Improvement programs for clinical indicators such as antibiotic and oxygen usage
and Foley catheter and IV discontinuation are relatively easy process improvement projects that can positively affect quality and cost within a short period (1–3 months). Longer-term improvement programs (3–24 months), such as case management, clinical pathways, evidence-based guidelines, and clinical benchmarking, are most successful when members of the medical staff are fully incorporated into the process. An important point to consider regarding any change management program is to select projects with high potential for success and, once the project is completed, to promote the success throughout the hospital and medical staff (4).

ADMINISTRATIVE POLICIES

Where other techniques might fail, desired changes in behavior can be achieved by the development of clear administrative policies. Although this institutional approach does not require the use of education and feedback, physicians are more likely to accept and even support the policies if they understand the reasons for them and participate in their development. A common example of an administrative policy that directly influences physicians' practices is the hospital formulary. When a hospital's pharmacy and therapeutics committee limits medications, or a brand of medications, whether for cost containment or quality-related reasons, physicians' prescribing habits are directly modified. Even when the hospital pharmacy does stock a medication, the prescribing physician may need to receive a consultation before being allowed to prescribe the medication. This type of restriction is often established for newly marketed therapeutic agents, especially antibiotics, to prevent or reduce biological resistance to the antibiotic by hospital organisms (44). One hospital successfully reduced resistance through a targeted pharmacy intervention program after a multidisciplinary antibiotic review committee identified that more frequent use of third-generation cephalosporins was associated with decreased susceptibilities of Enterobacter species (45). In another case, when an experienced pharmacist was required to review prescription orders for newer, more expensive medications, or more toxic antibiotics, the hospital experienced a 60–90% reduction in the use of the particular drug type (46).

Another example of how administrative policies can promote improved practice patterns is by simply redesigning the order form used by physicians when prescribing medications. In one hospital, a redesigned order form required physicians to categorize their antibiotic utilization as prophylactic, empirical, or therapeutic. If a medication was used for prophylaxis, the nurses were directed to automatically discontinue the drug therapy after 2 days. When a medication was used for empirical therapy (treatment without knowledge of the specific organism responsible for the infection), the nurses were to stop therapy after 3 days. Lastly, if the medication was used to treat a documented organism, therapy was terminated after 7 days if the medication was not reordered. Not surprisingly, with the implementation of these policies, antibiotic use decreased dramatically (47). At another institution, after an outbreak of nosocomial vancomycin-resistant Enterococcus faecium, an additional computer screen was developed that required physicians to select an appropriate indication for vancomycin use before the order could be completed. As summarized in Figure 5, a follow-up audit found a 50% sustained reduction of inappropriate vancomycin use (P < .001) based on the Centers for Disease Control and Prevention criteria recommended by the Hospital Infection Control Practices Advisory Committee (HICPAC) (48).

For overused diagnostic services such as computed tomography scans of the head or extensive analysis of clotting function, another policy that has been instituted at many hospitals for reducing diagnostic testing has been the use of triage mechanisms. In these triage systems, physicians were required to receive approval for the use of diagnostic services from a specialist on the hospital staff, such as a neurologist or neurosurgeon for head scans (49). In another study, when attending physicians rather than interns were required to order all laboratory tests, utilization decreased 20%. The significant reduction in tests was attributed to the fact that the screening tests typically ordered by interns early in the patient's stay were deemed to be of questionable value by the attending physician (50).
CONCLUSIONS

Regardless of which method or combination of methods is used to improve medical practice patterns, a successful change management program will require the use of objective quantitative information for measuring, managing, and monitoring performance and subjective qualitative information for interpreting and understanding the various processes at work within the system. It is further recommended that those most involved in the care process collaborate before making conclusive changes to the delivery of care and, then, only after effects on patient outcomes have been thoroughly evaluated.

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