The Concord Collaborative Care Model restructured current practice into a synergistic group effort that enhances patient safety and improves care outcomes.

JOHN M. EISENBERG PATIENT SAFETY AWARDS

System Innovation: Concord Hospital

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This article describes efforts in the Cardiac Surgery Program at Concord Hospital (Concord, New Hampshire) to restructure clinical teamwork for improved safety and effectiveness on the basis of theory and practice from human factors science, aviation safety, and high-reliability organization (HRO) theory.

At the heart of the program is a team-based, collaborative rounds process that is conducted daily at each patient's bedside, using a structured communications protocol.

An extensive literature exists about ways in which team-based interactions can optimize safety and effectiveness in complex organizational settings. Research in human factors science related to aviation safety and safety of other complex endeavors forms the bulk of this literature base. In certain complex industries, such as aerospace flight operations, nuclear power, and chemical engineering, methods adapted from this research have become standards of practice, resulting in marked improvement in safety and effectiveness. However, in health

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The project described in this article was conceived and carried out by the entire cardiac surgery care team, with the support of the Concord Hospital administration and the section of cardiac surgery at Dartmouth Medical School. The authors acknowledge the hard work, dedication, and contribution of all of those involved and believe that this award belongs collectively to them. *Please address correspondence to Anne K. Nason, MS, ARNP, Concord Hospital, 250 Pleasant Street, Concord, NH 03301; phone 603/224-2759, ext 3876; fax 603/227-7071; e-mail ANason@CRHC.org.*

Article-at-a-Glance

Background: The Cardiac Surgery Program at Concord Hospital (Concord, NH) restructured clinical teamwork for improved safety and effectiveness on the basis of theory and practice from human factors science, aviation safety, and high-reliability organization theory. A team-based, collaborative rounds process—the Concord Collaborative Care Model—that involved use of a structured communications protocol was conducted daily at each patient's bedside.

Methods: The entire care team agreed to meet at the same time each day (8:45 AM to 9:30 AM) to share information and develop a plan of care for each patient, with patient and family members as active participants. The cardiac surgery team developed a structured communications protocol adapted from human factors science. To provide a forum for discussion of team goals and progress and to address system-level concerns, a biweekly system rounds process was established.

Results: Following implementation of collaborative rounds, mortality of Concord Hospital's cardiac surgery patients declined significantly from expected rates. Satisfaction rates of open heart patients scores were consistently in the 97th–99th percentile nationally. A quality of work life survey indicated that in every category, providers expressed greater satisfaction with the collaborative care process than with the traditional rounds process. Practice patterns in the Cardiac Surgery Program at Concord Hospital have changed to a much more collaborative and participatory process, with improved outcomes, happier patients, and more satisfied practitioners. A culture of continuous program improvement has been implemented that continues to evolve and produce benefits.

care, knowledge and use of these theories and practices are rare.

Recent Institute of Medicine reports on quality and safety in the U.S. health care system have called attention to serious shortcomings between intended performance of health care processes and actual outcomes for the patient.[1,2] Discussion of these and other issues has led to a growing awareness that traditional methods of practice in health care may no longer be meeting the evolving needs of patients and society. There is growing interest in looking beyond health care for new knowledge that can permit restructuring of practice in an effort to provide better, safer care in new ways.

Like flight crews engaged in complex flight operations, health care practitioners caring for critically ill patients must respond to constantly changing conditions. Information flow and communication between practitioners of various disciplines must be optimized amid uncertainty, risk, and time pressures. Typically, however, health care practitioners continue to gather information and make decisions independently, noting actions in the clinical record and meeting on a one-on-one basis with other providers, as needed and able. This results in frequent telephone tag, numerous work interruptions, and rework as individual practitioners seek clarification of patient conditions, treatment strategies, and roles and responsibilities. The resulting environment is ripe for adverse events and other system failures that could result in patient harm.

Setting

Concord Hospital, an affiliate of Capital Region Health Care, is a 295-bed, not-for-profit community hospital located in New Hampshire's capital city, Concord. It is a regional referral center in central New England and it has a reputation for high-quality, patient-centered care. Approximately 250 persons a year undergo surgery in its Center for Cardiac Care, which has provided open heart surgery since 1998.

Before the Concord Collaborative Care Model was established in the Cardiac Surgery Program, patients received traditional medical–surgical care, characterized by the separate interaction of individual practitioners with the patient and the separate development of care plans by each discipline. Chart notes, one-on-one interactions outside the patient's room and telephone follow-up calls were the chief mechanisms for care coordination. A multidisciplinary discharge planning process, conducted at a place other than the patient's bedside, facilitated the interaction of caregivers across disciplines. However, the patient, family, and physician rarely attended discharge meetings.

Methods

Beginning in September 1999 persons interested in improving the care process for cardiac surgery patients began meeting regularly as a group to consider various aspects of the program and to collaboratively develop a methodology for continuously improving the structures and processes underlying patient care. This group, which came to be known as the cardiac surgery team, believed that changing the way the care team interacted around the care of patients was central to this initiative. Hence, it focused on changing the patient rounds process from the traditional format to a collaborative, team-based process—one that continues today.

Patient Rounds

The entire care team now meets at the same time each day to share information and develop a plan of care for each patient. This role-based team includes the patient and his or her family, a bedside nurse, a surgeon, a nurse practitioner or physician assistant, a social worker, a spiritual care counselor, a home care coordinator, a pharmacist, a physical or occupational therapist, a respiratory care therapist (when appropriate), a dietitian, a diabetic educator (when appropriate), an office coordinator, a cardiac rehabilitation specialist, and a clinical care coordinator (for utilization review). The patient and family members are encouraged to be active participants in the process and are considered integral members of the rounds team.

In most cardiac programs in the United States, care team members see the patient independently or work behind the curtains. They are never in the same place at one time. The Concord Collaborative Care Model, in contrast, "pulls back the curtains" and has everyone come at once. Physical space constraints are real, but the space is what it is, and the team works around it. When the group of 10 to 15 individuals enters a semiprivate room, it pulls the curtain between the two beds. Roommates routinely respect the need for privacy and the confidentiality of information.

Rounds are conducted daily at 8:45 AM at the bedside of each patient. They end after the team sees each patient, which generally is by 9:30 AM, unless more than 4 or 5 patients are on the unit. Rounds for each patient takes about 10 minutes. If the rounds extend past the allotted 45 minutes and if team members have to leave, they make provisions for someone to cover for them during the remainder of the rounds process.

Communication Protocol

The cardiac surgery team gave specific attention to developing for the rounds process a "structured communications protocol"* adapted from human factors science that was consistent and respectful and that supported sharing of insights and suggestions across hierarchy and role boundaries. The protocol's goal was to ensure consistency and completeness of information exchange through the development of a standard pattern of reporting and decision making. A relationship was established with an aviation human factors specialist [J.B.] who observed the rounds process and served as an advisor to the team.

As the "project champion" and the source of the initial vision for the new rounds process, the surgeon [P.N.U.] quickly realized that the new rounds process would work better if he stepped back from the leadership role and the nurse practitioner facilitated instead. This provided a palpable shift in the hierarchical barrier, encouraging all team members to speak freely to clarify information or to offer alternative information across traditional disciplinary boundaries and roles. Ideas, comments, and questions now emerge freely as the team builds trust in and mutual respect for all team members and belief in the value of the team process.

All team members, patients, and family members are encouraged each day to discuss anything that may have gone wrong in the care process (known as "system glitches"). This represents another profound cultural change. Practitioners in every health care discipline are trained not to make mistakes. The pressure to be perfect provides strong incentive not to talk about mistakes. To take health care to higher levels of outcome, a new culture must be established that encourages discussing errors and learning from them.

In the Cardiac Surgery Program, glitches are actively sought out during the rounds process as a source for learning. The Sidebar (p 669) provides sample glitches gleaned during recent rounds. All glitches, which vary from overstuffed paper towel dispensers that were difficult for the patient to use to missed medication dosages, are taken seriously. Role modeling and mentoring facilitate the discussion of

***The term was first used by James C. Taylor, PhD, and Manoj S. Patankar, PhD, experts in the use of new communication methodologies in error management, and was developed by aviation human factors pioneer Robert W. Mudge, retired captain of Delta Airlines.**

glitches in a blame-free, interdisciplinary, nonpunitive environment. The open reporting and discussion of glitches demystifies the care process for the patient and family, and their sense of trust increases. Good practices are also captured during the rounds process.

The Communication Cycle

The "collaborative communication cycle" guided by the nurse practitioner and occurring at each patient's bedside includes the following components:

- Recap of yesterday's plan of care. Inquiry of patient and family regarding whether all care elements occurred as planned. Were there any glitches at any point?
- Review by the nurse practitioner or physician assistant of the results of the morning's patient assessment. Inquiry of patient and family regarding how they are doing and whether they have any concerns.
- Statement of the patient's needs and wants as currently understood and an invitation to contribute "things we might have missed."
- Provision of an overview of the patient's progress by the bedside nurse.
- Pharmacist's review of a list of the patient's scheduled medications for that day, including the reasons for the medications and reconciliation of the current medications with the patient's home medications.
- Description by the physical therapist (PT) or occupational therapist (OT) of the PT/OT progress and plans for the day. Social worker, dietitian, respiratory therapist, and rehabilitation specialist do likewise.
- Discussion and team development of a care plan for the day and any contingency plans that may be needed.
- Clarification of new roles and responsibilities (for example, the social worker will help the patient with a personal or family concern, the physician will be in touch with the patient's sister).
- Summarization by the care coordinator of the day's plan of care as it has emerged from the discussion. Patient and family review and approve, with comments, questions, or concerns.
- Adjustments are made to the care plan, as needed, and a final, revised statement of situation offered for validation by the team.

Interruptions in the sequence occur frequently and are encouraged as questions and concerns emerge in participants' minds. Alternative or additional information is added by team members, including patients and their families, whenever needed. Conflicting theories of situations are resolved objectively, based on data, rather than through force of personality or hierarchical role. This "situation alignment" provides an understanding of the patient's needs and wants and the strategies agreed on to resolve those needs and wants. For example, during rounds, a patient may tell the team that he forgot to mention that he takes a daily thyroid medication. The team agrees to add this medication to the patient's regimen. Or the team may discuss pain medication needed that day and, based on objective data, make a joint decision about its form and timing.

Sidebar. Sample Glitches

Medication Related

A one-time dose of furosemide (Lasix; Aventis Pharmaceuticals, Bridgewater, NJ) was ordered postoperatively. The order was interpreted and entered into the computer as a daily dose. The following day, the glitch was identified during rounds and corrected before another dose was given.

Environment

Several patients mentioned that the towel dispenser was loaded so full that wads of towels came out when they used it. Cardiac surgery staff were able to work with Environmental Services to modify the loading technique.

Clinical Observation

Cardiac surgery staff noticed that a few patients had small discolorations on their upper lips after surgery which appeared to be related to the cleaning solution used on the transesophogeal probe. This led to a change in the cleaning process and no further lip discolorations.

Process Design

Postop orders specifically ask to transfer the patient to the cardiac surgical service, which in turn notifies the surgical team. This stopped happening. A quick look into this process revealed that "old" orders had been delivered from the printing office. These old orders had not addressed this line item.

Patient and Family Education

The patient and family are educated about the collaborative rounds process preoperatively by the physician and office staff, with emphasis on the importance of the patient's and family's active participation in the care process. Nursing staff reinforce this education

when the patient arrives at the facility. If the patient is admitted through the emergency department, the social worker or another team member provides the education. Because they likely would not have encountered this kind of approach, patients and their families really do not know what to expect until after they have experienced the process on postoperative day one.

During the first collaborative rounds, the nurse practitioner informs the patient and family that all team members will be introducing themselves and their roles, and that if the patient or family has questions, to please interrupt at any time. The nurse practitioner also introduces the concept of glitches at that time, describing a glitch as "something in your care that should not have happened or something that was omitted from your care that should have happened."

Patients catch on to the process quickly. On the first day, they tend to listen only. By the second day, they are testing the waters by asking questions that they've stored in their memories or written down during the previous day. By the third day, most patients are active participants in the process and understand their important role in their care.

System Rounds

To provide a forum for discussion of team goals and progress and to address system-level concerns, a system rounds process was established and the team meets biweekly. The team uses these meetings to tweak the daily rounds process and share ideas, as well as to plan informational sessions involving administrators and outside experts in such areas as patient safety and outcomes measurement. Glitches documented by the social worker in "the glitch book" are discussed, patterns are identified, and corrective systemwide actions are implemented to "fix" the problems.

For example, team members noticed that numerous patients continued to receive a medication, such as a diuretic, that was intended to be for short-term use only. The team developed a new mechanism for effectively stopping short-term medications at a specified point in time. When the physician orders a short-term medication, an automatic stop order after 24 or 48 hours is also provided.

Overcoming Barriers

The hierarchial barrier, as noted earlier, needs to be overcome so that all staff feel free to challenge one another, regardless of traditional role boundaries. Role modeling was and continues to be key to overcoming this barrier. The willingness of practitioners to ask others to challenge them openly, in front of others, including patients and family members, is countercultural, requiring self-confidence on the practitioners' part. Genuine respect for one another builds the necessary trust.

Another more subtle barrier involves the perception by those not directly involved in the rounds process that gathering 10 to 12 people at one time at one patient's bedside is wasteful. This line of thinking asks, "How could it be efficient to have all those people tied up at one time?" The reality is that, in the course of a day in a traditional hospital environment, each individual would see that patient and then spend a significant amount of additional time trying to figure out what the other 10 or 11 caregivers are thinking or doing. In traditional rounds, most care providers have to go back, read the patient's chart, and talk with other care providers because they do not yet have an overall picture of the patient's plan of care.

Results

During and following implementation of the Collaborative Care Model, Concord Hospital participated in the collaborative database of the Northern New England Cardiovascular Disease Study Group. This voluntary regional consortium includes all centers performing open heart surgery in Maine, New Hampshire, Vermont, and northern Massachusetts. The consortium tracks clinical outcomes based on risk models and observed mortality for all patients since the consortium's inception. Following implementation of collaborative rounds, mortality of Concord Hospital's cardiac surgery patients declined significantly from expected rates (Figure 1, p 671), and it continues to show improved results.

Measures of patient satisfaction were tracked using the Press Ganey Associates satisfaction survey. Following implementation of the collaborative rounds process, the Cardiac Surgery Program achieved scores consistently in the 97th–99th percentile nationally with its open heart patients. Informal patient interviews conducted by team members and outside observers indicate that patients and families are very happy with the care they receive. All the patients and

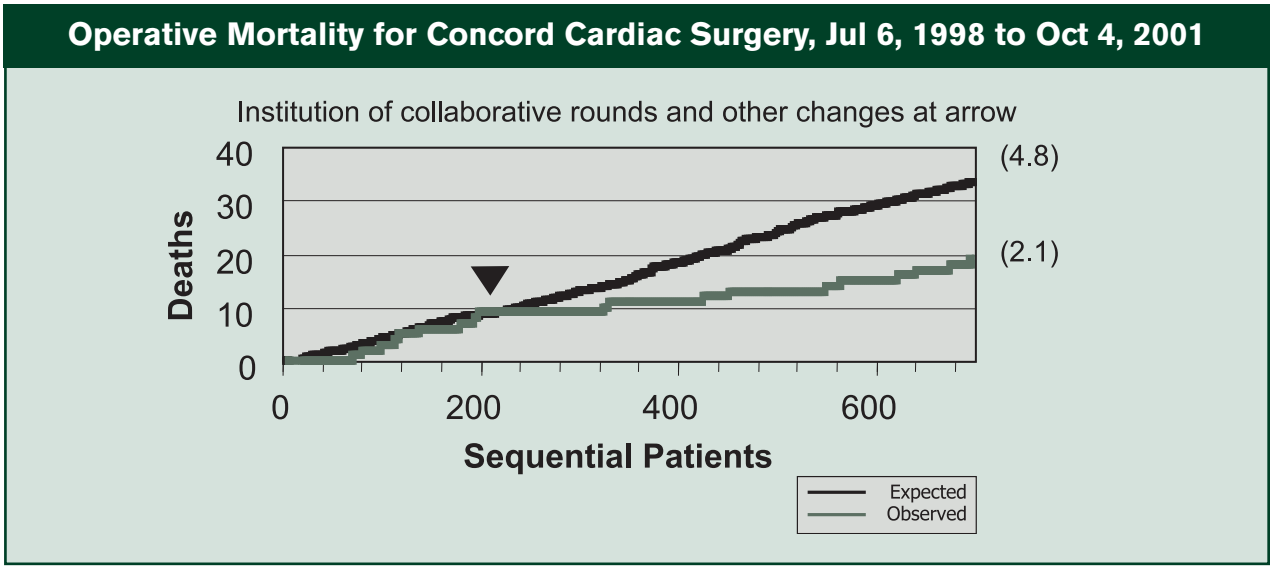

Figure 1. *Following implementation of collaborative rounds, mortality of Concord Hospital's cardiac surgery patients declined significantly from expected rates, and it continues to show improved results.*

family members mention how important it was to them that the team would show up reliably at the same time every day and would listen and respond to their questions and concerns. They described the relief of not having to lose sleep because they were worried about chasing medical staff to find out what was happening with their loved ones. For example, one family member stated:

> We were comforted as we watched this team gathered around my husband's bed, discussing his care together. We were empowered as we realized that our personal patient knowledge, our observations, and our questions were important to all those making the care decisions. We felt positive because we were involved and had no doubt that this medical team was informed, involved, and working together to provide my husband with the very best care possible.

Even patients or family members who expressed concern about their ability to participate in a group process because of shyness appreciated the process and wanted it to continue. The high level of patient and family satisfaction provides continuing impetus to the collaborative rounds process and enhanced job satisfaction for team members.

In February 2001 cardiac staff who participated in both the collaborative rounds format and in the more traditional rounds format participated in a quality of work life survey. Table 1 (p 672) illustrates the results. In every category, providers expressed greater satisfaction with the collaborative care process. Providers reported that having access on rounds to multiple perspectives about the patient's condition and treatment options consistently helped them to make better therapeutic decisions to enhance patient safety and care outcomes. Most of the individuals participating in the new style of rounds report that the process is either time neutral or in fact saves them time.

Discussion

The interdisciplinary, open communication process at the foundation of the Concord Collaborative Care Model enables the team members to learn from one another and effectively monitor and back up care strategies, proving a basic premise of human factors science. The more the team talks with the patient and family, the more it can effectively meet each patient's unique needs. The process has also led to a greater understanding of each team member's contributions to the overall process of care, which has resulted in a greater sense of mutual respect and trust. This continual education process and the systemwide changes made as a result of the discussion of glitches provides continued program improvement.

Does this process improvement stand the test of evidence-based science? Time will tell. Several programs around the country are now emulating the Concord Collaborative Care Model. Initial data look very positive, indicating similar improvement in clinical, patient satisfaction, and quality of work life outcomes.

Table 1. Mean Ratings for Quality of Work Life Survey*

Question	Rounds	
	Traditional	Collaborative
1. Sense of common purpose	3.9	4.6
2. Sense of personal/collective power	3.4	4
3. Listen actively to each other	3.9	4.5
4. Share responsibility for leadership	3.4	4.1
5. Problem-solving process apparent	3.3	4.3
6. Feel respected	3.4	4.1
7. Feel good about team membership	3.8	4.5
8. Sense of collaboration and team spirit	3.4	4.5

**Sixteen cardiac staff rated questions about Traditional Rounds and 15 cardiac staff rated questions about Collaborative Rounds on a 5-point scale (1, not true-5, very true).*

What other areas of the organization might benefit from a collaborative rounds process? All areas where patients with a particular pattern of needs receive care from a collection of people and resources that come together in a patterned way to meet those needs could benefit. Scholars, including Paul Batalden and Eugene Nelson, call such areas "microsystems."[3] Microsystems could include maternity care, orthopedic surgery, trauma care, and cancer care. The communication protocol can be helpful in improving care and decision making in all care settings. Elements of the structured protocol are being used in shift-to-shift reporting on other floors at Concord Hospital.

The continuing challenge faced by the Concord Collaborative Care Model is to change care providers' mental models of their work—from individual efforts to a collaborative process. As this is accomplished, efficiency increases, workloads lighten, and error risks plummet. The result is enhanced patient safety and improved care outcomes. J

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