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STUDYING AND SUPPORTING COLLABORATIVE CARE PROCESSES

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In patient care today, teams of practitioners from various disciplines must coordinate their efforts in order to deliver care successfully. Frontline nurses and physicians must interact with social workers, therapists, physician assistants, nurse practitioners, and others to develop and carry out coordinated plans of care. Also, clinical team members must communicate with patients and their families in language that can be understood and acted upon. In support of these goals, JCAHO standards require patient care to be planned and provided in an interdisciplinary, collaborative manner. As hospital units develop processes for collaborative care in complex environments such as post-surgery and critical care units, it is important to understand what constitutes success for these processes and how they can be enabled and supported. This report documents a series of field visits and simulations designed to observe, videotape, and interview collaborative care team members, patients, and family members engaged in varying forms of collaborative practice. This ongoing research is being conducted by a multi-disciplinary team of medical and social scientists with a shared goal of studying and supporting collaborative care processes.

INTRODUCTION

The biggest information repository in health care lies in the people working in it, and the biggest information system is the web of conversations that link the actions of these individuals (Coiera, 2000, p. 278).

Practitioners working in complex clinical environments must navigate effectively through high-risk situations, uncertainty, and the many challenges associated with coordinating care across multiple disciplines while communicating effectively with patients and families. In situations where clinical team members gather information and make therapeutic decisions independently of each other, various methods of communication and coordination are presently used, including one-on-one conversations, pages, phone calls, and notes. Often, parts of the medical record or chart act as a coordination device. Frequently, ill—and ill-equipped—patients and family members feel that they must maintain constant vigilance regarding consistency of the plan of care among team members. An oft-heard expression, usually uttered in frustration and disbelief, is, "Don't you people talk to each other?"

These conditions reflect a system vulnerable to failure—an environment of high stress, ripe for inducing error and adverse events (Reason, 1997). This research was undertaken to understand how to improve these complex processes of care; identifying ways of making patients whole again so that *both* patients and practitioners are positively affected by the care process.

ROUNDS AND COLLABORATIVE ROUNDS

The Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) requires that care be provided in an interdisciplinary, collaborative manner (JCAHO Standard TX.1.2: Care is planned and provided in an interdisciplinary, collaborative manner by qualified individuals). Since publication of this standard of patient care, hospitals have been working to understand how to meet the requirement. Establishing an interdisciplinary, collaborative rounds process is one way this can be accomplished.

Rounds processes vary widely, but many hospitals employ an early morning physician-led rounds process which is characterized by rapid exchanges of medical data among team members. Often team members who round are limited to attending physicians, resident physicians, and mid-level practitioners (PAs and Nurse Practitioners). The result can be a list of orders delivered to the bedside nurse, who has the closest view of the patient but who in many cases has not been a party to the interactions.

Other practitioners in other disciplines, despite their important roles in care, are often not involved in these discussions and decision making processes. Even patients themselves are often "talked about" rather than "talked to" during rounds, and families are usually excluded.

Recent research has shown the benefits of "relational coordination" on post-surgery patient outcomes. Gittell and her colleagues (Gittell et al., 2000) report improved quality of care, reduced length of stay, and post-operative freedom from pain were all significantly associated with relational coordination as defined by four communication dimensions (frequent, timely, accurate, and problem-solving communication) and three relational dimensions (shared goals, shared knowledge, and mutual respect).

Scholarship and research concerning coordinated teamwork in high risk environments outside of health

care suggests that there should be many benefits to be gained from a collaborative rounds process, including greater coordination across disciplines, sharing of expertise, team development and relational factors, quick issue resolution, and broadening team members' mental models resulting in better team sensemaking One collaborative rounds process that has been developed and documented is that of the cardiac surgery team at Concord Hospital in New Hampshire (Uhlig, Brown, Nason, Camelio, & Kendall, 2002). Between 1999 and 2003, this team developed a collaborative, structured communications process used at the patient's bedside during daily rounds. Applying theory and practice from aviation safety, human factors science, and high-reliability organization (HRO) theory, several departures from the traditional rounding process were implemented.

In the Concord Collaborative Care Model, all members of the patient's care team rounded together daily at a chosen time; the attending surgeon stepped back from the leadership role, enabling the nurse practitioner to facilitate; clinical team members interacted directly with the patient and their family members, using lay language; and the patient and family members were encouraged to discuss any issue in their care, no matter how small, with the team during rounds. These issues were captured and tracked, labeled as "glitches." Changes were also made in documenting the outcome of the rounds process, whereby a collaborative plan of care was made each day, following review of the patient's situation by all team members.

These changes, although seemingly simple, represent a significant departure from clinical care communications processes as typically practiced, even from collaborative rounds as practiced in many hospitals. The outcomes from the new collaborative rounds process were highly encouraging. After implementing this process, mortality of Concord Hospital's cardiac surgery patients declined significantly from expected (and from previous rates). Patient satisfaction rates increased to the 97th-99th percentile nationally. Staff quality of work life ratings, measured by survey, also increased notably. The Concord team received the John Eisenberg Patient Safety Award from JCAHO and the National Quality Forum for this work in 2002 (Uhlig et al., 2002).

The present research was undertaken to extend this work, with the goal of achieving better understanding of collaborative care processes, and developing insights and technologies that can support collaborative care among multiple practitioners in diverse care environments.

RESEARCH APPROACH AND METHODS

The research program being reported is an observational study of clinical teams that have implemented variations of the Concord Collaborative Care Model. The objective of this research is to understand the challenges and successful practices being implemented, and to document clinical team communications. In addition, a secondary goal is to develop an in-depth research plan for the design and evaluation of an innovative information system designed specifically to support collaborative practice based on CSCW (computer support of collaborative work) principles.

A team of social scientists was formed to conduct this research . The project team consists of a physician team leader familiar with collaborative care processes, an anthropologist, a video communications analyst, a health care cybrarian/knowledge management expert, a systems safety/human factors scientist, an organizational psychologist, a computer scientist with expertise in computer support of collaborative work (CSCW) practice, and a cognitive engineer. The breadth of multi-disciplinary perspectives, theories, and methods brought to bear by the research team is analogous to the breadth of perspectives and disciplines comprising a collaborative rounding team.

At time of writing, the research team has visited two hospitals implementing collaborative rounds and has conducted two simulations of the Concord collaborative rounds process involving former Concord team members, patients, and families.

The research protocol included observations, individual interviews, and group interviews with team members, patients, and family members. Hospital A is a large university teaching hospital which implemented collaborative rounds only in the past year. Hospital B is a smaller community facility with a two-year-old cardiac surgery unit. Those forming the unit intentionally modeled their rounds process after the Concord process, along with innovations from other hospitals they visited. At Hospital B, at the time of our visit, 322 patients had been through the cardiac surgery program with only one death, for a mortality rate of 0.3%. At both hospitals, the research team observed both early morning "medical rounds" as well as late-morning "collaborative rounds," involving different team members. Video equipment was pre-positioned in one patient room in each hospital. Following rounds, the research team conducted group interviews and later individual interviews with clinical team members. During group sessions, questions were targeted at understanding practices, culture, and consciousness related to the development and conduct of the collaborative rounds process.

During each of the two simulation events with the Concord team, team members who had developed the collaborative care model at Concord participated in half-day scenario-based re-enactments of their rounds process. A bedside nurse, a pharmacist, a social worker, a respiratory therapist, and an attending physician comprised this medical team. A nurse practitioner also participated in one of the simulations. In a medical simulation facility configured like a hospital room, former patients and family members previously cared for by the clinical team enacted post-surgery day 1, 2, and 3 vignettes, inserting challenges which were unknown to the medical team. The research team observed the care process from behind one-way windows, and video recorded the sessions. Key interactions in the recorded

rounds and simulations will be subjected to detailed video analysis (Koschmann, Stahl, Zemel, 2005).

Group interviews with team members, patients, and family members followed each half-day simulation session. A structured interview process was followed, and participants were also encouraged to tell stories that described important points. A belief in the importance of utilizing narrative as a tool in the development of technological solutions has informed this research.

For many of the individual interviews, the research team employed the Wagon Wheel method of Team Cognitive Task Analysis, which is a method designed to reveal how teams communicate (Klinger and Hahn, 2003). The method works as follows. After the process is explained to the interviewee, his or her name is placed at the center of a common point of reference (large paper, white board, etc.). Interviewers ask whom he/she communicates with, and these names or roles are placed around the center circle and connected by directional arrows showing flow of communication, labeled with mode of the communication. Most of the time in the interview is spent determining the nature of the communication, using a set of focused questions (see Klinger & Hahn, 2003, for further description). The wagon wheel map reveals patterns of communication flows involving that individual, and can be combined with the patterns of other individuals to develop a map of the information flows in the environment.

Data from the interviews is being transcribed and an ethnographic analysis is being prepared but is not yet completed. The research team has also conducted follow-up telephone interviews and follow-up visits with key individuals at both hospitals who because of time constraints could not be interviewed in person. Additional observations and simulation sessions are planned.

FINDINGS

At the time of this writing the research team has accumulated data from 6 group interviews and 20 individual interviews. Transcription and analysis of interviews is not yet fully accomplished. This paper will be limited to preliminary findings in text and table format.

Clear differences were evident in the extent of adoption of the collaborative rounds process in the various settings observed, partly due to the legacy culture existing in Hospital A in contrast with Hospital B, which had implemented collaborative processes since the unit opened, and also because of the various ways the different observed teams have chosen to incorporate collaborative and hierarchical methods in daily patient care.

The different degrees of adoption of collaborative care processes across observational settings provides an opportunity to make comparisons across a spectrum, from traditional hierarchical rounds at one end to the fully developed Concord Collaborative Care Model at the other.

Across this spectrum, differences were observed regarding 1) the person or persons to whom the rounds conversation was addressed (to the physician progressing to the team and then to the patient/family); 2) the language that was used (medical terminology progressing to mixed and then to lay language); 3) the issues considered for discussion (strictly technical progressing to mixed and then to frequently non-technical); 4) whether team members were introduced and whether patients and families were specifically invited to participate (no introductions or invitations progressing to introductions progressing to active invitations to participate); and 5) how mistakes and errors (often called "glitches") were treated (not discussed progressing to noted progressing to elicited).

The subjective emotions and self-perception of care team members, patients, and family members from group and individual interviews have not been fully analyzed at the time of writing. However, preliminary data from interviews conducted with Concord team members and former patients and family members after the Concord simulations show a striking contrast of emotions and self-perception in the collaborative process in comparison to hierarchical rounds. These data show a much higher degree of perceived control, contribution, and self-worth in the collaborative process for both patients and practitioners.

When asked how they felt practicing collaborative rounds, caregivers responded that they felt safe to express opinions, compassionate, confident, empowered, energized, calm, satisfied, and responsible. When working under a hierarchical rounds process, caregivers reported feeling insecure, angry, confused at times, disempowered, frustrated, exhausted, stressed, agitated, unsatisfied, and not responsible. Patients and family members reported that they felt comforted, supported, satisfied, hopeful, and confident when collaborative rounds were practiced, and the lack of these feelings in an environment without collaborative rounds. Preliminary data from the other group and individual interviews suggest that these trends will be consistent across the collaborative settings.

EMERGING TRENDS AND THEMES

In addition to these initial findings, certain trends and themes are emerging from the observations and interviews that will require further analysis but seem worthy of note. These are summarized below by descriptive categories, with brief interpretive comments.

Communications and Concept Alignment

Practitioners report that the collaborative rounds process enables insight into the work and expertise of other disciplines and of patients and families. This enables and expands conceptual "common ground" across the team, helps practitioners anticipate the concerns of patients and information needs of other disciplines, and helps to align team actions. Byproducts of better communication reported by team members, patients, and family members include increased trust, and

a sense of feeling valued for contributions to the patients' care by the rest of the team.

Bedside nurses, often with the greatest minute-to-minute insight about the patient's condition, are using the collaborative rounds process as a vehicle to share observations with other team members in ways that they report often cannot be easily shared in traditional hierarchical communications environments. In addition, in both hospitals and in the Concord team, efforts had been made to ensure that nurses and other team members would not be punished for offering opinions further up the hierarchy. Fear of rebuke, or simply of having opinions ignored, is a well-known demotivator in today's healthcare environment. Assuring that information flow is valued is a recognized determinant of patient safety on many levels.

In both hospitals, as well as in the Concord team, a jointly developed patient care plan was used as a key method for organizing and coordinating teamwork.

Time Efficiency

Many practitioners report that time efficiency is improved as a result of investing time in the collaborative care process. Team members accomplish synchronization with the rest of the team during the morning rounds session (typically lasting one to two hours, depending on number of patients and issues) that results in cascading efficiencies throughout the rest of the day. Previously, team members would spend hours tracking down others by phone or pager to accomplish the same synchronization.

Networks

From the representations of communications revealed in Wagon Wheel-style interviews, nurses may be interacting with twice as many information sources as physicians are. Patient information is primarily accumulated and evaluated in the team member's head, with assistance from the patient's chart and on line radiology and laboratory data sources. The use of the patient's chart as a key repository for storing and sharing information was cited repeatedly. When shift change occurs during morning rounds, this source of information becomes a bottleneck. .

Confidence

Greater confidence among caregivers, and therefore among patients, was cited as a major byproduct of collaborative rounds. Teams became confident due to enhanced understanding of each others' roles, and cited their confidence as a major influence on patient confidence and outcomes. Uncertainty management, cited as an issue in other studies on ICU cognition (McHugh, Crandall, Miller, & Mills, 2005), seems to be facilitated by the cross-flow of information inherent in collaborative rounds. The attending surgeon at Hospital B stated he felt team morale and confidence had a strong impact on patient morale and confidence, which in turn had an important effect on clinical outcomes.

Organizational Changes

Flattened hierarchy is a byproduct of collaborative rounds if all team members are encouraged to contribute openly. Flattening of the hierarchy was evidenced in Hospital B beyond the work environment by unit social gatherings and phone calls from the attending to check in on sick staff members being treated in other hospitals.

Hospital B pursued an extended team concept, which included the entire unit staff and OR staff; each team member is integral to weekly team meetings and to identifying "glitches" and their solutions.

Hospital A cited mutual respect among practitioners as a byproduct of collaborative rounds. An insistence by unit leaders on a culture of mutual respect, without exception, was a factor named in hospital B.

Outcomes

Hospital B's attainment of a 0.3% cardiac surgery mortality rate post-, and survey data showing high patient satisfaction, mirror the outcomes documented in the Concord experience, and provide further evidence of the benefits of collaborative practice. Program leaders in Hospital B stated that staff retention rates are excellent and that working this way helps keep nurses at the unit.

Glitches

One of the interesting areas of observation concerned the identification and recording of mistakes and errors in care, known as "glitches." In the fully developed Concord Model, glitches were elicited and recorded by making a direct inquiry about glitches each day of every patient, family member, and care team member as a usual part of the collaborative rounds process. In Hospital B, glitches were recorded when they arose, but not specifically elicited. In Hospital A glitches were not discussed. Program leaders in Hospital B stated that the glitch process had evolved over time, with progressive comfort on the part of team members who early on would attempt to disguise their handwriting and now are actively signing their names to glitches when they note them.

Having a centralized place for noting problems that in turn are acted upon for improvement helps to illustrate the success of the new behavior being supported through collaborative rounding. It is evidence that the opportunity to learn from mistakes and near misses is being built into the fabric of how work is done.

Table 1.
Characteristics of Rounds Observed

	Hosp A Early (Medical Rounds)	Hosp B Early (Medical Rounds)	Hosp A, 10 am (Collab Rounds)	Hosp B, 9 am (Family Rounds)	Concord Simulations
Who facilitates	Fellow	PA (night shift)	Bedside Nurse	PA (day shift)	NP or other team member
Language used	Medical	Medical	Mix	Lay	Lay
Rounding team members	Physicians: AS, CT Surg Res, PGY1, PGY4, MedStud, 2 PAs	Attending, PA, bedside nurse.	Entire team: AS, NP, PA, SW, N, PH, OT, PhT, CH, PT, Fam	Entire team: AS, PA, Nurse educ, Nutrit, CH, Exer Phy, RT, PH, Case Mgr/Disch Planner	AS, SW, N, PH, OT, Patient, Family
Communications directed primarily at	Attending	Attending	Team members	Patient and Family	Patient and Family
Patients/families requested to participate	No	No	Yes	Yes	Yes
Team introduction	No	No	No	Yes	Yes
Plan of care documented how?	Individual hand-written notes	CSU Flow Sheet	Individual hand-written notes	Plan of care developed, decisions made in real time	Team member wrote and discussed with Attending in real time
Glitches noted	No	No	Yes	Yes	Yes

DISCUSSION

How clinical teams work together to provide the best patient care possible is a critical issue for our times. There are organizational issues, cultural issues, cognitive issues, and technology issues involved, but overall, collaborative work is a deeply human endeavor. No one scientific discipline will have the answer, but if many work together, multiple solutions may emerge. This paper reflects a work in progress to understand and mitigate the challenges that front-line clinical teams face. Our research is intended to understand practice in the field and use that understanding to make progress on as many levels as possible.

As part of this research, concepts of personas and other domain specific design processes are being considered as methods that can support collaborative teamwork (Head, 2003). Data produced by the wagon wheel method will help illuminate patterns of knowledge transfer that will inform our development work in this area.

ACKNOWLEDGMENTS

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