Patterns of Medical and Nursing Staff Communication in Nursing Homes: Implications and Insights From Complexity Science

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Abstract

Complexity science teaches that relationships among health care providers are key to our understanding of how quality care emerges. The authors sought to compare the effects of differing patterns of medicine-nursing communication on the quality of information flow, cognitive diversity, self-organization, and innovation in nursing homes. Two facilities participated in 6-month case studies using field observations, shadowing, and depth interviews. In one facility, the dominant pattern of communication was a vertical "chain of command" between care providers, characterized by thin connections and limited information exchange. This pattern limited cognitive diversity and innovation in clinical problem solving. The second facility used an open communication pattern between medical and frontline staff. The authors saw higher levels of information flow, cognitive diversity, innovation, and self-organization, although tempered by staff turnover. The patterns of communication between care providers in nursing facilities have an important impact on their ability to provide quality, innovative care.

Keywords

nursing homes; aged; communication; complexity science; clinical decision making

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Although many authors have called for improved medicine-nursing communication, objective research on this subject has been limited (Henneman, Lee, & Cohen, 1995; Sweet & Norman, 1995; Weiss, 1985). Surveys have revealed discrepancies between physicians' and nurses' perceptions of communication frequency and quality (Framptom & Mayewsky, 1987; Thomas, Sexton, & Helmreich, 2003). Qualitative studies have identified consequences of suboptimal medicine-nursing communication, including medical errors and low staff satisfaction (Holm et al., 1996; Levorato, Stiefel, Mazzocato, & Bruera, 2001; McKnight, Stetson, Bakken, Curran, & Cimino, 2002; Tange & Smeets, 1994; Viney, 1996). Our literature search revealed no studies of medicine-nursing communication in skilled nursing facilities.

More recently, researchers have suggested that communication between health care providers should be viewed through the lens of complexity science (Anderson, Crabtree, Steele, & McDaniel, 2005; McDaniel & Driebe, 2001). This school of thought maintains that the traditional, "Newtonian" view of organizations as "machines" with each worker acting locally to perform his or her defined role is an oversimplification that can lead to inappropriate management strategies. Rather, complexity scientists view health care organizations, including nursing facilities, as complex adaptive systems (CAS). CASs are characterized by a number of agents (staff) interacting locally in a dynamic, nonlinear fashion (Cilliers, 1998). Complexity scientists study how order emerges from the interaction among these agents (Anderson, Ammarell, Bailey, Colón-Emeric, Corazzini, Lekan-Rutledge, et al., 2005; Anderson & McDaniel, 2000). One emerging property of health care organizations, including nursing homes (Anderson, Issel, & McDaniel, 2003), is the quality of care, which unfolds as providers relate and interact around clinical problem solving. Thus, understanding quality of care first requires understanding the relationships and communication patterns among medical and nursing providers from which quality emerges.

Complexity scientists have identified key practices that allow organizations to adapt successfully to changing environments. First, information is viewed not as a commodity to be controlled but, rather, as something that emerges and flows spontaneously when agents interact. Successful organizations facilitate a free flow of information to all members. Second, employing staff with a wide range of personal and professional backgrounds is viewed as a strength, because it allows people of different perspectives to join in forming new ideas. A successful organization can exploit this "cognitive diversity" to make better sense of emerging events and reduce "group think" (Ashmos, Huonker, & McDaniel, 1998; Eisenhart, Kahwajy, & Bourgeois, 1997; McDaniel & Walls, 1997). Both information flow and cognitive diversity are critically determined by the communication and interactions between staff members.

When appropriate information flow and sufficient cognitive diversity are present, the stage is set for effective self-organization and innovation. Self-organization, or the spontaneous emergence of new structures and new forms of behavior in open systems, has the potential to lead to progress and improvement in healthy systems (Anderson, Corazzini, & McDaniel, 2004; Anderson, Issel, et al., 2003). An example of effective self-organization in a nursing home might be a group of certified nursing assistants that is dissatisfied with the information they receive about resident needs across shifts, asking the charge nurse to help them improve communication.

Innovation, or creative adaptation to a changing environment, could result from this self-organization and profoundly affect the nature and quality of care, and subsequent resident outcomes.

The purpose of our study, therefore, was to describe the communication patterns among medical and nursing staff in planning and delivering care with a particular emphasis on (a) information flow, (b) use of cognitive diversity, (c) effective self-organization, and (d) innovation. We used data from a large, comparative case study to develop a conceptual and thematic description (Sandelowski & Barroso, 2003) of nursing home provider communication in relation to these characteristics.

METHOD

Facility Selection

This analysis included two nursing homes, referred to as "Sweet Dell" and "Harbor," enrolled in a comparative, multiple case study of nursing management practices. The case study method is not defined by a particular method or philosophical approach (Crabtree & Miller, 1999);

instead, it integrates multiple approaches to data collection and analysis. In this study, we used multiple methods, including data collected from different people, groups, or written reports and documents. We located eligible facilities in one of six North Carolina counties, which we selected using a random number generator to maximize representativeness. We asked facility administrators to sign an agreement for the facility to participate in the study. Informed consent processes were employed for all individuals interviewed in the study. The university institutional review board approved all study procedures.

Sample and Procedures

Staff from all departments were potentially involved in the case study. Data collection efforts focused on shadowing and interviewing key informants who held important or unique places in the organization, such as a managers, department heads, or informal leaders. The analysis reported here focused in particular on data collected from nursing staff (certified nursing assistants, or CNAs; licensed practical nurses, or LPNs; and nurse managers) or medical staff (physicians, nurse practitioners) about clinical decision making and information exchange. Overall, there were 212 focused observations and 40 shadowing encounters, both of which included informal interviews, and 71 formal depth interviews. Data were collected from 119 nursing staff and 7 medical staff. Forty nine percent of the nursing staff was African American, 40% was White, and 11% represented other ethnicities. Eight-six percent of the medical staff (including physicians [MD] and nurse practitioners [NP]) was White, and 14% represented other ethnicities. The main demographic contrast between the two cases was that a higher proportion of nursing staff at Sweet Dell was White (52%) than at Harbor (29%).

To obtain further data about medicine-nursing communication patterns and consequences, we supplemented the data described above by additional targeted interviews. These additional depth-interviews included MDs ($n = 2$), NPs ($n = 2$), directors of nursing (DON, $n = 2$), assistant directors of nursing (ADON, $n = 1$), nurse supervisors (NURSE SUPERVISOR, $n = 2$), and focus group interviews including LPNs ($n = 6$) and CNAs ($n = 7$). During the supplemental interviews, we asked participants to describe how they communicated with other disciplines during a recent patient care situation. Interview probes were used to elucidate the explanations for, and consequences of, the communication patterns.

Data Collection

Two field researchers collected qualitative data in each facility over 6 months. Data collectors and analysts received training in the methods of the study. The field researchers observed daily routines on multiple shifts including medical rounds, shift change, and care-planning meetings. After each observation, detailed field notes were recorded immediately and later transcribed. All interviews were taped and transcribed verbatim.

We used several means of ensuring the reliability and validity of the data. We conducted interviews with a wide range of staff members until the same themes were repeated and no new themes emerged. Data triangulation included data collected from observation, interviews, facility documents, different people, and different groups (Miller & Crabtree, 1999). At the end of each case study, we presented a summary of our findings to the participants, who confirmed that we had adequately captured their communication patterns and offered no new themes. This "member check" supports the trustworthiness of the data.

Analysis

We used a meaning condensation approach, with the key concepts from complexity theory (Anderson, Issel, et al., 2003) forming the initial reference point from which the analysis commenced. Our goal was to transform the data into what Sandelowski and Barroso (2003) have termed a "Conceptual/Thematic Description" in which "the authors import concepts or

themes to reframe a phenomenon, event, or case" (p. 913) with the complexity science framework as the conceptual model.

All research team members read all of the data. At least two team members coded each document (field note, interview, or facility document) using ATLAS.ti software. We used an open coding technique, whereby investigators independently analyzed the data for common and recurrent themes relating to communication. Emerging themes were discussed at weekly data analysis meetings. Field researchers provided immediate feedback on the validity of the themes based on their firsthand experience in the facility. When it was appropriate, they were then charged with seeking additional data from the field that substantiated or refuted the theme.

Using the coded data, the first author (CCE) developed case study summaries describing the medicine-nursing communication patterns in each facility and their relationship to the complexity science concepts. Summaries were reviewed independently by other team members (MLP, CB, RA, KC), who identified both missing themes and themes not adequately supported by the data.

Finally, we performed a cross-case analysis to develop the conceptual insights. After preliminary cross-case results were established, we reread the primary data to ensure that our results were consistent with the original data. In addition, team members knowledgeable of the data but not involved with this analysis reviewed the summaries and confirmed consistency.

FINDINGS

Observational and interview data revealed two distinct patterns of medicine-nursing communication. The findings are organized below to describe (a) the communication pattern used at each facility and (b) the consequences of each pattern on the complexity science concepts of information flow, cognitive diversity, effective self-organization, and innovation.

Nursing Home Characteristics

Sweet Dell is a nonprofit, 120-bed facility located outside a medium-sized southern U.S. city. Sweet Dell prides itself on patient-centered care, low staff turnover rates, and a clean, attractive physical facility. It serves an affluent, primarily White resident population (Table 1). Medical care at Sweet Dell is provided almost exclusively by an MD and an NP he employs. The nursing leadership at Sweet Dell includes a DON, a NURSE SUPERVISOR, two registered nurse (RN) minimum data set nurses (MDS-RNs), and a quality assurance (QA) nurse. These experienced nursing managers complete care planning at Sweet Dell, with little participation from the floor staff nurses (generally LPNs) or CNAs.

Harbor Nursing Home is a for-profit corporate facility with more than 180 beds located near Sweet Dell. Residents at Harbor are more socioeconomically diverse (see Table 1). The medical staff at Harbor includes a medical director and her NP, a staff physician, and a consulting psychiatrist. The nursing leadership at Harbor includes a DON who is frequently absent, and an assistant DON (ADON) and NURSE SUPERVISOR who are overwhelmed by corporate or regulatory tasks. Harbor nursing managers participate little in the care planning process.

Communication Pattern at Sweet Dell

Communication between medicine and nursing staff at Sweet Dell occurs in a vertical, closed fashion. CNAs, who provide most of the direct care in Sweet Dell, describe the "chain of command" as the means for communicating clinical observations.

> After we speak with the nurse we go through chains of command … then they talk to [NURSE SUPERVISOR] … I always follow through with the chain of command here and I think that is really good. (CNA, focus group)

The NURSE SUPERVISOR makes rounds with the NP or the MD each time they are in the facility. The MD confirms the chain of command as the means of communication in the following quotation:

> I work with [NURSE SUPERVISOR] who gets her information from the nurses, and that system works real well … And if there is a problem, the [floor] nurse tells [NURSE SUPERVISOR] who tells [NP] or me. (MD, depth-interview)

Medical orders are also transmitted back down this chain of command. Another CNA describes information coming back to them:

> [NURSE SUPERVISOR] will tell the nurse and the nurse will tell us. Going right up and down the alley. (CNA, focus group)

Communication between the LPNs and the NURSE SUPERVISOR relies heavily on written notes left at the nursing desk.

Interviewer: How do you communicate back to the nurses what you talked about with [NP] and [MD]?

Nurse Supervisor:: I leave the charts out for the nurses to read. I flip them open to the notes. They know what is going on when they read the notes. (Field note during physician rounds)

In contrast to the strong connections between the NURSE SUPERVISOR and the medical team, communication between the LPNs, CNAs, and medical staff is notably thin. There are both implicit and explicit instructions to the floor nursing staff to avoid communicating with the physician. Nurses are not typically invited to participate in rounds with the medical team, and their feedback is not sought when residents are examined. In a nurses' meeting, the NURSE SUPERVISOR and DON instruct the nurses not to "bother" the MD with calls that can be handled through the chain of command. The result is minimal interaction between the direct care providers (LPNs and CNAs) and the medical staff.

Interviewer: So do you have any interaction with [MD] or [NP]?

LPN: No. [NP], you know, will say "good morning" and if [NURSE SUPERVISOR] is not here [NP] will ask about whatever. (Depth interview)

Interviewer: Do you talk with [NP] about your patients?

CNA1: I haven't asked her anything.

CNA2: Go straight to the [floor] nurse. Just report to the [floor] nurse.

Interviewer: How about [MD]?

CNAs all together: No! (laughing)

CNA4: I don't feel like he has enough time.

CNA3: I don't think it's our place …

CNA2: You report it to the [floor] nurse and she does her follow-up. Like to [NURSE SUPERVISOR] and from [NURSE SUPERVISOR] to [NP]. What you call the chain of command.

CNA4: Yup, it's the chain of command. (Focus group)

The medical team valued this pattern of communication, because it reduced the time they needed to spend tracking down information.

> So, when I come in now, [NURSE SUPERVISOR] has got my labs ready, she's got the charts out. She can tell me what this patient's been doing … [NURSE SUPERVISOR] knows that stuff, she knows which family likes what … and that's important for me to be able to get this job done and move on to the next nursing home. (NP, depth interview)

The communication pattern at Sweet Dell, in summary, is vertical and closed (Figure 1). There is a strong connection between staff with similar cognitive schema (the NURSE SUPERVISOR, NP, and MD) but few or no connections between direct care staff and medical staff. The written communication between the NURSE SUPERVISOR and the floor nurses is efficient but not conducive to a reciprocal sharing of information or ideas.

Communication Pattern at Harbor

In contrast, the medicine-nursing communication pattern observed at Harbor is a direct, open interaction between the frontline nursing staff (LPNs) and the medical staff. There is no linear chain of command and no single nurse "liaison" in evidence. The nursing managers, the RN-level staff, are generally not part of patient care interactions.

> I always try to write it in my chart or more often I notify someone [in] nursing service because I always believe the doctor-nurse relationship is the best way to get something done … and then she can express my wishes to administration or supervisor. (MD, depth interview)

NP: I have a clipboard on each unit and the [floor] nurses write down whatever they need me to take care of. Sometimes they forget and they just tell me when I come in or they will call at the office …

Interviewer: How about the CNAs, do you interact much with them?

NP: Umm … fair amount and sometimes they will even come up and [tell] me "you need to go look at so and so, he's not acting right." (NP, depth interview)

There are numerous field observations of direct communication between floor nursing staff and the medical team over a variety of issues. Indeed, the medical team at Harbor communicates directly with workers in many disciplines, including social work, medical records, dietary, rehabilitation, and maintenance.

> [LPN] and the psychiatrist get into a conversation about [a] resident. The psychiatrist asks how he is doing. [LPN] says he's not doing well. Psychiatrist asks whether he is still agitated…. They discuss medications and prescriptions in a very back-and-forth way. [LPN] is making suggestions; he is accepting them; they are trying to determine both appropriate medication and the best way to administer it…. They reach an agreement about what to try. He has been completely open to [LPN]'s suggestions. (Field note)

In summary, the communication pattern at Harbor is horizontal and open characterized by multiple loose connections between the frontline nursing staff (LPNs and CNAs) and medical staff. However, there is little involvement of the RN-level administration staff (see Figure 1).

Organizational Consequences of the Communication Patterns

As viewed through the lens of complexity science, these two observed patterns of communication differentially influence the capacity for providing high-quality care. In the sections that follow, we describe the effect of the two communication patterns on the quality of (a) information flow, (b) cognitive diversity, (c) innovation, and (d) self-organization.

Information Flow and Quality—At Sweet Dell, the linear communication pattern acts as a filter, progressively limiting the flow and quality of information available for clinical decision making. The QA nurse recognizes this problem as she describes how information she gathers during the admission process must be passed through several people before it reaches the medical team.

> The disadvantage, though, was everything I knew I had to repeat again to the nurse, or [NURSE SUPERVISOR] … because they're the ones that made the connection with the doctor. (QA nurse, depth-interview)

When several people are involved in the chain, important information can get lost.

> [NURSE SUPERVISOR] looks at the chart, "[Catheterized] urine is cloudy." *NP:* "Who wrote that?" *NP Student:* "Occupational Therapy." *NP:* "We need to talk to [LPN] about that. Why didn't she write it [on the communication board]?" *NURSE SUPERVISOR:* "Yeah." (Field note during NP rounds)

In these examples, the linear communication pattern between medical and direct care staff results in inefficient and disrupted information flow. A possible result of disrupted information flow is delayed diagnosis and treatment of acute problems, such as in the example of the resident with a possible urinary tract infection.

In contrast to the often disrupted information flow observed at Sweet Dell, the loose connections between multiple care providers at Harbor facilitated free flow of information. This type of information flow creates the potential for better clinical problem solving. As an illustration, a physician and a CNA were independently asked to describe the process used to address a resident who is having frequent falls at Harbor.

> I think that if a patient is having frequent falls, then that's when your team comes in. There should be a conference between the doctor, the nurse, and all the people who have been assigned to the team to investigate falls. (MD, depth interview)

CNA: I've got one down here now who says she is going to get up out of that bed. She thinks she can walk, but she only has one leg … She had her rails up but she kept putting her leg over them. I kept saying, "Hey, put her closer to the nursing station so that someone can always keep an eye on her."

Interviewer: And what did they do when you said that?

CNA: They did, they moved her. (CNA, depth interview)

Here, resident-specific information was communicated directly to other team members and incorporated into the plan of care. Had this information been unavailable to those in a position to authorize a bed change, it is likely that an alternative and less appropriate intervention, such as restraints, would have been used to prevent the resident from falling. The open communication pattern at Harbor improved the quantity and quality of information available to decision makers, setting the conditions for more appropriate clinical care.

Cognitive Diversity—A second consequence of the linear communication pattern used at Sweet Dell is reduced cognitive diversity available to process information and make clinical decisions. As an illustration, a Sweet Dell CNA encountered a resident who was not eating, refused to get out of bed, and was tearful. She communicated her interpretation of this information to the LPN in the chain of command, and the LPN apparently accepted it and did not explore other explanations.

> I think that she feels like that she is not getting enough attention. And she will go through this thing for like 2 or 3 days of kind of being quiet and stay in the bed.… [The resident] feels like crying her eyes out, she is all puffy in the face and not eat her lunch.… I mean in her situation when you know that a person is crying out for a bit of attention and you know that these people are spoiled … I had the nurse [LPN] come to me and say "what happened?" and I say "just leave her alone for awhile give her time to get all her crying done." … I let this nurse [LPN] know and she found out that "OK, I see what you are saying" … 'cause when you go down and mess with her it makes it worse. (CNA, depth interview, also quoted in Anderson, Ammarell, Bailey, Colón-Emeric, Corazzini, Lillie, et al., 2005)

Had the CNA been able to transmit this same information to other providers on the team (rather than the LPN who was next in the chain of command), she would have interacted with clinical staff holding different cognitive schema for interpreting the symptoms of crying, anorexia, and withdrawal and might have prompted an evaluation for pain or depression. The lack of open communication between the CNA and the RN-level staff and medical staff reduced the teams' ability to capitalize on the range of training, knowledge, life experience, and interpretations that its members possessed. The ability of the team to problem-solve effectively was thus diminished. Indeed, the publicly reported rates of pain and untreated depression, as measured by the Minimum Data Set, revealed that Sweet Dell had rates twice as high as the state average. The linear communication patterns might have reduced both the information quality and the cognitive diversity needed for successfully addressing of these issues.

Use of cognitive diversity in decision making is more evident at Harbor. In this quote, the director of social work (SW DIR) talks about how she includes the CNAs in clinical problem solving.

Interviewer: You talk with CNAs, do they help problem-solve?

SW DIR: Yeah. Um hm. Mostly tryin' to figure out a way to help a resident.… [They might say] "let's try this or let's try that" special adaptive [equipment]. "How can we get so and so to eat better? Have you tried this?" Or, "how did they like their food? Are you checking with them to see if they like it a certain way?" Or, observing the [residents] … "What do you see in them? During the time that they're crying out, how comfortable does their body look?" [CNAs help us] look at these other issues that'll help us better care for the resident. (SW DIR, depth interview)

This quote demonstrates the value of information flow between parties with different cognitive schema. The SW DIR values the knowledge and expertise of the CNAs who are actually helping the resident and might suggest, for example, special adaptive equipment. Reciprocally, the SW DIR is able to challenge the CNA to consider alternative explanations for not eating that might not otherwise have occurred to her, such as food preferences or discomfort. The diverse cognitive schemas that both disciplines bring to the discussion strengthen their ability to solve problems.

Innovation and Creativity—A direct result of greater information flow and cognitive diversity observed at Harbor is more innovative problem solving and clinical decision making.

Such creativity was often lacking in Sweet Dell. In this Sweet Dell quote, for example, the RN-level staff and the dietary services director (DIET) are problem solving about a resident's dehydration during a weight loss meeting.

NURSE SUPERVISOR: So what are you going to do?

DIET: I don't know. I really don't. I am worried because of the State. Remember what happened last time they came. They came down hard on us because people were dehydrated but we did not have a specific plan.

DON: And we cannot be too specific because if we do not follow a specific plan, we will also get it.

DIET: Well, I guess we should put down to continue to encourage fluids.

DON: Why don't you call in the [consultant] dietician on this one? That sounds good, right? I'll put down "Will consult with dietician." That is something concrete but not too concrete. (Field note of weight loss meeting)

Here, staff with similar experiences (less cognitive diversity) and limited information (less information flow) allow an external pressure (State surveys) to drive their decision making. The result is a care plan that adheres to accepted standards but does not address the individual needs of the resident and, therefore, is unlikely to be of benefit. In contrast, consider the following example of problem solving at Harbor.

NP: I have a little "Houdini lady" that we have tried everything known to man and we have not been able to solve her falls issue.… Physical Therapy has seen her, Occupational Therapy has seen her. The Social Worker made her an apron with little pockets in it to try to keep her busy.… She has been in every wheel chair that we have. She had every self-release/non–self-release belt. The Maintenance Director made her a [special] walker, she got out of that. The regional nurse liaison lady [corporate consultant] came and she tried to think of things we could do for her. I have had the psychiatrist to look at her medicines. I think everybody has had a hand with this patient trying to find a way to keep her from falling.…

Interviewer: So who was coordinating all the communication and the problem solving with all these different disciplines?

NP: Actually, the floor nurse [LPN] that has her most did most of the talking to everybody.… She was going to everybody trying to find a way to keep her from falling. (Depth interview)

Although the resident outcome was not completely satisfactory, the process used clearly demonstrates innovation that is characteristic of systems with more connection and interaction among agents. Problem solving at Harbor, facilitated by the open communication between staff with diverse cognitive schema, is much more likely to result in positive resident outcomes.

Self-Organization—The quotation about the frequently falling resident above is also illustrative of another phenomenon of complex adaptive systems that is facilitated by open communication: the ability of the members to self-organize effectively. There was no formal "committee" meeting at Harbor to develop the plan to prevent falls in this resident; rather, the floor nurse spontaneously coordinated a multidisciplinary effort to address the problem. This demonstrates that the staff members at Harbor, particularly the floor nursing staff, feel responsible and empowered to participate in clinical problem solving. Such effective self-organization was not evident at Sweet Dell. Indeed, the Sweet Dell DON often bemoaned the lack of responsibility assumed by the floor nurses.

> We just want them to take ownership of their residents.… We want them to know that if they sent a urine [sample] off it's got to trigger "Hey, did that urinalysis come back? Did the [culture results] come back?" That's what we want the charge nurses to be able to do, to take ownership of their hall. (DON, depth interview)

The vertical, closed communication structure in place at Sweet Dell reinforced the notion of silos that limited responsibility among the staff and inhibited effective self-organization.

Although the open communication at Harbor facilitated more effective self-organization, this process was vulnerable to staff turnover and reassignment. The NP describes the impact as follows.

> If I can keep the same nurses on the same halls for any length of time it's really not an issue. They really know those folks and can even give me the heads up before they get really sick; you know they pick up really early; "this one is not acting right, go check on them." … But when the staff is short, they [move the nurses around and] then I get a lot of "I don't know … I don't know that guy, I just don't know …" And that is very, very frustrating. (NP, depth interview)

Stable staffing is required for the floor nurse to "know" the resident and be able to identify subtle changes or problems. Thus, while open communication promoted effective self-organization and initiative when staffing was stable, excessive turnover has a negative influence on self-organization by limiting information flow between providers.

DISCUSSION

It is widely accepted that substantial improvements are needed in the quality of care that is provided in our nation's nursing homes (Wunderlich & Kohler, 2003). Complexity science suggests that quality improvement in an organization occurs not by influencing individual agents in a system but by changing the relationships between these agents (Anderson, Ammarell, Bailey, Colón-Emeric, Corazzini, Lillie, et al., 2005; Anderson & McDaniel, 2000). In theory, an organization with open communication between people with diverse cognitive schema will be best able to adapt and respond to a constantly changing environment. For example, previous studies have demonstrated that management practices that promote such relationships in nursing facilities can lead to improved outcomes in aggressive behavior, restraint use, immobility, and fractures (Anderson, Issel, et al., 2003) and lower staff turnover (Anderson, Corazzini, et al., 2004). Furthermore, involving physicians in chronic illness care teams was associated with greater perceived team effectiveness (Shortell, Marsteller, et al., 2004); and in intensive care units, greater caregiver interaction was associated with lower length of stay, lower nurse turnover, better quality of care, and greater evaluated ability to meet family member needs (Shortell, Zimmerman, et al., 1994). Relationships that are mindful, attentive, and respectful will promote information sharing and creative problem solving (Weick, 1993; Weick & Roberts, 1993).

We believe, therefore, that attention to the communication patterns used by nursing home staff have a profound potential to influence the quality of care they provide. In the two case study nursing homes, we found strikingly different patterns of medicine-nursing communication that provided insights into the dynamics of clinical decision making. In Sweet Dell, a lack of connections and the vertical chain of command restricted the ability of interdisciplinary staff with diverse cognitive schema to self-organize effectively and solve problems together. Consequently, despite hard work and good intentions, staff at Sweet Dell were unable to achieve the innovative care for which they were striving. In contrast, Harbor came closer to achieving effective self-organization by using a horizontal, open communication pattern among medical providers, frontline nursing staff, and the interdisciplinary team. Unfortunately, this communication structure did not arise out of an administrative climate encouraging

connection and participation in decision making. Rather, it arose to fill a void created by an absent administration. Moreover, the RN-level staff, distracted by administrative tasks, did not add their expertise during clinical problem solving. Finally, the high staff turnover and frequent reassignment tempered the staff's ability to share information and promote innovation. Thus, although the communication pattern at Harbor allowed some effective grass roots self-organization, the system as a whole was not able to capitalize on it to optimize care.

Our study has limitations that should be considered. The case study design did not allow for an exhaustive cataloguing of all existing patterns of medicine-nursing communication in nursing facilities. Indeed, it is likely that other patterns and hybrid combinations of the two described here are in use. However, we believe that examining these two extreme patterns from the complexity science framework illustrates a number of implications that might be useful for future work.

What are these implications for practitioners, managers, and researchers seeking to improve care in nursing facilities? Busy practitioners at Sweet Dell valued the perceived efficiency of communicating with one nursing liaison in the facility rather than spending time tracking down multiple nurses and CNAs. Conversely, nursing staff at Harbor reported feeling overwhelmed when medical staff disrupted their routines to seek information about residents. Practitioners and managers need to find ways to foster interdisciplinary communication without further burdening busy staff. Instituting a brief information sharing period between the medical and nursing staff before medical rounds on each floor or wing might be an efficient means of accomplishing this. We believe that mandatory, scheduled "care plans" created by a few individuals in the organization are less likely to improve care than real-time responses to changing resident needs generated by self-organization among the interdisciplinary team. Managers (and regulators) would be well served to promote and reward such behavior rather than creating more formal meetings and paperwork.

Health services researchers seeking to improve the quality of care in nursing homes must be mindful that the communication pattern used in the facility might affect the use and effectiveness of interventions. Moreover, our work suggests that interventions that target individual behavior change around a specific medical condition (the traditional, Newtonian model of quality improvement) might be inferior to interventions that target improved connection and communication between the interdisciplinary staff (the complexity science model). Such interventions might lead to improved quality of care that is more likely to be generalizable and sustainable than improvements resulting from traditional quality improvement programs (Mittman, 2004; Samsa & Matchar, 2000). Developing interventions that improve interdisciplinary communication remains a challenge to be tackled by those seeking to improve care in our nation's nursing homes.

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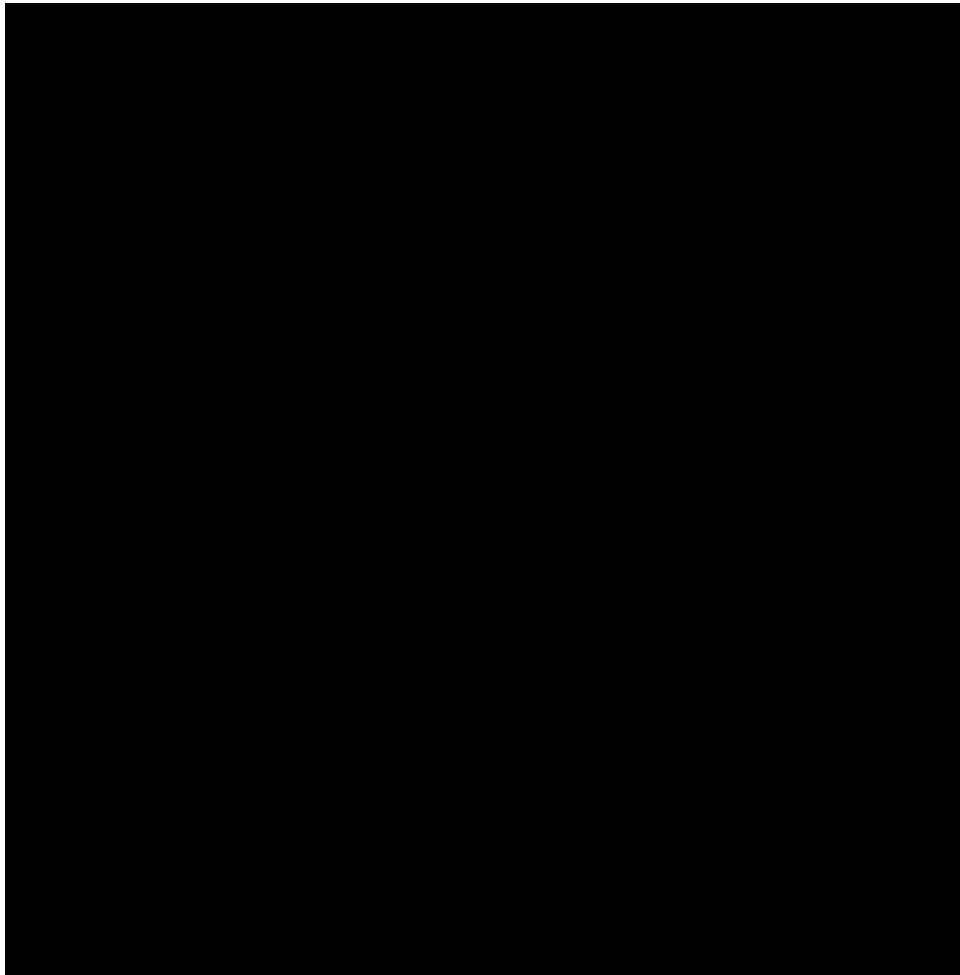
FIGURE 1.
Two Patterns of Medicine-Nursing Communication Observed in the Case Study Nursing Facilities NOTE: CNA = certified nursing assistant; DON = director of nursing; LPN = licensed practical nurse; MD = physician; MDS = minimum data set nurse; NP = nurse practitioner; QA = quality assurance nurse. Sweet Dell providers use a vertical, closed, "chain of command" pattern of communication between providers, with the NURSE SUPERVISOR as the main conduit of information between the floor nurses (LPNs), other nursing managers (DON, MDS, and QA nurse), and medical staff (MD and NP). At Harbor there is direct communication between the LPNs, CNAs, and medical staff, whereas the nursing administrators are relatively isolated from patient care decisions.

TABLE 1

Characteristics of the Study Nursing Facilities

Characteristic	Sweet Dell	Harbor
Profit and corporate status	Not for profit, not corporate	For profit, strong corporate influence
Setting	Suburban	Urban
Religious affiliation	Yes	No
Bed size[a]	100-120	175-200
Staff hours per resident day[a]	3.5	3.5
Staff turnover rate[a]	Lower	Higher
Payer mix[a]	Medicare, Medicaid, many private pay	Medicare, Medicaid, few private pay
Resident demographics[a]	Elderly, White, high socioeconomic status	Mix of elderly and younger patients, racially diverse, low socioeconomic status
Subacute and behavioral care provided	No	Yes
Deficiencies on the most recent State survey[a]	0-1	10

NOTE: Sweet Dell and Harbor are pseudonyms for the nursing homes in the study.

[a] Ranges only are provided to protect the identity of the facilities.

TABLE 2

Comparison of the Patterns and Outcomes of Medicine-Nursing Communication

Pattern or Outcome	Sweet Dell	Harbor
Communication pattern	Vertical, closed	Horizontal, open
Density of medical team to staff connections	Low	High
Quality and quantity of available information for clinical decisions	Low	High
Cognitive diversity among clinical decision makers	Low	High
Innovation in clinical problem solving	Lower	Higher
Effective self-organization observed	Lower	Higher

NOTE: Sweet Dell and Harbor are pseudonyms for the nursing homes in the study.