

AN OBSERVATIONAL INVESTIGATION OF ON-DUTY CRITICAL CARE
NURSES' INFORMATION BEHAVIOR IN A NONTEACHING
COMMUNITY HOSPITAL

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Critical care nurses work in an environment rich in informative interactions. Although there have been post hoc self-report survey studies of nurses' information seeking, there have been no observational studies of the patterns and content of their on-duty information behavior. This study used participant observation and in-context interviews to describe 50 hours of the observable information behavior of a representative sample of critical care nurses in a 20-bed critical care hospital unit. The researcher used open, in vivo, and axial coding to develop a grounded theory model of their consistent pattern of multimedia interactions. The resulting Nurse's Patient-Chart Cycle describes nurses' activities during the shift as centering on a regular alternation with the patient and the patient's chart (various record systems), clearly bounded with nursing "report" interactions at the beginning and the end of the shift. The nurses' demeanor markedly changed between interactions with the chart and interactions with the patient. Other informative interactions were observed with other health care workers and the patient's family, friends and visitors. The nurses' information seeking was centered on the patient. They mostly sought information from people, the patient record and other digital systems. They acted on or passed on most of the information they found. Some information they recorded for their personal use during the shift. The researcher observed the nurses using

mostly patient specific information, but they also used some social and logistic information. They occasionally sought knowledge based information. Barriers to information acquisition included illegible handwriting, difficult navigation of online systems, equipment failure, unavailable people, social protocols and mistakes caused by multi-tasking people working with multiple complex systems. No formal use was observed of standardized nursing diagnoses, nursing interventions, or nursing outcomes taxonomies. While the nurses expressed respect for evidence-based practice, there clearly was no time or opportunity for reading research literature (either on paper or online) while on duty. All participants expressed frustration with the amount of redundant data entry required of them. The results of this study have significant implications for the design of clinical information systems and library services for working critical care nurses.

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CHAPTER 1

INTRODUCTION

This study addresses the information behavior of on-duty critical care nurses in a nonteaching community hospital.

Background

Registered nurses (RNs) are the largest group of professional health care providers (Blythe & Royle, 1993). The American Nurses Association and its constituent member nurses' associations represent more than 2.7 million registered nurses (American Nurses Association, 2003). *The Statistical Abstract of the United States: 2002* reports that in 2001 2,162,000 nurses were employed in the United States. Physicians are the second largest group with 761,000 practicing in the United States in 2001 (U.S. Census Bureau, 2002, p. 381).

Most nurses work in hospitals (Marriott & Mable, 2000, p. 25) and the majority of hospital employees are nurses. Hospital nurses spend more time with individual patients than do other health care workers in hospitals (Canadian Institute for Health Information, 2001), therefore they enter more data into patient specific medical records than any other health care providers. They are responsible not only for following orders and performing routine duties, but also for maintaining a constant surveillance of their patients, especially in a critical

care unit. Clarke & Aiken (2003) emphasize “Nursing’s 24-7 Surveillance” role, explaining that

Because nurses are often the first to detect early signs of possible complications, their vigilance makes timely rescue responses more likely.... When nurses detect signs of a potentially serious complication, rescuing a patient means they must be able to mobilize hospital resources quickly, including the ability to bring physicians to the bedside....

Surveillance involves assessing patients frequently, attending to cues, and recognizing complications (p. 43-44).

Nurses also gather and transmit information from the patient's family to other health care providers, and sometimes even between the patient and the patient's family (Clarke & Aiken, 2003). Mayer (1997) points out that

“... [T]he role of the staff nurse goes well beyond meeting basic physical care needs. Patients will typically communicate more openly and honestly with their nurse – the caregiver they see daily. In addition, the family of the patient will also turn to the nurse for information on the patient’s status, as well as for comfort and general support during a time that is often trying and frustrating (p.162).

We begin with the following vignette:

A jagged green line forms and reforms across the screen of a monitor. A critical care nurse notices a change in its pattern and takes a series of immediate actions that save a person’s life. After the crisis has passed, the nurse gathers data and creates records that describe the incident in detail. At the end of the

shift, the nurse tells a new nurse coming on duty not only the details of this emergency but also the patient's history throughout the shift. This oral report includes a description of the patient's immediate family, who's in the waiting room or the cafeteria, and how to contact the designated family spokesperson. After report, the new nurse carefully reads the patient's orders and records, taking notes on a small sheet of paper. The new nurse "takes report," reads charts for each new patient and may not make the first visit to a patient until an hour into the new shift.

Critical care (also known as intensive care) nurses spend more time with individual patients than do other hospital nurses. They provide all care for the two or three patients to whom they are assigned on a given shift without any help from nurses' aides. Hospital nurses, especially critical care nurses, are responsible for the coordination of all care for the patients in their charge (Thelan, Lough, Urden & Stacy, 1998, pp. 3-11). Their on-duty information behavior in this information ecology can literally be a matter of life and death.

As Nardi and O'Day (1999) write:

A hospital intensive care unit is an information ecology. It has an impressive collection of people and technologies, all focused on the activity of treating critically ill patients. Human experts (nurses, physicians, therapists, ethicists) and machines (monitors, probes, and the many other devices in the ICU) all have roles to play in ensuring smooth, round-the-clock care. Though this is a setting with an obvious reliance on advanced

technologies, it is clear that human expertise, judgment, empathy, cooperation, and values are central in making the system work. (p. 49)

Most studies of nurses' (and other health care providers') knowledge based information seeking have been done in academic contexts (McKnight & Peet, 2000). Indeed, some medical librarianship literature treats hospital libraries as if they were academic medical libraries in miniature (McKnight, 1996). In reality, the services of hospital libraries often resemble those of corporate special libraries more than those of academic libraries. Hospital librarians are often perplexed when marketing and teaching strategies developed for large university health sciences center libraries do not work well in community hospital libraries. Should they expect working nurses to use hospital libraries much like they used academic libraries when they were in school? Or is the on-duty hospital nurses' information ecology quite different from that of the nursing student? Formally and informally, hospital librarians decry nurses' lack of use of their traditional library services (Bunyan, Lutz & DuMont, 1990; Bunyan, 1991; Gonnerman, 2003; Layton & Hahn, 1995; Royle, Blythe, DiCenso, Bauman & Fitzgerald, 1997; Spath & Buttlar, 1996; Wakeham, 1993, 1996a). With the exception of clinical librarians (who are usually only in teaching hospitals) most hospital librarians have spent little, if any, time with nurses on a hospital unit.

Purpose and Significance of the Study

The purpose of this grounded theory study is to use observer participant data and in-context interview data to describe and understand the information behavior of individual on-duty critical care nurses in a community hospital.

“For the purposes of this paper, grounded theory is defined as theory generated from data systematically obtained and analyzed through the constant comparative method (Conrad, 1978, p. 101)” (Creswell, 1998, p.98).

Nurses work with people and information sources in an information ecology built by tradition and rituals from a predigital era. Brewer & Frazier (1998) note that “Changes in the economic environment of healthcare and nursing are causing major changes in models of nursing care delivery as hospitals ... respond to cost constraints...”(p. 28). Their tools for gathering and recording information are rapidly changing from paper systems to digital systems. Many of these tools are designed primarily to create medical records for legal purposes without regard for their impact on nursing care. As Dalrymple (2003) writes “Observation of information-gathering behaviors ... contributes to developing delivery systems that actually work. Understanding the information behaviors of clinicians – how they seek information and how they apply it to practice – is a crucial first step in designing information delivery systems” (p. 531). This grounded theory model from an information science perspective can be useful not only in the design of various information systems in critical care

units but also as an aid to the redesign of nursing procedures to optimize nurses' professional effectiveness in a digital environment.

This investigation is helpful to hospital librarians who provide knowledge based information services to on-duty hospital nurses by informing librarians' understanding of critical care nurses' information behavior at the point of care.

Information Context of Critical Care Nursing

Health care is an information rich environment. Health care providers spend most of their time gathering, using, storing, retrieving and passing on information.

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) specifies *information management* as one of the major hospital functions. The JCAHO has standards and guidelines for (a) *patient specific information*, (b) *aggregate information*, and (c) *knowledge based information*. The primary container of patient specific information is the medical record, a detailed record of the patient's history, conditions, medications, laboratory reports, physician orders, nurses' notes and other records. It can exist in online, on paper, or in both media. Aggregate information is the statistical analysis of data gathered by the institution such as mortality rates, average length of stay and the case mix of conditions treated. Knowledge based information refers to generalizable published information such as is found in medical books and journals (JCAHO, 2003).

In a study of physicians' information needs, Gorman (1995) grouped physicians' questions into five categories. (a) Patient data (generally corresponding to the JCAHO's patient specific information) refers to a single person, is in the patient's medical record or learned from the patient's family or other health care personnel. (b) Population statistics (generally corresponding to the JCAHO's "aggregate information") includes recent patterns of illness and public health data. (c) Medical knowledge (generally corresponding to the JCAHO's "knowledge based information") is generalizable to many persons and is found in textbooks and journal literature, or it may be sought from colleagues or other health care professionals. (d) Logistic information (how to get the job done) includes knowledge of forms, insurance coverage and procedures for order entry, bed requests, transfer routines and paging systems. (e) Social information is information about local practice patterns and about the expectations or beliefs of others, including colleagues, consultants, patients, family and others in the community. For the purposes of this study, "information" is presumed to be data or knowledge pertaining to Gorman's five categories and other categories that might emerge from the observed behavior.

For the purposes of this study, observable "Information seeking" is presumed not only to be "any activity of an individual that is undertaken to identify a message that satisfies a perceived need" (Krikelas, 1983, p. 6) but also to include patient surveillance (Clarke & Aiken, 2003), browsing and scanning the environment. Some information-seeking behavior can properly be described as posing a question, but not all.

For the purposes of this study, "Information use" is presumed to be any observable action resulting from newly obtained information, including any action which implies that the information has been forgotten or ignored. Observable actions can include passing on information as well as acting on it.

The Practice of Nursing

The popular stereotype of nurses as physicians' helpers is about as accurate as the popular stereotype of librarians as guardians of the silence and contents of large book-filled rooms. As Smeltzer & Bare (2000) describe the nursing profession:

The practitioner role of the nurse involves those actions that the nurse takes when assuming responsibility for meeting the health care and nursing needs of individual patients, their families, and significant others. This role is the dominant role of nurses in primary, secondary and tertiary health care settings and in home and community nursing. It is a role that can be achieved through the use of the nursing process, the basis for all nursing practice. The nurse helps patients meet their needs through direct intervention, by teaching patients and family members to perform care, and by coordinating and collaborating with other disciplines to provide needed services (p. 11).

The nursing process (as taught in nursing schools and textbooks) has five essential steps. First, *Assessment* is the gathering and analysis of patient

specific data. Nursing assessment begins with checking and recording the patient's vital signs: blood pressure, pulse, respiratory rate and body temperature. (Some practitioners refer to assessment of pain as the “fifth vital sign”.) It includes reading records and interviewing the patient to learn the patient's health history as well as doing additional personal assessment and evaluation of the patient’s physical, mental and emotional condition. Second, nursing *diagnosis* is the nurse's determination of patient problems revealed by the assessment. Nursing diagnoses are not the same as medical diagnoses; they are the patient's actual or potential health problems that nursing care can directly affect. The North American Nursing Diagnosis Association (NANDA, 2001) has developed a taxonomy of approved nursing diagnoses. Third, *Planning* includes setting goals based on the nursing diagnoses. Planned interventions are codified in the Nursing Interventions Classification (NIC) (Dochterman, 2000). (Note that one nursing diagnosis is *knowledge deficit* for which the appropriate nursing intervention is *patient teaching*.) Nurses perform both nurse-prescribed and physician-prescribed interventions. Fourth, *Implementation* carries out the plan. The nurse is responsible for the implementation, but some interventions may be performed by the patient, family members, other nurses, or other members of the health care team. (e.g., The respiratory therapist provides breathing treatments and the dietician plans appropriate feeding.) Finally the fifth step, the nurse's *evaluation* checks on the accuracy and effectiveness of the previous four steps. Objective data are available from many sources, including observation, other people, monitors, and text. Nursing outcomes (frequently behavioral) are codified

in Nursing Outcomes Classification (NOC) (Johnson, Maas & Moorhead, 2002). Nursing diagnoses and related interventions may change dynamically during a patient's care. The nurse records directly observed outcomes in the patient's record.

Nurses' notes are expected to include much more than nursing diagnoses, NIC terms, NOC terms, numerical data and care plans. Henry & Mead (1997) believe that the nursing classification systems do not sufficiently represent nursing clinical activities. The nurse's narrative notes are also important. There is legitimate concern that many computer-based medical record systems either do not allow narrative notes or make it too difficult for the nurse to enter them. Space for narrative notes is often severely limited and difficult to access.

All steps in the nursing process are intense information-seeking and information-using activities. Most of this information is patient specific. A hospital nurse begins each shift with report from a nurse coming on duty. It is an oral process during which a nurse going off duty describes in detail the condition and progress of a patient in his or her charge to the nurse coming on duty for that patient. The nurse coming on duty has such an interview for each patient for that shift, and the process can take an hour. Next the nurse reviews the charts (paper, electronic or both) for each patient, reading doctors' orders, nurses' progress notes, lab results and other records (Lange, 1993; Malestic, 2003).

After gathering that information, the nurse seeks information directly from the patient. The nurse's first visit of the shift to the patient has two purposes -- self-introduction to the patient (giving the patient some information), and

performing a thorough assessment of the patient's condition. Some of the information gathered in that visit is recorded in the patient record (paper or digital) immediately afterward. The nurse chooses nursing interventions based on this information and implements them. The nursing process is a cyclical process, with an evaluation loop for each phase.

In support of the nursing process, many nursing educators advocate Evidence Based Practice (or more specifically, Evidence Based Nursing). This approach uses overlapping principles from the older approach of Nursing Research Utilization and that of Evidence Based Medicine. McKibbin (1998) explains:

Evidence-based practice (EBP) is an approach to health care wherein health professionals use the best evidence possible ... to make clinical decisions for individual patients... Effective EBP takes time and energy and involves five steps. The first of these is formulating the question or questions that need to be answered to satisfy the health care or other needs of a specific patient... The second step is the retrieval of the necessary information to answer the questions. This can involve textbooks or a laboratory test but often requires the use of the journal literature... Reading and assessing the retrieved information to help make a clinical decision form the third step. The fourth is carrying out the decision and the fifth is evaluation of the process to ascertain if optimal outcomes have been obtained for the patient ... (p. 396).

The third, fourth, fifth steps of EBP integrate with the planning, implementation and evaluation steps of the nursing process.

Statement of Problem

The problem can be stated thus: There is a lack of scholarly studies that explicitly address the information behavior of on-duty critical care nurses. Most studies of nurses' information behavior used only post hoc self-report data gathered from surveys and interviews. There have been no previous observational studies of on-duty critical care nurses' information behavior. Without such understanding, it is difficult for information professionals to provide critical care nurses with the information systems they need to perform their professional duties.

Nursing research has produced many studies of patients' information-seeking behavior, some of which are observational and have produced *grounded theory*. The goal of most nursing research is, of course, improvement of patient care outcomes. This unique study reveals patterns in critical care nurses' own information behavior and rather than that of their patients

Research Questions

The primary purpose of this study is to present a grounded theory model of on-duty critical care nurses' information behavior based on data derived from *participant observation* and in-context interviews. The study's central question is:

What is the observable information behavior of on-duty critical care nurses in a nonteaching community hospital?

In addition, the following questions are addressed:

1. What information sources do they use?
2. What is their observable information use behavior?
3. What kinds of questions do they have on the job?
4. How do they choose which of these questions to pursue?
5. What barriers to information acquisition do they encounter?

Limitations of the Study

As in all such studies, this study described the behavior of one group of people at one time in one setting and the results are not generalizable to all settings. The participants were all volunteers who expressed pride in their profession but did not appear to restrain themselves from expressing their frustrations. It is possible that some of the nurses in the unit who did not volunteer were not as happy with their jobs.

Just because none of these nurses were observed reading knowledge based information or pursuing epidemiologic information, one cannot assume that that never happens – just that it did not happen during these observations. Likewise, it is not unusual for critical care nurses' patients to die, but none did during these observations.

The human resources department would not release age data for unit nurses. The participant nurses gave the researcher their ages. On observing other nurses in the unit and from discussions of the demographics of the current nursing shortage, the researcher estimated that they were a representative sample of this unit by age, but could not verify it with numerical data.

The participant nurses could, of course, alter their behavior because of the presence of the researcher. While the researcher occasionally detected some "performance" behavior at the beginning of a shift, the opinion of this researcher is that the nurses' work was so constant and intense that they could not keep that

up very long. Observational qualitative research requires the researcher to refine and improve her observations with experience. At the beginning of the first observation (a four hour observation), the researcher's perception of the exotic drama of a critical care unit prompted the participant to recount stories that fit that perception. The stories ceased, however, when the researcher and the nurse focused on current events rather than the nurse's memories of events on other shifts.

Some of the nurses did not attempt to explain to the researcher what they were doing. On questioning the ones who did explain from time to time, the researcher discovered that they had recently been a preceptor to a new nurse employee. This is a practice whereby a recently hired nurse shadows another nurse for the first week or two. These nurses found it comfortable and natural to explain things to the researcher that they had explained to the new employee. Most of the explanations were logistical information.

Some words were missed (a) because low voices or background noise prevented the researcher from hearing or (b) because the speech was too fast for the researcher to record. The latter occasionally happened during shift change report when the nurse going off duty rapidly recounted to the new nurse a large amount of information about the patient. In such cases, the text indicates "[unintelligible]". The content of some long clinical discussions and of the data the nurses entered in to the chart was not recorded for two reasons – this content was not the focus of the study and recording it would have risked betrayal of patient's confidentiality rights.

The fact that the researcher (participant observer) in this study is not a nurse is both a limitation and a strength of the study. This study did not begin with a particular nursing theory or formal process, but rather with observation of nurses' information behavior. The participant nurses knew that in no way was the researcher assessing their professional skills or practice. The participant observer was not considering how best the nurse should care for the patient, but was focusing on the observed information behavior.

Definitions

For the purpose of this study, the following definitions are used:

Categories are units of coding in grounded theory research. Each one describes an event or phenomenon (Creswell, 1998, p. 239).

Coding is the categorization of qualitative data. It usually begins with *open coding* as the initial categorization of general and specific categories. *In vivo* categories are codes in the exact words a participant which express an emic (within the culture) concept. Etic codes are conceptual categories brought to the data from the researcher's scientific perspective. *Axial Coding* creates a classification that demonstrates relationships of codes. They may be in groups or in hierarchies. *Selective coding* is the final phase of coding qualitative data. The researcher

relates the central phenomenon to other categories and develops a narrative that describes it (Creswell, 1998, p. 57, 242; Strauss & Corbin, 1998, p. 230-234.)

Community hospitals are "Institutions with permanent facilities and organized medical staff which provide the full range of hospital services primarily to a neighborhood area" (Medical Subject Headings, National Library of Medicine, 2003).

Critical care is generally considered to be "Health care provided to a critically ill patient during a medical emergency or crisis" (Medical Subject Headings, National Library of Medicine, 2003). However, in this study the term is used interchangeably with "Intensive Care" as it is in the institution where the research was conducted.

Critical care nurses work in specialized hospital units designed to provide critical care.

Field notes are notes on what is observed. They are written either in the research field or very close to it in time. Writing about observation notes, Richardson (2000) writes "These are as concrete and detailed as I am able to make them. I want to think of them as fairly accurate renditions of what I see, hear, feel, taste and so on. I stay close to the scene as I experience it through my senses" (p. 941).

Field work, a term derived from ethnography, is data gathering on the site or sites where the activity of interest takes place (Creswell, 1998, p. 246).

Grounded theory research “is the process of developing a theory, not testing a theory”. The researcher “generates an abstract analytical schema of a phenomenon, a theory that explains some action, interaction, or process” (Creswell, 1998, p. 241). “The centerpiece of grounded theory research is the development or generation of a theory closely related to the context of the phenomenon being studied.... This theory, developed by the researcher, is articulated toward the end of the study and can assume the form of a narrative statement (Strauss & Corbin, 1990), a visual picture (Morrow & Smith, 1995), or a series of hypotheses or propositions (Creswell & Brown, 1992)” (Creswell, 1998, p. 56).

In situ means “in the natural or normal place” (Dorland’s Illustrated Medical Dictionary, 2003, p. 936).

In vitro means “within a glass; observable in a test tube; in an artificial environment” (Dorland’s Illustrated Medical Dictionary, 2003, p. 948).

In vivo means “within the living body” (Dorland’s Illustrated Medical Dictionary, 2003, p. 948).

Information, information seeking, and information behavior are defined as follows:

"*Information* can be any *difference* you perceive, in your environment or within yourself. It is any aspect that you notice in the pattern of reality. An *information need* is a recognition that your knowledge is inadequate to satisfy a goal that you have. *Information seeking* is a conscious effort to acquire information in response to a need or gap in your knowledge. *Information behavior* encompasses information seeking as well as the totality of other *unintentional* or *passive* behaviors (such as glimpsing or encountering information), as well as purposive behaviors that do not involve seeking, such as actively avoiding information" (Case, 2002, p 5). Information behavior described in this study also includes the observable use of information that is found.

"'Information' is understood here as the nominalization of the verb 'to inform'. This is an active verb, which indicates that information involves both an activity accomplished by someone and a process experienced by someone. From the perspective of the informant, information is an activity that is accomplished. From the perspective of the users, information is a process: something that happens to the user. ...The position taken here is that it is the process that is the truly essential aspect of information. People inform themselves or are informed" (Allen, 1996, p 2).

Information ecology, as defined by Nardi and O'Day (1999) is "a system of people, practices, values, and technologies in a particular local environment" (p. 49).

Intensive care is "Advanced and highly specialized care provided to medical or surgical patients whose conditions are life-threatening and require comprehensive care and constant monitoring. It is usually administered in specially equipped units of a health care facility" (Medical Subject Headings, National Library of Medicine, 2003). The nurse-to-patient ration is higher in hospital intensive care units than in other hospital units. The architecture of such units is designed to facilitate nurses' visual and auditory surveillance of their charges.

Joint Commission on Accreditation of Healthcare Organizations (JCAHO) is an independent, nonprofit, organization that accredits hospitals and other health care organizations.

Nurses are "professionals qualified by education at an accredited school of nursing and licensed by state law to practice nursing. They provide services to patients requiring assistance in recovering or maintaining their physical or mental health" (Medical Subject Headings, National Library of Medicine, 2003).

Observation refers to "the action or an act of paying attention, marking or noticing; the fact of being noticed". (Compact Edition of the Oxford English Dictionary, 1971) *Observational* here is "of or pertaining to observation or taking notice" as well as "of or pertaining to scientific observation" (Compact Edition of the Oxford English Dictionary (1971). Qualitative observational research includes selecting a site to be observed and identifying who or what to observe when, and for how long. It includes determining the researcher's role as an observer, and using an observational protocol for recording notes in the field (Creswell, 1998, p. 125).

On duty in this study includes only the period of time between when the nurse clocks in for a work shift and when the nurse clocks out. During this time the nurse is presumed to be "engaged in the performance of one's appointed office, service or task" (Compact Edition of the Oxford English Dictionary, 1971).

Participant observation is an ethnographic technique for gathering information in context in many ways – primarily the researcher conducts an investigation as an observer in a human ecology and occasionally as a participant in the culture. The researcher is immersed in the day-to-day activities and may conduct one-on-one interviews with participants (Creswell, 1998). The practice might be described as ranging from mostly observing with some participation to mostly participating with some observation. The researcher in this study observes more than participated.

Questions are not only formally articulated queries but also routine environmental monitoring, browsing and vigilant surveillance for the unusual.

Registered Nurses (RNs) are graduates of nursing schools who have passed a state board of nursing examination and have been registered and licensed to practice nursing.

Saturation occurs when data collected in the field no longer add new information or new patterns to the primary theoretical categories (Creswell, 1998, p. 56, 242.).

Teaching hospitals are "hospitals engaged in educational and research programs, as well as providing medical care to patients (Medical Subject Headings, National Library of Medicine, 2003). Most teaching hospitals are affiliated with one or more medical schools. Many are associated with large university health sciences centers which include undergraduate and graduate schools of nursing, pharmacy and other health professions. Teaching hospitals tend to be larger than community hospitals and offer more care specialties.

Triangulation is a qualitative research method for increasing the trustworthiness of the data by comparing it with data from multiple sources (Glesne, 1999, p. 31).

The next chapter discusses previous research relevant to this study.

CHAPTER 2

REVIEW OF LITERATURE

Information is to human minds what oxygen and carbon are to human bodies. Researchers can study evidence of parts of its actions but never all of it at once. Scientists in differing disciplines study oxygen transport in hemoglobin or in winds of the jet stream. They may study how these elements and other elements are combined into proteins that carry information in DNA or across synapses between neurons. Likewise, information scientists may study how humans behave searching for information from a particular database with particular searching software or they may study how a teenager seeks information about possible career choices.

This chapter describes research in health care providers' information behavior, observational studies in physicians' information behavior and various studies of nurses' information behavior. Most of the latter have been limited to only one kind of information and few of these are observational.

Research in Health Care Providers' Information Behavior

Most studies of health care providers' information behavior are studies of physicians, and few of those are observational (Detlefsen, 1998; McKnight &

Peet, 2000; Case, 2002, p. 247; Dawes & Sampson, 2003). Most hospitals are community hospitals and not teaching hospitals; most studies of the information behavior of health care providers have been done in teaching hospitals. According to McKnight & Peet (2000) some, purporting to be studies of health care providers, are actually studies of students.

Observational Studies of Physicians' Information Behavior

Two observational studies of physicians' information behavior are noteworthy. In the first, a multidisciplinary group of researchers (physicians, computer scientists and an anthropologist) from Pittsburgh (Forsythe, Buchanan, Osheroff & Miller, 1992) conducted a participant observational study of physicians' expressed questions on rounds, in morning report and in clinical settings in a large teaching hospital. After both videotaping and audio taping were found to be impractical for the study, field notes were used to record 65 speakers in 35 hours of observation. The transcribed textual data included 121 pages containing 1554 unequivocal information requests. The researchers coded the questions in 11 categories, on the basis of the kind of information and the forms in which the requests were expressed. The results of this study were quite different from those of non-observational studies.

In the second study, Perley (2001) studied *curbside consultations*, physicians' informal consultations, with a multiple case study research design. This naturalistic qualitative study included field observations, 60 formal

interviews, and informal conversations. Perley found the main purpose of the curbside consultations to be clinical, but the conversations often included medico-legal and financial concerns. The physicians expressed different expectations for their curbside consultations than they reported as outcomes from them. Perley observed the physicians' tacit rules of behavior during the consultations. Individually, the physicians were more aware of the cognitive aspects of these interchanges than the social aspects, which often led to less satisfactory information gathering.

Nursing Report

One aspect of nurses' on-duty information behavior that has been studied extensively is the practice of "report" or "handover" (as it is called in British and Australian nursing). This is an oral conversation between a nurse who has been caring for a patient and the nurse who is about to take over the care of that patient. It is a "shift report" if the nurses involved are going off and coming on duty, but it may also occur when patients are transferred from one hospital unit to another. Ekman & Segesten (1995) observed and audio recorded ten oral shift reports, then interviewed the participants. Their ethnographic study found the practice to be important as a ritual to pass on "mediated deputed power of medical control." Kelly's (1999) ethnomethodological study of two handovers documented the use of verbal short hand and turn taking during the conversation. Lally (1999) found it to be an important exercise for team building

and enhancement of a shared value system among nurses. Odell (1996) analyzed the practice in relation to communication and group networking theory. Parker, Gardner & Wilshire (1992) describe it as a traditional narrative sharing important to professional identity needs. Richard (1988) listened to fifty-seven reports and then checked the patients to verify congruence between what was reported and what she found to be the patients' actual conditions. She reported them to be 70% congruent on average with a range of 50 to 98.3%.

Nurses' Use of Patient Specific Information

Patterson, Blehm, Foster, Euglee & Moore (1995), and Roberts, While & Fitzpatrick (1995) have studied nurses' use of patient specific information in the nursing process. Because the nurse has more direct interaction with the patient record than any other health care provider, nurses who are researchers and others have studied the informatics of clinical information systems (computerized patient records). A major problem for nurses is that the driving forces in the development of these systems are not nursing but medical, legal, and financial (Corcoran-Perry & Graves, 1990). The interfaces that nurses use with these systems are a secondary consideration in their design. Nursing Informatics as a nursing specialty is growing (Ball, Hannah, Newbold & Douglas, 2000; Simpson, 1992, 1992b), but its influence on the development of such systems is significantly less than that of medical, legal and financial influences.

Darbyshire (2000) conducted focus groups and interviews with nurses in six states who were using such systems and found that they were "predominantly critical of systems in almost every area related to 'user-friendliness'" (p. 93). Their major complaints were (a) passwords (difficult, multiple and changing), (b) waiting for a terminal, (c) poor navigability (having to go through too many screens to find or enter information and difficulty in consulting and comparing information on different screens) and (d) confusing command language or graphics. In general they found online charting to be much more time consuming than paper charting.

Nurses tend to create private, personal notes for information they need but do not believe they can retrieve quickly enough when they need it. These might include times when drug doses are due, blood pressure observations from the last shift or emergency phone numbers for patients' family members. Sometimes they jot down data that they have observed and will not enter into the system until later. For instance a nurse might take a patient's temperature and then have to attend to another patient in distress before there is time to record that temperature in the computer system. The nurse typically writes the temperature and the time on some scrap of paper (or even the back of a hand) so that it will not be lost. Ash et al. (2001) call these notes *bundles* and describe them as

organized collections of highly selective bits of information, usually derived from multiple sources, created by experts to support the performance of specific tasks in specific contexts. Bundles are often created in informal, temporary form, using any available media, including [not only] paper but

also latex gloves, paper towels, sticky notes, exam-room table covers, or tissue boxes (p. 294).

Nurses' Use of Knowledge Based Information

There is little literature on hospital nurses seeking knowledge based information. What little there is mostly emphasizes library sources. Hospital librarians report that even though nurses make up the largest group of health care employees, they are not the largest group of hospital library users (Bunyan, Lutz & DuMont, 1990; Bunyan, 1991; Gonnerman, 2003; Layton & Hahn, 1995; Royle, Blythe, DiCenso, Bauman & Fitzgerald, 1997; Spath & Buttlar, 1996; Wakeham 1993, 1996a).

Hospital librarianship literature sometimes advocates marketing library services to nurses to encourage nurses' library use (e. g., Bunyan & Lutz, 1991; Spath & Buttlar 1996). However, hospital nurses usually work eight to twelve hour shifts many of which do not coincide with library hours. Illustrative of nurses' working conditions is their serious concern for comfortable footwear, which results from the fact that they rarely sit down very long while on duty. Thus if an on-duty nurse were to visit a hospital library, that nurse would have to persuade some other nurse to care for both nurses' patients while he or she went to the library. The social cost of that action is too high for most nurses to pay.

Bunyan, Lutz & DuMont (1990) note that hospital library services are usually designed more for physicians' information-seeking behavior than that of

nurses. They note four important constraints on nurses' use of libraries: (a) need for sources from the nursing (instead of the medical) paradigm, (b) time barriers (library hours), (c) physical distance from the library, and (d) last, but possibly most important, the large number of patients in each nurse's care takes up so much time that there is not time for retrieving, much less actually reading, information from the library. This time problem has only increased since 1990 as changes in third-party payment mean that hospital nurses are, on average, taking care of more patients with higher acuity levels (sicker) than they were then. Insurance payments cover shorter stays in the hospital, so the hospital population at any given time is sicker than it was in 1990. In addition, with the drop in revenue due to managed care, hospital administrators have increased the number of patients for which each nurse is responsible, reducing the nurse-to-patient ratio (Brewer & Frazier, 1998; Buiser, 2000; Jakob & Rothen, 1997; Grandjour, 2000).

Spath & Buttlar (1996) used a questionnaire to survey nurses' use of libraries in three Ohio hospitals. They found that the nurses sought information from colleagues more than from any other source. Most said that they used the library on "a regular but limited basis to obtain information needed in caring for or making decisions about their patients", but only 4% said they used the library to "stay abreast of new information and developments in the field."

Pettingill, Gillies & Clark (1994) reported lack of time as the factor that most discouraged nurses from using research, even when libraries and computer services were available. Royle, Blythe, DiCenso, Baumann & Fitzgerald (1997)

address the issue of nurses' lack of resources and lack of information-seeking skills to support the use of research in their practice. This study featured mailed questionnaires and the authors concluded that if resources and skills were better, time would no longer be a barrier. In the *Journal for Nurses in Staff Development*, Asselin (2001) describes nurses' new knowledge acquisition and utilization as a very diverse and subtle process, one with a greater reliance on colleagues, unit-based resource nurses, or the health care institutions' nurse educators than personal literature searching and reading.

Hicks & Hennessy (1997) report a major disconnect between the type of research published and encouraged in academia (including the emphasis on quantitative methods over qualitative) and the kind of validated practice information that staff nurses need. Indeed, much of the research done on how nurses seek and use knowledge based information concerns more educated or academically oriented nurses, such as nurse practitioners (Rasch & Cogdill, 1999; Cogdill 1998), nurse educators (Barta, 1992, 1995) or specialists working outside a hospital setting, such as occupational health nurses (Lathey & Hodge, 2001), midwives (Bawden & Robinson, 1997) or nurses in an outpatient clinics (Pettigrew, 1999).

Crawford, Brown, Anthony and Hicks (2002) interviewed and conducted focus groups for community mental health nurses. They found the nurses' understanding of Evidence Based Practice (EBP) to be at odds with practices in their working lives. Although the nurses were in favor of EBP on scientific, humane and economic grounds, they had great difficulty integrating it into many

areas of practice over which they had no control. In particular, organizational constraints on their work severely limited their opportunity to gain knowledge based information from research. Additionally, even if they had had to time to study it on the job, these community mental health nurses had technological and skill barriers to finding relevant research quickly. (The study mentioned libraries as places to go to seek information, but not librarians as providers of information services.) These nurses found it difficult to relate current research to a particular practice problem and stressed that in some way, current research information needed to be “preselected and prepackaged in order to be usable” (p. 294). These nurses “are not merely, ‘ignorant Luddites’ but are in fact keen to capitalize on the possibilities afforded by interacting with colleagues, using information technologies and education resources in becoming aware of ongoing research” (p. 294). Furthermore, “the kind of research that is often considered to be most valuable in health care, the randomized controlled double-blind clinical trial (Traynor, 2000) is the most esoteric and difficult to apply to their own practice” (pp. 295-296).

Several studies of nurses' seeking and use of new knowledge based information are especially worth noting. For her doctoral dissertation, Ramming (1992) surveyed a large group of registered nurses on which sources they believed to be their primary learning resources. She asked them to choose from a list of resources including various materials, colleagues and classes. A majority (68 per cent) was hospital nurses. She found a preference for independent study

rather than classes, as well as many situational barriers (including time) to further learning. This study does not mention the use of libraries.

Beitz, Fey & O'Brien (1998) examined 86 nurses' perceived needs for more or new knowledge based information in relationship to their actual knowledge as demonstrated in a test. Their test case concerned the best care of pressure (decubitus) ulcers. Lack of knowledge was only slightly correlated with any perceived need for more knowledge. The nurses who knew the most were more likely to express a perceived need for more information than were the nurses who knew the least.

Corcoran-Perry & Graves (1990) used questionnaires and observer interviews to gather data on cardiovascular nurses' "supplemental information seeking". In this context, the authors used "supplemental" to describe knowledge based information that the nurses did not already know from school or experience. The researchers used Krikelas' information-seeking behavior model to analyze their observations in terms of the need-creating event, the content of the information need, external sources of information and source preferences. They grouped the content of the information sought into four categories: patient specific data, institution-specific data, procedure information and domain knowledge (which corresponds to knowledge based information). Domain knowledge made up 21% of the information sought.

Blythe & Royle (1993) did an ethnographic study of nurses on duty in several types of hospital units. These nurses sought information to help them care for individual patients and some information about broader topics in nursing

from oral, written, printed and computer sources. They used research literature very rarely, and then only what was available on the unit because they could not leave their patients.

Urquhart & Crane (1994) used structured interviews and vignettes to elicit from nurses the sources they believed they would use in a hypothetical situation. The authors concluded that a third of the nurses were "confident information seekers" and a third "appeared lacking in information-seeking skills". The former group cited two or more possible sources of information and was also more likely to mention using libraries than the latter. Both groups preferred seeking information from informal sources (people) to formal sources (books, journals or libraries). Many complained about their lack of access to particular library services in the area. Wakeham (1993, 1996a, 1996b), in reporting on his Information-Seeking Behaviour of Nurses (ISBN) Project, said that nurses' main sources of information were "colleagues and ward-based information". He also wrote that librarians and nurses alike saw libraries as useful to nurses primarily when they were taking formal courses. Librarians and nurses each spoke disparagingly about the other profession.

Grounded Theory Models of Nurses' On-duty Information Behavior

None of this literature proposes any grounded theory or model of nurses' on-duty information behavior. The successful and important observational study of physicians' information behavior by Forsythe, Buchanan, Osheroff & Miller

(1992) influenced the choice of method for the present study. The next chapter discusses how this study uses participant observation to develop a grounded theory model of critical care nurses' on-duty information behavior.

CHAPTER 3

METHODOLOGY

This chapter discusses the overall procedural methodologies of the study and the specific methods and techniques used. The methods for this study are primarily from the grounded theory tradition using ethnographic participant observation and in-context interview techniques for data collection. The investigator and the people work so closely together that they are all considered participants, not researcher and subjects. In *field work* the investigator is immersed in the context and culture of interest.

Observation in Context to Investigate Information Behavior

Needs may be important in some kinds of information-seeking behavior, but they are not directly observable. Individuals may report a perceived need, or investigators may infer a need from observed behavior, but this kind of need is more difficult to establish than, say, the human body's need for food and water. Furthermore, people can call wants and desires *needs*, while in contrast being ignorant of their lack of some information they seriously may need for their well being. Many older studies in library literature purport to investigate *information needs*, but contemporary scholarship emphasizes that *behavior* is observable while *needs* are not. However, the practice of using some kind of survey,

ostensibly for information needs assessment, is still widespread. Forsythe (1998) presents four reasons why asking people to describe their information behavior is not trustworthy: (a) self-report (like eyewitness testimony in court) is often neither accurate nor complete, (b) respondents may believe that their answers reflect their level of professional competence, (c) people cannot identify information needs of which they are not aware, and (d) investigators may not understand the context of respondents' answers.

Case (2002) writes "Information seeking is a topic that has been written about in over 10,000 documents from several distinct disciplines" (p. 13). The subject interests anthropologists, information scientists, consumer market researchers, public health officials and others. The authors of the more than 10,000 documents were people living in specific cultures and contexts, as were the people they studied. Many of these studies used surveys, interviews, or focus groups. The post hoc self-report data gathered in such contexts often reflected peoples' reported current satisfaction with and memory of their use of such sources, rather than their true behavior when they were seeking a particular kind of information. Surveys, structured interviews and focus group methods can yield qualitative data (and even some quantitative data) about feelings and memories, but they are not direct observation of the phenomena of information seeking. Actual observation of the information-seeking behavior of the same people might well produce different data (McKnight, 2001).

However, actual observation does not reveal internal thought processes. Some studies of information-seeking behavior, including Branch's (2000) study of

adolescent use of online systems, attempt to follow this process with concurrent verbal protocols called *think alouds*. Branch also used *think afters* (participant report immediately after the completion of a task) to gather the adolescents' thought protocols retrospectively. As Branch reports:

Controversy exists, however, about the validity of both retrospective and concurrent protocols. Erikson and Simon (1984) contend that both methods have validity depending on the nature of the task. Their later studies have indicated that there may be invalid or incomplete memories or interpretation by the participants who use the retrospective method. Concurrent verbal protocols are less useful when the task involves a high cognitive load, then the information is difficult to verbalize because of its form (i.e., visual data) or when the processes are automatic for the participants (p. 372)... Many of the concerns about retrospective protocols focus around the problem of forgetting and fabrication.... Long-term memory contains a vast amount of knowledge, both procedural and highly individual. Short-term memory, on the other hand, is extremely limited if the information is not acted upon.... It is this short-term memory that verbal reports tap (p. 374).

Thus, data gathered in brief conversations in context and interviews immediately after the behavior are contemporaneous records of behavior. They are still self-report, but have more reliability than recall from long term memory.

Qualitative research methods demand "that the researcher stay in the setting over time.... [That] time in analysis [be] equal to time in the field ... [that]

the researcher become the research instrument.... [and that there is] ongoing analysis of the data" (Janesick, 2000, p. 386). Case (2002) notes that "one trend in recent investigations [of information-seeking behavior by scientists] seems to be a move away from quantitative measures of large numbers of scientists and toward more naturalistic observations of information-seeking behavior" (p. 234).

Results from a biomedical experiment carried out *in vitro* (i.e., in an environment outside of the body, like a glass test tube) may not be valid for the same process *in vivo* (i.e., within a living body) or *in situ* (i. e., in place). Likewise, the study of information-seeking behavior in a real (naturalistic) situation yields results more accurate than those either derived from subject memories or produced in the situation of a controlled and contrived experiment. Police investigators, consumer product developers and educational psychology researchers sometimes observe behavior unobtrusively through a camera or one-way glass. Since they are only observing and not participating they cannot ask for clarification of their observations *in situ*. If those they are watching know they are being watched, the behavior may be more akin to *in vitro* than *in vivo*. Dervin (1976) warns against the assumption that "objective information can be taken out of context" (p. 328). Anthropologists and sociologists long ago developed ethnographic research methods to minimize that distance by putting the observer into the context of, and even participating in, the phenomena under investigation. Naturalistic inquiry not only seeks to understand the observed behavior in context, but takes advantage of the insights an investigator can have from truly being *in situ* and *in vivo*.

Naturalistic Qualitative Inquiry

Qualitative methods of inquiry are especially appropriate when, as in this study, “the concept is ‘immature’ due to a conspicuous lack of theory and previous research” or when there is “a need ... to explore and describe the phenomena and to develop theory” (Morse, 1991, p. 120). This lack of theory needed to describe critical care nurses’ information behavior was explored in the second chapter, Review of Literature.

Qualitative research (a) takes place in the natural setting enabling “the researcher to develop a level of detail about the individual or place and to be highly involved in the actual experience of the participants,” (b) it uses “multiple methods that are interactive and humanistic” and is “emergent rather than tightly prefigured”, (c) it is “fundamentally interpretive” as “the researcher makes an interpretation of the data,” and (d) “uses complex reasoning that is multi-faceted, iterative, and simultaneous” (Creswell, 2003, p. 181-183). Qualitative research borrows heavily from (and sometimes directly uses) the ethnographic techniques originally developed by anthropologists and sociologists.

Naturalistic qualitative observation can lead inductively to *grounded theory*. Deductive research begins with a preexisting theory from which testable hypotheses are derived, but grounded theory begins with observations from which generalizations can be made. Barney Glaser and Anselm Strauss first

described grounded theory research as sociologists in the 1960's and explained its further development in several books (Glaser, 1978; Glaser, 1992; Glaser and Strauss, 1967, 1999; Strauss, 1987; and Strauss and Corbin, 1998). Dey (1999, pp. 3-9) summarizes the structure of current grounded theory research practice into these stages of (a) initiating research, (b) selecting data, (c) collecting data, (d) analyzing data, and (e) concluding research. Inherent to the grounded theory method is the practice of concurrent activities (b), (c) and especially (d). Research concludes (e) when the categories developed in (b), (c), and (d) become *saturated* and no new patterns emerge.

Creswell (1998, p. 56) explains that "The centerpiece of grounded theory research is the development or generation of a theory closely related to the context of the phenomenon being studied". Charmaz (2000, p. 511) describes grounded theory as "durable because it accounts for variation; [and] flexible because researchers can modify their emerging or established analyses as conditions change or further data are gathered". Also, nurse researchers Baker, Wuest & Stern (1992) clearly describe how

"... [The] researchers' purpose in grounded theory is to explain a given social situation by identifying the core and subsidiary processes operating in it. The core process is the guiding principle underlying what is occurring in the situation and dominates the analysis because it links most of the other processes involved in an explanatory network. Thus consistent with its intellectual underpinnings, the grounded theory method generates

inductively based theoretical explanations of social and psychosocial processes” (p. 1357).

Methods for This Study

With the grounded theory method, analysis of the rich data begins immediately and continues throughout the study period. It begins with *open coding* and *in vivo coding*, continues through *axial coding* and *selective coding* as described in the Introduction of this study.

Participant observation can mean several things. It could describe the activities of (a) an observer who is in the field but hardly participates, (b) an *observer as participant* (primarily an observer, but with some interaction with the study participants) or (c) a *participant as observer* in *action research*. It is possible for an investigator to migrate during a study from *observer as participant* to *participant as observer* (Glesne, 1999, pp. 44-45).

In the present study, the researcher usually was an observer as participant, but occasionally was a participant as observer (as described later in this chapter) when assisting in patient care tasks. This study is not action research with the intent to create immediate change. While in the field, the investigator interacted with the participants, took descriptive notes or made audio recordings of interviews with the participants. This was an effective way to observe and understand critical care nurses' information behavior first hand.

Research Context

The site selected for this study is a 20-bed critical care unit in a 275-bed community nonteaching hospital. This hospital was chosen because it had an Institutional Review Board (IRB). Research is rarely conducted in community hospitals, so most do not have an IRB. This hospital had a recently constituted IRB so that oncology physicians could enter their patients in clinical trials. This nonprofit hospital is in a suburban city in United States Census Division 7, West South Central. There is a university campus in the hospital's city, but the hospital has no affiliation with that university.

Fifty-eight RNs work in this unit; there are no LPNs or Nurse's Aids. Each RN is responsible for the total care of two or three patients each shift. Shifts are regularly scheduled as 8 or 12 hours, but may often run longer depending upon circumstances. Other health care workers are here for an entire shift (for instance, the Unit Secretary and monitor technicians) or visit the unit as their duties require (for instance, respiratory therapists, housekeepers, dieticians and case managers).

The physical description of the site follows:

The unit is comprised of two rows of 10 patient rooms on the outside walls and two long, straight hallways along the rooms. The hall side wall of each single room (all glass) can easily be opened in large sections to allow beds and

equipment to be moved quickly in or out of the room. There is a curtain that can be pulled for privacy.

Between the open hallways are various enclosed rooms and two large open square (three sided) nurses' stations with seating both inside and outside of the square. There is one nurses' station at roughly one-third and the other at two-thirds of the way down the hall. The outside of the nurses' station includes a high counter and stools for seating. Inside the square is a desk level counter with desk chairs on wheels. There is a lot of equipment in the nurses' stations including several computer workstations, electrocardiogram monitors, printers and a fax machine. Mobile computers are often plugged in at the nurses' stations for recharging or use there. By each station is a vacuum tube system terminal for delivering specimens to the lab, receiving blood (or blood components) from the blood bank for transfusions, or occasionally receiving supplies or drugs from the pharmacy or central supply. Most drugs and patient supplies for which patients would be charged are kept in ® automated storage, dispensing and tracking machines (Pyxis Corporation, San Diego, California) on the unit. PYXIS® systems have a high level of security that includes detailed records and controlled access. There is a small enclosed drug preparation room near each station.

Also in the center area are specialized treatment rooms, a clean utility room (with a mini-kitchen for snack items for patients and visitors), a soiled utility room (with appropriate receptacles for used equipment and linens), a respiratory therapy room, staff restrooms, an equipment room, and a staff room with lockers.

At the far end of the unit is a staff lounge with comfortable seating, a small kitchen, TV and an intercom system to the stations. There are educational posters and announcements of in-service education opportunities for nurses in the staff restrooms and lounge. Technicians watch ECG and vital sign monitors for all patients on telemetry from a monitor room on the floor.

At the opposite end of the unit from the lounge, between the security doors and the rest of the hospital, there is a large waiting room for family members and visitors. The entire unit is closed to visitors during shift change times so that oral report does not break patient confidentiality. Visitors may also go to the waiting room when the patient is having a procedure or the patient has too many visitors at a time.

The social, economic and circadian context of the research site can be described in the “city” and “neighborhood” analogy that follows:

A hospital, even a modest sized community hospital, is a like a small city with many neighborhoods. It is not an office building inhabited only on weekdays but rather a small city of birth, death and illness 24 hours a day, seven days a week. Without leaving its confines, its citizens can work, eat, socialize, purchase flowers, books or gifts or watch TV. This city has dozens of different neighborhoods.

The most powerful citizens, often those paid most by the hospital, are there only from 8:00 am -- 4:30pm on weekdays. These are the administrators, the directors, the managers and most of the nonclinical support staff. Many of

these people have offices far from patient care areas. Some outpatient care neighborhoods are busy neighborhoods on weekdays.

The Emergency Department and inpatient units (including critical care) care for sick and injured patients around the clock. The long term inhabitants of these neighborhoods work eight-hour shifts (7 a.m. to 3 p.m., 3 p.m. to 11 p.m., and 11 p.m. to 7 a.m.), twelve-hour shifts (7 to 7) or other variations. Most of these neighborhoods are very different at night or on weekends from what they are like on weekdays.

Members of the even more powerful group, the physicians, have their offices elsewhere, but spend some time in this “city”. They are not its employees, but, because they admit the patients who pay the hospital (usually through a third-party payer), they generate most of the hospital’s income. The medical staff administrative structure and the hospital administration are technically independent, but, in reality, very interdependent.

Participants

The six RN participants in this study constituted a purposeful representative sample of the staff in gender, education and experience. The unit’s RN staff during the research project included 47 females and 11 males. Three of the participants were female and three were male, but the researcher spent more time with the females so that the amount of observation of female

nurses and male nurses would be representative of the gender proportions of the staff. See Table 1.

Table 1. Unit RN Population and Participants

	RN Population	RN Participants
Number	58	6
Gender		
Female	47	3
Male	11	3
Education		
Diploma	3	0
AD	24	3
BS	29	3
MS	2	0
Ethnicity		
European American	51	5
African American	3	0
Chinese American	4	1
Experience		
range	NA	2 to 22 years
median	8 years	7 years
mean	9.3 years	8.3 years
Age		
range	NA	30 to 48 years
median	NA	40
mean	NA	39

A nursing division director provided the population data. He stated that age data and experience range data were not available from the human resources database.

As the participant observer researcher, I accompanied each RN participant for one shift (ranging from 4 to 13 hours) for a total of 50 hours of field work. I made observations on weekdays (7 a.m. to 7 p.m.), weekday nights (7 p.m. to 7 a.m.), weekend days and weekend nights. No shift was on a holiday. The observations began in January 2001 and concluded in March 2002. All observations were completed before federal Health Information Privacy and Portability Act (HIPPA) confidentiality regulations went into effect on April 1, 2003.

Participant Observer's Experience and Conceptual Structure

At the time of my participant observation, I was a 54-year-old white female with a Master's Degree in Library and Information Science and 18 years of experience as a hospital librarian. I had significant familiarity with health care vocabulary and hospital culture, at least from the viewpoint of an ancillary professional service. I previously experienced nurses' knowledge based information seeking in a hospital library setting. I knew that although nurses are the largest group of hospital employees, they usually are not the largest group of hospital library clients. For many years, I marketed hospital library services to the nurses in the hospital where I worked and studied literature about doing such marketing. Although I was familiar with nursing literature, I refrained from reading any critical care nursing texts until the later stages of this research. My preconceptions about the kind of information used by health care providers were

those expressed in the JCAHO and Gorman taxonomies described in the Information Context of Critical Care Nursing section of Chapter 1.

During the observations, I dressed as a hospital employee, but not as a nurse. It happened that I knew one of the volunteer participant nurses (by name only) before the study began.

Participant Observer's Entry into the Field

This section explains how the researcher gained access to the site for participant observation and how the researcher recruited participant RNs.

The hospital's vice president of nursing; director of emergency, critical and post-critical care; and the manager of the critical care unit were interested in and enthusiastic about the study from the beginning when I first broached the subject of this study with them. They were aware of how rare research is conducted in this environment. The IRBs of both the University of North Texas and the hospital approved the research plan. Because of the confidentiality provisions approved, the hospital, the unit, and all of the individuals involved (except the researcher) are not be named. Originally I had planned to obtain written consent from both the participant and each patient (or patient's guardian). Hospital officials determined that that would be too disruptive of the nursing process and asked that the nurse obtain oral consent and document that consent in the patient's

record. The doctoral committee for this dissertation saw all IRB approvals and consent forms.

I explained the consent forms and the recruitment process in meetings with the Director of Emergency, Critical and Post-critical Care and the unit's nurse manager. They understood that they would not pick, nor be told, who the participants would be. After that meeting, I posted flyers around the unit (on bulletin boards and on the insides of stall doors in the restrooms) and attended six regularly scheduled unit meetings to explain the research project to the unit nurses. I emphasized to them that (a) I was not a nurse and would not be judging anyone's professional competence, (b) I would protect participants' confidentiality as much as possible, but during observations other staff might notice my accompanying the participant, and (c) I was in no way a change agent for the institution. Furthermore, I told the nurses that if at any time they perceived my presence to be interfering with patient care, they should give a certain hand sign (described below) and I would leave immediately. I asked them to volunteer privately and not during the staff meeting. Each of the participants volunteered privately at different times. At least one volunteered because of seeing me accompanying another nurse on the unit. That one expressed a belief that I should observe a nurse different from the other one.

I met with each participant during an off-duty time before the observation shift. Not only did I go over the consent form in detail, but I answered any questions the nurses had at that point. The consent form included a complete description of the study and its purpose, the data collection procedures, known

risks, and notice of their right to withdraw from the study at any time without any penalty or repercussions. It also included provisions for the security of complete field notes for a particular observation. I told them that I would leave a patient's room during any intimate procedure (such as bathing, bed pan time or genital area care) and rehearsed with them the hand signal they could use if at any time they believed me to be interfering with their work. The hand sign was a quick flash of the palm side of a hand with all fingers spread. The nurse could give the sign to the researcher in any convenient way, including behind the nurse's back. No one ever used the sign.

Data Collection and Analysis Procedures

The following is a description of how the data was collected and analyzed. EasyScript® speedwriting method (Legend Company, Newton, Massachusetts) was used to record all observations. Earlier studies of physicians had determined that taking any kind of audio or video recording equipment into a patient care area was too intrusive (Forsythe, Buchanan, Osheroff & Miller, 1992; Osheroff, Forsythe, Osheroff et al., 1991). I accompanied each participant for a shift, taking notes in EasyScript® on a small stenography pad. In my field notes, people were identified by role (e.g., RN, patient, doctor, family member) rather than by name and all names of diseases, procedures and drugs were blinded by using {disease name}, {procedure} or {drug} in place of the actual word. I recorded observed actions, conversations and some on-the-scene memos. From

time to time I asked questions in context. The nurses were used to talking to someone about what they were doing because they occasionally are accompanied on duty by nurse externs (newly hired nurses who go through a preceptorship with an individual nurse for a period before working in the hospital), or LPN students (from a local vocational school) doing clinical observations. As a participant observer, I frequently helped the nurse with small tasks such as moving a patient or unwrapping components of a patient's meal while the nurse participant was present. As the data gathering continued I progressed from mostly observing (with little participation) to a combination of observation and participation. At one point I noticed and alerted the nurse participant to a change in a cardiac rhythm on an electrocardiogram (ECG) monitor.

I also gathered samples of (blank) forms used on the unit and descriptions of the computer interfaces the nurses used. These were helpful when I was coding the kinds of information the nurses gathered from or recorded in them.

Sometime toward the end of the shift, when the nurse could take a short break, I engaged the participant in a private, audio recorded interview. The interview usually lasted 20 to 25 minutes. During a day shift this interview took place in the staff lounge or staff room. Sometimes at night it was possible to do the interview at the nurses' station, but the background noises of various alarms and machines made that less than desirable. At the end of each observation, the researcher presented the participant with a small box of gourmet chocolates as a token of her gratitude.

As soon as possible (within 24 hours) I transcribed all of the observation notes and the recorded interview. I noted words that I could not hear or read as [unintelligible] in context. I used the following *member check* technique (Glesne, 1999, p. 23) to verify the accuracy and validity of my observations. I gave each participant a copy of the transcript within hours of its completion and asked the participant for revisions. Most made no revisions at all, and the few revisions they did make were minor. All participants said that reading the transcript was interesting to them; some reported new insights into their own work, including the frequency of some of their activities. I did not, however, record those reactions verbatim because they were not covered in the consent form approved by the IRBs.

I immediately began open coding, in vivo coding, and axial coding (for the secondary research questions) of the transcribed field notes and interviews. I also wrote memos about the evolving theory. This common practice of *memoing* in grounded theory research includes “preliminary propositions, ideas about emerging categories, or some aspects of the connection of categories ... these are written records of analysis that help with the formulation of theory (Strauss & Corbin, 1990)” (Creswell, 1998, p. 241).

I used NUDIST® qualitative research software (QSR International, Melbourne, Australia) and its later version, N6® qualitative research software (QSR International, Melbourne, Australia) to record my concurrent coding and to index the data for ease and accuracy in later retrieval. (NUDIST® is an acronym for Non-numerical Unstructured Data Indexing Searching and Theorizing.) I

developed axial (hierarchical) codes in three tree structures (Information Seeking, Information Use, and Information Kind) plus open (free) codes for concepts that emerged during the data gathering. Information Seeking included these broad categories of information sources and many, many narrower categories: people (including patient, family member, other nurse, physician, and other health care provider), paper charts, computer systems, published information and other. Information Use categories initially branched into “acts on” and “passes on” with many subcategories. Information Kind included patient specific, logistic, social, knowledge based and epidemiological or statistical information. Some of the free coding terms included mobile computer use, multitasking, jot sheets, legal awareness, antipathy to reading on duty, decision not to pursue a question and barriers to information finding. At one point toward the end of the post-observation analysis, the researcher used 55 open (see Appendix B) and 64 axial (see Appendix A) codes for the data.

The observational data gathered for this study includes 4,236 paragraphs of text. (Fewer than 250 of these paragraphs described activities that were not information behavior.) The concurrent memos constitute another 406 paragraphs. The latter, of course, tend to be longer paragraphs because they do not include transcripts of conversation.

Analysis continued after the end of the observations with selective coding, triangulation from other sources (e.g., critical care nursing textbooks and casual conversations with nurse educators and nurse managers not involved in the study) and grounded theory development.

The core process findings from analysis of these data are presented in the next chapter as grounded theory illustrated by a graphic model and a narrative. Subsidiary processes, observed phenomena relating to the research questions, are described and illustrated with examples from the data in the following chapters.

CHAPTER 4

FINDINGS: THE NURSE'S PATIENT-CHART CYCLE MODEL

This chapter describes the core process findings, five kinds of informative interactions, from analysis of the data. The resulting grounded theory model, the Nurse's Patient-Chart Cycle, is presented graphically and narratively. It answers the primary research question, "What is on-duty critical care nurses' observable information-seeking behavior?"

Model of the Core Process

The model illustrates the core process of the observable information behavior of on-duty critical care nurses in a nonteaching community hospital. It represents the analysis of open and axial coding of the data. Selective coding was used to choose examples from the data to illustrate the findings.

The basic unit of hospital nursing practice is the shift, a work period for which nurses are paid by the hour. The nurse usually cares for the same patients throughout a given shift, but that may change if one of those patients is transferred to another unit, or if the nurse is assigned a patient being transferred from another unit. (Critical care patients usually transfer to the unit from the Emergency Department or the Surgery Department. A patient may also be discharged or die during a shift.) Nurses in this critical care unit usually have two patients at a time, but may occasionally have to care for three.

All of the nurse participants in this study demonstrated a consistent and easily observable pattern of information behavior during their on-duty shifts. Information seeking, and recording or passing on of information is a nearly constant process for the entire shift. The consistent process pattern, illustrated in Figure 1, included the following interactions of seeking and passing on information, as well as, to a lesser extent, acting on information received:

1. Report: Informative interaction between the nurse who has been caring for the patient and the nurse who is about to begin caring for the patient – at the beginning and end of each shift, as well as whenever a patient is transferred from one unit to another. This is commonly called “report”.

2. Chart: Informative interaction with the patient record, commonly called the “chart”, in paper or automated systems.

3. Patient: Informative interaction with the patient

The nurse repeats interaction number two and interaction number three alternately throughout the entire shift, interspersed with brief episodes of:

4. Health Care Worker: Informative interaction with other health care providers or health care workers, primarily to coordinate the care of the patient

5. Family, Friends, and Visitors: Informative interaction with the patient’s family, friends and visitors on behalf of the patient

All five kinds of informative interactions can – and often do – happen in multiple media.

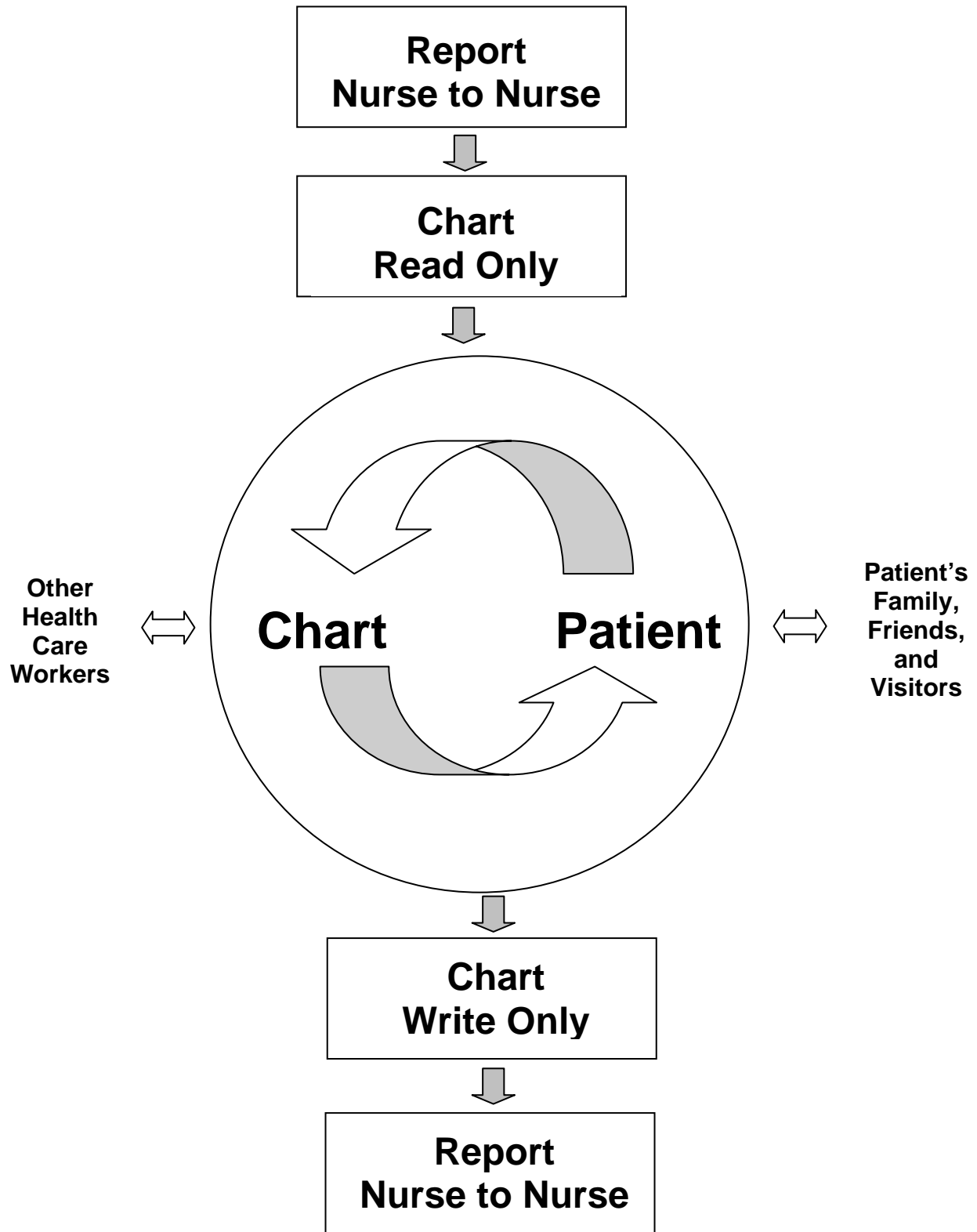


Figure 1. The Nurse's Patient-Chart Cycle Model

Nurses' Informative Interactions During a Shift in Critical Care:

A Narrative With Examples

This narrative follows the Nurse's Patient Cycle of informative interactions with report, the chart, the patient, other health care workers and the patient's family, friends and visitors. For each component of the cycle, examples are given from the data. The examples were chosen by selective coding to illustrate the components of the cycle.

[The following narrative is based on observations of all the participants. Feminine pronouns for the nurses are used consistently to improve readability and preserve confidentiality. Although the majority of the nurses on the unit are female, in no way does this stylistic convention imply bias against the male participants. Also, for the sake of readability and confidentiality, masculine pronouns are used consistently for other health care workers, the patient, the patient's family members and visitors.]

The nurse arrives on the unit and goes straight to the time clock in the staff room where she swipes her identification badge through the card reader. She's dressed in brightly colored scrubs and comfortable athletic shoes. (Comfortable shoes are important to nurses; they spend most of their on-duty time on their feet.) Before she tosses her backpack into her locker, she takes out

her stethoscope and drapes it around her neck. She may put paper and a pen or pencil in her pocket. In addition to personal items, the backpack contains her own copy of a pocket nursing drug guide. She uses the staff restroom quickly because it will probably be hours before she has that opportunity again.

In her first observable information behavior, the nurse reads the staffing board in the staff room to find out (a) who her assigned patients are and what rooms they are in as well as (b) what nurse had each of those patients for the last shift. The board is hidden from public view. It lists only the patient's surname, the nurse's first name and the doctor's surname. It may also include marks made by the current charge nurse (literally, the nurse in charge of the unit) that indicate the relative condition of each patient and the existence of any DNR (do not resuscitate) orders. (It is important for all nurses on duty on the unit to know for which patients they should not initiate resuscitation procedures in the event of a full cardiac arrest.)

She goes to the nurses' station and locates the two heavy binders containing some paper records for each patient. Some of the papers are part of the patient's permanent medical record and some are not, but for the duration of this shift this collection, and the computer records for this patient, are collectively "the chart". She finds the nurse who was in charge of one of her patients during the last shift. Usually, one of them says "Let's do report" and the ritual begins.

1. Informative Interaction: Report

The narrative below illustrates the first part of the model, the informative interaction between the nurse who has been caring for the patient and the nurse who is about to begin caring for the patient, commonly known as “report”. It is followed by six examples (A through F) from the data. The examples are:

Example A – From observation – Report on a patient who has been on the unit for about a week

Example B – From observation – While the nurses discuss the patient’s poor physical status, they are considering emotional support because the patient is alert and aware.

Example C – From observation – Report for a patient who will not live much longer

Example D – From observation –Report includes information about the patient’s physician and family

Example E – From observation – A shift report about a patient who will transfer out of the unit later during the shift

Example F-- From observation – A report for a patient transferring from one unit to another

During report, the nurse going off duty (“previous nurse” in the examples below) does most of the talking. The nurse going off duty begins with a rapid description of the patient’s condition and medical history. Most of this information can also be found in the patient’s record, but there are some variations. The nurses conscientiously refrain from gossip or conjecture, but they do pass on some information, especially social information, which is important to the patient’s care that will not be in the record. The nursing coming on duty (“new nurse” in the examples below) asks questions and makes comments. Both use mutually understood jargon and abbreviated terms.

At shift change times, one sees pairs of nurses at the nurses’ station, in the staff room or anywhere they can find a place for this interview. Because this is an oral process, the unit is closed to visitors at shift change times to protect the privacy and confidentiality of the patients.

In the examples below, “Family member” may refer not only to a family member, but also to a friend or other visitor without any kinship to the patient. Bold type indicates a speaker. Selective coding produced each of the six (A through F) examples of informative interactions presented below. All names of diseases, procedures and drugs are blinded by using {disease name}, {procedure}, {drug}, etc. in place of the actual word. All examples are verbatim from observation field notes or transcriptions of interviews.

Example A – From observation – Report on a patient who has been on the unit for about a week

Previous Nurse: [after rapid description of patient's history] ... and extubated last {day of week}

New Nurse looks at printout of arterial blood gas levels

Previous Nurse: still a lot of soft bronchi ... can cough ... afib [atrial fibrillation, a cardiac dysrhythmia]... converted to sinus [more normal rhythm] about 5:01

New Nurse: Did the doctor order...

Previous Nurse: He didn't say

[Both look at a three-page assessment form.]

Previous Nurse: He's been up in a chair only once ... Swann [catheter] out

New Nurse: Was he sick prior to {procedure}?

Previous Nurse: He'd been ill ... {another kind of procedure} ... but nothing else ... pulled chest tube ... one leg incision

New Nurse: They start him on any solid [food]?

Previous Nurse: Yeah ... stated feeding today ... on the {proprietary clinical pathway name}

New Nurse: Diabetic?

Previous Nurse: Yes, but not insulin, just diet ... ordered ADA [American Diabetes Association Diet] for tomorrow ... q i d [four times a day] insulin check ... asked all day about pain – nothing. He's a bit confused ... {family member} works in {workplace}.

New Nurse: Blood pressure?

Previous Nurse: Yes, 110s, 120s

Example B – From observation – While the nurses discuss the patient's poor physical status, they are considering emotional support because the patient is alert and aware.

Previous Nurse: {Eponymic diagnosis including paralysis}, on ventilator, CMV [controlled mechanical ventilation] ... {lung function} was {number} this a.m. and vital capacity {number} which is pretty good for him

New Nurse: How many times a day?

Previous Nurse: Once a day. {Respiratory Therapist} thinks improving ... [continues to describe condition] ... all charted

New Nurse: I always go back in the chart for a week or so.

Previous Nurse: Moves upper extremities, pupils react, talks on chart [a card with letters, numbers and pictures that the patient can point to; patient is unable to talk because of the mechanical ventilator]

Previous Nurse discusses fixing a mistaken entry on the paper assessment chart ... there is little room for correction

Previous Nurse: ... got high top tennis shoes ... put them on at 8 p ... got foot drop pretty bad ... tape one eye shut. Dr. {name} wrote order to leave the fan [in the room] off because his eye is drying out. Patient is very hot, so the fan is on but aimed away from him. Tell them in the morning to watch

out or Dr. {name} will “hit the fan” [laughs] ... lubricating eye drops help ...
q.i.d. needs again at midnight

New Nurse: [who has had this patient before] I did {therapeutic activity} earlier so
he could watch {TV show name}.

Previous Nurse: Yes ... likes TV ... has letter board, spells excellently [more a
description of state of mental awareness than of intellectual skills] likes ice
... {family member} present who will help ... has to be suctioned every 1-2
hours ... had trouble with intubation and nosebleeds. Had a bad day. I
don't think he understood about intubation and with the nose bleeds and
all he was very unhappy ... don't know if he's had episodes of diarrhea or
not, but his butt is red.

New Nurse: Is the {family member} in the room?

Previous Nurse: I think he's gone to get something to eat ... oh, and he's got the
lumens [separate tubes in vascular catheter]

New nurse is reading doctor's orders.

Previous Nurse: He's pretty [unintelligible]. You've got ABGs [arterial blood gas
measurements], chest x-rays and lab ... I just spent time in there with him.
Had a kind of freaky weekend. Didn't understand about intubation ...

New Nurse: You never know ... some of these people with {eponymic diagnosis}
... any results on {specialized test}?

Previous Nurse: I haven't seen any. I figure that stuff will come back next week.
..[describes patient's IV and feeding regimen] ... If you just spend time
with him ... He's had a good day ...

Example C – From observation – Report for a patient who will not live much longer

Previous Nurse: ... is DNR

New Nurse: I had him five days last week

Previous Nurse: Totally unresponsive now [continues with description of condition] ... mostly just turning him ... had he had many visitors [last week]?

New Nurse: Yeah. {Family member} still around?

Previous Nurse: Not now, his cell phone is a long-distance number

New Nurse: Hasn't eaten in two weeks

Previous Nurse: You can cancel labs for tomorrow ... not on hyperal [hyperalimentation, parenteral feeding] any more.

[Although professional and businesslike, the demeanor of both nurses was quiet and respectful throughout this report.]

Example D – From observation –Report includes information about the patient's physician and family

Previous Nurse has finished rapid description of patient's history.

Previous Nurse: The doctor ordered another {diagnostic imaging procedure}.

Previous Nurse tells New Nurse what the physician has told the family. The doctor has not yet seen the family this shift.

New Nurse: Tell me where the family is.

Previous Nurse: They went to the waiting room. [continues with description of patient's activities] and he's talking more

New Nurse: And it's coherent?

Previous Nurse: Yes, Sometimes he's hard to assess though. You know he rolls his eyes up – hard to see his pupils. Doctor wants him to get up with a walker.

New Nurse: What's he taking for pain relief?

Previous Nurse: {drug name} He's awake. He's staring at the TV in his room. The Doctor said to get him up twice during the day. We only got him up once but he was up for a while.

New Nurse: New orders?

Previous Nurse: Only new {orders}.

Example E – From observation – A shift report about a patient who will transfer out of the unit later during the shift

[Report is very, very fast. Researcher is unable to take notes on all phrases.]

Previous Nurse: He has two IVs. He picks at them. He didn't have {x} checked.

New Nurse: [reading chart] Yes, he did.

Previous Nurse: [tiredly] if he did, I'm out of my mind.

New Nurse: OK, what's he on?

Previous Nurse: {names drugs} ... can't cough yet ... started wheezing.

New Nurse: Still wheezing?

Previous Nurse: Yes, still wheezing. Can't keep him up in bed; he scoots down.

New Nurse: OK

Previous Nurse: He talked and said he was not hurting, but when I gave him his {pain medication} his sats [blood oxygen saturation] came up and he was breathing better [sign of reduced pain]

New Nurse: What's he had?

Previous Nurse: {procedure} ... Mr. {Name} has all of his stuff signed, credit care and all ...

New Nurse: [looking at chart] Yes, the transfer order's here, everything is signed [patient to transfer to another institution]

Previous Nurse: Yes, ready to leave. Dr. {name} wants to know why he can't leave before {time}, but Dr. {different name} wants to keep his [IV] line in.

New Nurse: Yes, I saw one on his arm.

Previous Nurse: Yes, he still has one in his arm. Still has this arm [tied] down.

New Nurse: Yes

Previous Nurse: I gave him a glass of tea

New Nurse: Blood sugar?

Previous Nurse: {number}

New Nurse: Has not {unintelligible}, IV fluids, the same

Previous Nurse: Yes, still good. Real cooperative – just confused.

Researcher's comment: The new nurse "takes report" for each of her patients on this shift and "gives report" to the next shift nurse for each of them.

Nurses also "do report" when a patient is transferred from one unit of the hospital to another. One of the participants had one patient transfer from the

critical care unit to the hospital's "step down unit" or post-critical care unit (a unit with a higher level of nursing care than that of a standard medical-surgical unit, but not as much as that of a critical care unit) and a new patient transfer into the unit from the Emergency Department. Therefore, she did six reports during her shift – two when she came on duty, two during the shift and two at the end of the shift. In busy hospitals, there are times when patients needing critical care are held in emergency departments until a bed in the critical care unit is available. Consequently mid-shift transfers must be handled as quickly as possible. The nurse who is responsible for these patients must not only care for each patient, but insure that the rooms are cleaned between patients. She must be sure that not only the patient information, but also the patient's equipment and belongings are transferred efficiently. Additionally, the nurse is the contact person for all of the people – health care providers, family, and visitors – associated with the patient.

Example F— From observation – A transfer report

Previous Nurse: Did you see those two forms in the front of the chart?

New Nurse: Yes

Previous Nurse: Dr. {name} has to sign them. Who's taking {room number}?

New Nurse: They're waxing the floor in there; can you give us until {time}?

Previous Nurse: Would you like to do report?

New Nurse: Yeah

[They sit, facing each other. What follows is a rapid-fire recitation punctuated by a few brief questions from the New Nurse.]

Previous Nurse: He had {procedure} the day before yesterday. Dr. {name} did {procedure}. Dr. {another name} is attending ...

New Nurse takes notes on a sheet of blank paper. [Personal notes are discussed in a later chapter.]

Previous Nurse continues report for another 15 minutes.

New Nurse: Does he [the doctor] want {particular kind of automatic monitoring}?

Previous Nurse: I don't know – just said to go to {unit name} ... Do you have one on the floor?

New Nurse answers.

Previous Nurse: When asked to cough he can do that. He was on {drug name} but he's off that now.

New Nurse: His central line is?

Previous Nurse: ... triple lumen ... {body site} ... [describes the current use of each lumen]

Previous Nurse describes family

New Nurse: He has {disease name} and {disease name} also?

Previous Nurse: I'll check on that. Dr. {name} is on call for Dr. {another name}.

Dr. {yet another name} wants lotion [Previous nurse rubs own arm to demonstrate]. I did give him a bath.

Researcher's Comment: Another nurse participant arrived at work only to discover that the nurse in charge of one of her patients had already left and was

not available to do report. She had to work very hard seeking the information that she should have received in report.

2. Informative Interaction: Chart

The discussion and narrative below illustrates the second part of the model, information interaction of the nurse with the patient record or chart. Within the discussion are six examples (A through F) from the data:

Example A – From observation – Open charts before the doctor arrives

Example B – From observation – An hour before seeing the patient [because of time spent in report and with the chart]

Example C – From observation – I need a MAR and bar code stickers

Example D – From observation – Checking chart information

Example E – From observation- Am I charting on the right patient?

Example F – From observation – Copying the monitor report into the chart

Immediately after taking report the nurse studies each patient's record in detail. During these observations parts of the patient record (the chart) were in computer systems and parts were on paper. A few functions moved from paper systems to online systems during the observation period. Most, but by no means all, of the paper and online documents the nurse uses are part of the patient's permanent medical record. The nurse loosely uses the term "chart" not only as a

noun describing this collection of documents but also as a verb describing her addition of information to these documents. According to Thelan, Lough, Urden & Stacy (1998)

Documentation in the patient's medical record must be (1) complete, (2) accurate, and (3) timely. The medical record provides legal proof of the nature and extent of care delivered to the patient. The critical care nurse has a legal duty to maintain the record in sufficient detail; insufficient or improper documentation may result in nursing liability or nonreimbursement by a third-party payer [e.g. government or private health insurance]. The general rule, "what isn't in the medical record didn't occur," continues to prevail. The courts have held fairly consistently that failure to document care infers failure to provide care.... Correcting an entry is lawful if the corrected portion remains legible; obliterating an entry may expose one to liability... Other documentation errors include factual omissions, unreasonably late entries, unauthorized entries, vague or ambiguous recordings, abbreviations not in common usage, personal opinions and subjectivity, failure to sign or time the record, and illegibility (p. 1018).

In this hospital, the paper parts of the chart are contained in a large binder with the room number prominently displayed on the cover. One of the top sheets in the binder is a form identifying the patient, one or two of the patient's nearest relatives, and health insurance company (or other payer). The binder contents include consent, disclosure and agreement forms signed by the patient or

patient's guardian, physician's orders, and reports of laboratory test results. There are handwritten notes made by the physicians, the nurses, and other health care providers (such as dietitians, respiratory therapists, physical therapists, and pharmacists) who are involved in the care of this patient. It also contains originals or copies of organ donation forms and living wills or medical power of attorney forms. There may be a brightly colored sticker about a drug allergy or a pneumococcal pneumonia vaccination on the chart.

All parts of the official medical record are on forms approved by the hospital's documentation form committee. They have regulated margins so that no part of the record can "disappear" if a form is faxed. Physician's orders may be written on lined forms with columns for data and time, but most are on standard pre-printed orders for particular treatments or conditions. For instance, there are preprinted orders (with boxes for the physician to check and a place to sign and date) for new admissions, postpacemaker care, preoperative and postoperative heart surgery care, central parenteral (intravenous) nutrition, anticoagulation therapy after a stroke, routine anticoagulation orders for cardiac patients, post epidural pain management orders, intra-aortic balloon pumps, continuous infusions of specific pain relieving drugs, and other therapies. There are also preprinted clinical pathways (evidence-based plans of care with timelines) for specific diagnoses. There are forms for nurse's assessment, nurse's progress notes, patient teaching records and other forms.

The chart also includes printouts from laboratory report systems, reports on x-rays and other imaging modalities, and printouts from various automated

monitors. In critical care, it usually includes some representative electrocardiogram strips. Also in the binder are sheets of bar coded stickers that match the patient's wrist band. These can be used for labeling lab specimens or papers related to the patient.

Particularly important to the nurse are the Medication Administration Record (MAR), a pre-printed plan of care (often proprietary) and a Kardex® printed card (Remington Rand, Buffalo, New York). The Kardex® has areas for recording activities, lab orders and results, dressing changes, vital signs, treatments and medications. Gorman (2000) notes:

This card is annotated in pencil and updated and erased constantly; it is used by many people, and, although it is of central importance, it does not get permanently filed. It is a record of the management plan for the patient, a place where information is pulled together so a clinician can quickly learn about the patient. It contains information about active medications and treatments (p.295).

The Kardex® is not a legal medical record – everything on it must be copied into the official chart – but it is a handy guide for the nurse to organize her care of a particular patient. The Unit Secretary, who processes physician orders, frequently updates the Kardex® for the nurse.

The chart also includes ephemeral documents. These might include phone numbers for relatives or physicians not on the staff of this hospital. Sometimes there is a handwritten list (provided by a patient or family member) of

all the medications (and their dosages) that the patient was taking before admission to the hospital.

As more and more papers are added to it, the entire chart tends to get large and unwieldy. The Unit Secretary regularly “weeds” charts, sending less recent and less necessary documentation to the Health Information Management (formerly known as Medical Records) Department. The chart itself stays (or is supposed to stay) in a secure area inside the nurses’ station. The nurse generally carries what she needs from it on a clipboard she can carry to other parts of the unit. She also uses a personal note sheet (the “jot sheet”) which is discussed later in this chapter.

These are only the paper components of the patient’s record. The nurse also uses a number of online systems, including ADT (admissions, discharges and transfers), dietary, drug, radiology, lab and treatment orders, and requests for materials or services from other hospital departments (e.g., housekeeping, engineering, patient transportation, nutrition, social services). There are online systems for entering the nurse’s assessment, patients vital signs, medication and progress notes. The nurse enters other data online such as fluid input and output (I’s and O’s), patient weight, serum glucose levels (blood sugar), etc.

The nurse uses a laptop computer on a wireless network to access most of the online systems. The laptops are secured to stands on wheels so that they can roll anywhere on the unit. These computers on wheels (COWs) do have to be plugged in from time to time to charge their batteries. Even though they are

intended for nurses to use standing up in or near a patient room, the nurses nearly always use them at the nurses' station where they can sit down.

So, after taking report for each of her new patients, the nurse sits down to study the charts (both paper and online) for each of her patients. On a Kardex®, personal note sheet, MAR printout or some combination thereof, she plans out the ordered medications, tests and treatments that must be administered this shift and when they should be done. She also studies the patient's recent history so that she can report to or ask questions of the patient's physician. (The physician may arrive at any time and will not stay on the unit very long, so she must be ready.) She will return to the chart many, many more times during the shift, but this will probably be the only time when she does not add something to it.

Only after report and studying the charts does the nurse make her first visit to the patient. It may have been more than an hour since the patient last saw a nurse. In the examples throughout the rest of this chapter, "RN" refers to a nurse participant and "Researcher" refers to the participant observer.

Example A – From observation – Open charts before the doctor arrives

RN: There. I feel better. My charts are all open. You try to get your charts open before you talk to the doc.

Example B – From observation – An hour before seeing the patient [because of time spent in report and with the chart]

RN: It's not unusual for me to be at least an hour into the shift before I see a patient.

Example C – From observation – I need a MAR and bar code stickers

RN: [going through chart] I don't have a printed MAR.

She goes to computer to order one, logs into computer with personal ID and password, then logs into area for that particular patient. She goes through several screens until finding the section of the MAR she wants and orders a print. After retrieving the print from printer, she makes notes on her personal jot sheet.

RN: See these bar code stickers? I put one on my clipboard. They're just like the one on the patient's wrist band. Once in a while, if you can't reach the patient's wrist without greatly inconveniencing the patient, you can zap one of these stickers [with a bar code reader] instead [of the one on the patient's wrist band]... But you have to be VERY careful when you use these that you don't mix them up.

D – From observation – Checking chart information

After report RN checks meds on the MAR against those on the Kardex®. RN reviews recent lab reports and puts them in the pocket of the clipboard. RN studies a contact information sheet left by a family member.

Researcher's comment: The nurse is very aware of the legal importance of the permanent patient record. She is aware that its contents are very important in a malpractice lawsuit against any of the patient's health care providers. A mistake in charting could cost her her license. It is all too easy for a nurse to log in to the wrong patient's record and enter data for a different patient. If the nurse notices the mistake, legal safeguards in the system make it extremely difficult to change. Most systems log the time the data are entered. Nurses complain that that may well not be the time the data were gathered.

Nurses and medical records administrators alike report that when an institution migrates from an all-paper records system to an online patient-information system, the amount of paper archived often doubles. Nurses have to printout screens in order to compare them, have to take data from the printout of one system (for instance, a bedside monitoring system) and enter it into the clinical information system. Most of these printouts are retained for legal risk management.

Example E – From observation- Am I charting on the right patient?

RN: Is this the right patient? Oh, yes, it is ... I've done that before.

Researcher: Done what?

RN: Charted on the wrong patient. I'm getting tired and my dyslexia is setting in.

Researcher: Yeah, I've seen that before.

RN: Yes.

Researcher: It doesn't matter if you catch it, but it does if you don't catch it.

RN: That's what's really weird with this [new computer] system. You can't see what you've written. I've come in and noticed that someone else has charted on the wrong patient the entire time. Ugh! That would be so bad if it went to court! Really terrible. It's so much easier to make that kind of mistake on the computer. On paper it would be obvious that there's been a big change, but not so obvious here.

Example F – From observation – Copying the monitor report into the chart

RN at nurses' station retrieves a monitored vital signs printout from the printer.

RN copies the numbers from the printout into the paper chart. Researcher asks why.

RN: The monitor system records vitals every 15 or 30 minutes. You can put the printout in the chart like this [points to a printout with a patient bar code sticker attached] but it may be lost from the chart. Because I know it may disappear, I copy it here. I know this form will stay with the chart. If not, some day in court some lawyer may say "Did you take vital signs?" and if the record isn't there, I'm screwed.

3. Informative Interaction: Patient

The narrative below illustrates the third part of the model, informative interaction with the patient. It is followed by these four examples from the data:

Example A – From observation – Introductions and assessment with an alert patient

Example B – From observation- Introduction and assessment with a less alert patient

Example C – From observation- Interaction with a patient and family member

Example D – From observation – Introduction, assessment and reassurance

The nurse's demeanor changes dramatically when she enters the patient's room; she is clearly in a different role. While studying the chart she was concentrating and shutting herself off from all the activity around her. When she enters the room she is very alert to everything within the room. The first time she enters a patient's room, she introduces herself to the patient (and any visitors who may be in the room) and writes her name on the white board on the wall beyond the foot of the patient's bed. (There is a clock and a calendar – the kind with one sheet per day and a large number on it – above the white board.) Most nurses try to arrive with something to give to or do for the patient immediately; it may be a pain medication or a fresh pitcher of water. The nurse is adept at donning procedure gloves from a box on the wall in the room, taking notes on paper and juggling all the things in her hands and pockets. She begins with friendly banter but is really assessing the patient at the same time. (Most visits to the patient include some multi-tasking.) Even though she had just studied the patient's chart, she may ask the patient about their history and present condition

while she is doing a physical assessment. This gives her an idea of how much the patient understands about his condition as well as his present mental clarity or confusion. According to Thelan, Lough, Urden & Stacy (1998)

Nothing is more valuable to a patient in the critical care unit than a nurse who is proficient in physical assessment, who knows “normal” from “abnormal” appearances or behavior, and who recognizes subtle physical or behavioral changes. The cardiovascular abnormal signs can quickly develop, accelerate, and prove fatal without skilled nursing observation and intervention (p. 355).

The nurse assesses vital signs and asks the patient about pain. She notices skin color, texture and condition and feels in several places to note temperature, edema and pulses. She feels and inspects several large veins that lie close to the surface. The nurse checks the patient’s equipment to make sure it is functioning correctly. (A critical care patient typically is hooked up to several different kinds of machines.) She notes the level of IV medications in the hanging medication bag and urine in the Foley bag, either of which may need to be replaced. She reads cardiac rhythms and vital signs on the monitor and presses buttons to create print-outs on one of the printers at the nurses’ station. She takes the patient’s temperature and listens with a stethoscope to heart, lung and bowel sounds. She inspects IV and wound sites and does other assessments appropriate for the patient’s diagnosis. The nurse attends to the patient’s comfort needs by moving the patient and readjusting the bed and bed clothes. At the end of the visit the nurse takes a very relaxed stance and asks “Is there anything else

I can do for you? I have the time.” Before leaving the room, she makes sure that the patient can reach the nurse call button, and tells the patient to push it to summon her any time. She removes her gloves and washes her hands just before she leaves the room.

Example A – From observation – Introductions and assessment with an alert patient

RN checks remote monitor for patient, then goes to patient's room. She introduces herself [and asks for permission for researcher to enter and observe; patient assents.] She checks the IVAC [intravenous drug administration system] then goes back to the nurses' station to get a tympanic [ear] thermometer. When she comes back she checks the patient's temperature and looks at the eyes and skin.

RN: Can you squeeze my hand?

Patient: I think so [squeezes her hand].

RN: That's good, very good. I'm going to listen to your heart and lungs. I hear
you were bleeding a little.

Patient: Yes.

RN: [smiling] We're not going to have any more of that, OK? [Listens with
stethoscope]

Patient: Ever since I had my {sudden condition}, I've been short of breath.

RN: I'm going to look at your incision, OK?

Patient: [laughing] That's cold!

RN: I'm going to look at your feet. I see you've got some very fancy dancy socks.

[antithrombosis stockings].

Patient: I'm going dancing in them.

RN: I hear you like to waltz

Patient: Yes ... if I can find a partner.

RN: I have some medications for you. [Puts meds in IV].

RN: Are you hurting?

Patient: No, no

RN: You're going to let me know if you do hurt, OK? I'm going to have to come in
and change this [motions to IV bag] in a few minutes.

*Example B – From observation- Introduction and assessment with a less alert
patient*

RN: [cheerfully] Good morning! Good morning! How are you? Doing OK?

Patient: Cold

RN: You're cold

Patient looks confused.

RN: Remember me? My name is {name}. I was here yesterday. Did you have a
good night? [RN adjusts equipment]

RN: Can you lower your right arm? Where are you?

Patient: Hospital

RN: Hospital, right. Are you hurting anywhere? Let me cover you up, OK? I need to attach this [a pulse oximeter] to your toe so we can check on your oxygen level – all right?

Example C – From observation- Interaction with a patient and family member

RN: This is {researcher's name}. She's doing nursing research. Is it all right if she comes in and watches?

Family member consents.

RN introduces researcher to family member, they chat amiably about the weather while RN takes the patient's temperature, checks pulses and makes other assessments.

Family member: Has Dr. {name} been here this morning? Has he made rounds?

RN: Not yet.

Family member: He's sleeping in this morning. [Both laugh]

RN: [to patient] I'm going to take out this {line}.

RN speaks clearly and loudly to this patient. She always makes sure that he can see her face when she talks to him. He is confused, but she speaks to him as if he were not. He groans when she removes the line. She looks in his eyes and adjusts his oxygen mask.

RN: I'm going to hold a little pressure on this for a little while – OK? Can you take a deep breath and cough?

PT does something but doesn't quite cough.

RN: Very good. Very good. I have to put a little pressure on this. Would you like to get up in the chair?

Patient nods head “yes.”

Researcher gives RN cotton balls and tape from the supply drawer; nurse uses them to bandage the small wound where the line was.

RN to Family member: I hope you don't have far to go home if the weather gets bad.

Family member: I live in {town name}. If it gets bad I'll stay.

RN: You can stay here. We'll get you a blanket.

RN: [keeping pressure on line site] I took the {name of} line out. I had to press a while.

RN appears relaxed; show no sign of how rushed she feels.

Family member: He bleeds easily.

RN helps patient into chair and adjusts a blanket over him.

Patient looks at researcher. Researcher smiles. Patient winks.

Family member pats RN's back as she washes her hands.

Example D – From observation – Introduction, assessment and reassurance

RN enters room, introduces self and asks for consent for researcher to come in to watch. Patient consents. A respiratory therapist is in the room giving the patient a breathing treatment.

RN takes the patient's temperature, checks the Foley bag, looks at the monitor and listens with a stethoscope. Patient coughs a little.

RN: Good cough!

RN moves the bed slightly.

RN: Let's get this guy [Sir Cough-a-Lot – a stuffed toy bear given to post-heart surgery patients for them to hug to their chest to protect their incision when they cough to help clear their lungs] up where you can hold on to it while you cough.

RN checks monitor, pushes buttons to see different displays, checks feet, checks catheter

Patient: What's that noise?

RN: That's your breathing treatment.

Patient: I kind of make a noise when I breathe.

RN: There may be some fluid in your throat. Do you go by {patient first name}?

May I call you {patient first name}?

Patient nods "yes"

RN: I've got to check that {name} site. [to Respiratory Therapist and Researcher]

Can you help me move him?

They move him up in the bed and adjust the bed to a more comfortable position.

RN: You said you weren't doing so well. What's bothering you?

Patient: I get so out of breath.

RN: Yes. You're going to be pretty weak for a while. I'm going to be kind of a slave driver tonight. You're going to be doing breathing exercises tonight. You need to do a lot of coughing and deep breathing. There's some

congestion in your lungs. You've got a sucker here [hands him a tube] like at the dentist's office. You can spit into it.

Patient coughs.

RN: Good cough! That's what I want you to do... a lot of coughing like that tonight. Any time you cough and you need to spit, just put this [the tube] to your mouth and spit.

RN checks patient's pupils.

RN: Do you know where you are? Can you tell me?

Patient: Hospital

RN: I'm going to ask you some dumb questions just to check on you. Who is the president?

Patient: Bush

RN: What is four plus four?

Patient: eight

RN: I'll check back with you a lot tonight. [Looks at monitor] It looks like your heart's converted back to normal. Your heart had converted back with some {name of cardiac dysrhythmia}. We're going to give you a little medication for that. Are you having any pain?

Patient: A little bit.

RN: Your heart or your chest?

Patient: chest

RN: I'm going to check your blood pressure. Is that all right? [RN watches monitor] All right, everything is working OK. Your heart just doesn't like to

...

Patient's expression changes to fear.

RN: You're OK. Are you scared?

Patient: I'm scared.

RN: It's OK. You don't have to be scared. Just rest. I'll check on you frequently through the night.

After leaving the room, the RN went to the PYXIS® automated storage, dispensing and tracking machine (Pyxis Corporation, San Diego, California), a drug dispensing system, to get him some medication immediately. He had had a cardiac dysrhythmia when he was stressed a little during the breathing treatment, but had converted back to a normal rhythm when it stopped. RN asked the monitor tech for a printout of the ECG during the episode and put the strip in the chart.

RN: [to monitor tech] I'll see if I can get you a lead with a P wave [ECG]. He's teetering back and forth. His heart rate jumped up to {number}. There's no more question about whether or not we're going to wean him off {cardiac drug}. We're not going to wean him off {cardiac drug} tonight.

After this first visit to the patient, the nurse goes back to the nurses' station and begins entering information from the visit into the chart. She adds to the notes she has already taken in the room on her personal note sheet. She writes

on the Kardex® and then enters information in various parts of the paper chart. Next she logs into the computer system, logs on for the particular patient, and goes through several screens before she starts entering data into that system. Some of the same data is entered in several places.

When the nurse has finished this session with the chart, it's time to go check on the patients again. This will be the pattern for the rest of the shift -- time with the chart, then time with the patient and then back to the chart again.

Difference Between the Nurse's Observable Behavior When Interacting with the Patient and When Interacting with the Chart.

The narrative and examples below illustrate the clear differentiation between the nurse's behavior during informative interaction with the chart (part 2 of the Nurse's Patient-Chart Cycle) and informative interaction with the patient (part 3 of the Nurse's Patient-Chart Cycle).

The separation between the chart and the patient segments of the Nurse's Patient-Chart Cycle is evident in the dramatic difference between the nurse's demeanor when interacting with the chart and when interacting with the patient. No matter how stressed, rushed, frustrated or overwhelmed the nurse may be, she drops all outward signs of that when she walks through the door of the patient's room. The nurse consistently makes this conscious change of attitude. The curtain drawn around the patient's bed is as a curtain for a stage. Her body language, facial expression and speech patterns are dramatically different in

these two segments of the patient-chart cycle. The nurse very rarely shows any frustrations with the chart, other systems or people in the patient's room. This difference can be characterized allegorically as "Gentle Nurse Jekyll" and "Harried Nurse Hyde."

Gentle Nurse Jekyll always presents to the patient a relaxed, caring and reassuring person. There is no sign inside the patient's room of the Harried Nurse Hyde who may have been swearing at a paper chart, the computer, or a systemic malfunction just seconds before. Harried Nurse Hyde may be juggling several tasks, but when she rushes (sometimes runs) to a patient's room she stops just outside the door and composes herself before walking calmly in as Gentle Nurse Jekyll. These 13 examples and example sets from the data are presented below:

Example Set A – From observations - About the patient's call button

Example B – From observation – Doctor's orders and patient's perceptions

Example C – From observation – Patient exercise of control

Example D – From observation – Smile as if ...

Example E – From observation – Act as if it's no problem ...

Example F – From observation – Rush, then appear calm

Example G – From observation – Many things are going wrong, but the nurse smiles and laughs with the patient

Example H – From observation – I have to be good

Example I – From observation – Frown to smile to frown

Example J – From observation and interview – Once you're flustered everything just goes out the window

Example K – From observation – It's serious, but keep a sense of humor

Example L – From observation – Distract and give choices

Example M – From observation – Don't say that it's quiet; there's too much to do

Example set A – From observations - About the patient's call button

The patient's call button rings a bell at the nurses' station and turns on a signal light in the ceiling by the door to the patient's room.

(1)

RN checks to make sure the call button is near the patient's hand.

RN: [about to leave the room, to patient] If you need anything, anything at all, call me.

RN: [to researcher outside of the room] You *always* say that every time you leave the room. And when I answer a call [from the patient's call button] – even when I am rushed, I pretend not to be. If you don't say that when you leave the room, they actually call you more often than they do if you reassure them that you can come anytime.

(2)

RN: [to patient] Usually people just want me to get out of here. Do you know where your call button is?

Patient: It's on the phone cord somewhere.

RN shows it to him and puts it in his hand.

RN: Try the call light any time. If that doesn't work, just yell {nurse's first name}.

This patient's room is directly across the hall from the nurses' station.

(3)

RN: Remember, if you need me, use your call button. That's what I'm here for.

Example B – From observation – Doctor's orders and patient's perceptions

Patient: Incidentally, no one's brought me my medications. I take {names of several drugs}. I took them before I left the house this morning.

RN: It's different here. You're under your cardiologist's care.

Patient: I know, but ... it's on the chart ... I know it's all on the chart.

RN: I'll check the chart.

RN does not mention the fact that she's just spend a half an hour reading the chart and double checking the MAR against the physician's orders.

RN talks to patient about his heart rate.

Example C – From observation – Patient exercise of control

We leave the patient's room.

The patient immediately pushes the call button and we return.

Patient: There was a bag of ice on my {medical device area}.

RN: [sweetly] I'll check it for swelling and get you some ice.

RN gets ice from the clean utility room. Researcher remains in the hall while the nurse examines and ices the patient's groin area.

RN: [to researcher, back at nurses' station] He's a little bit demanding. People feel out of control when they're here. It's a controlling thing. Things go better if there is not a power struggle.

Example D – From observation – Smile as if ...

RN: {patient name} Can you wake up a little bit? Can you take a tablet for me?

Open wide ... open wide

The patient is not completely responding, but the RN gives him very big smiles anyway.

Example E – From observation – Act as if it's no problem...

RN spends several minutes looking for a thermometer before going to the patient's room.

RN: [to patient] I'm going to take your blood pressure more frequently.

RN puts the thermometer into the patient's mouth. She jokes and laughs with the patient while resetting the monitor and assessing him.

The patient drops the thermometer on the floor and it breaks. The thermometer is electronic and the part that goes into the patient's mouth is attached to the central unit by a long curled cord. The cord has broken off of the central unit.

Patient looks concerned about the thermometer

RN picks up the pieces.

RN: [smiling] Don't worry about that ...

RN calmly continues assessing and caring for the patient.

Back at the nurses' station, the nurse, visibly agitated, asks another nurse how to fix it.

Example F – From observation – Rush, then appear calm

RN is helping the patient with his meal. RN spills a few drops of milk and wipes it up.

Patient: I make a mess myself sometimes.

Patient retches a little.

RN hands the patient a bowl shaped plate cover, inverted.

RN: Here ... I'll get something else. I can take care of any mess.

RN walks out of the room, and then rushes to the clean utility room to get an emesis basin and a wash cloth. On the way she nods at another nurse who steps into the patient's room.

The patient vomits into the bowl.

RN walks calmly into the room, whisks the bowl away, and wipes the patient's face with the washcloth while saying soothing words.

RN: I'll get you something to help with that.

Outside of the room, the RN rushes to the chart and the MAR at the nurses' station. Then she jogs to the PYXIS® dispensing machine to retrieve an anti-emetic drug included in the orders. She prepares a syringe and hurries back to the room.

The other nurse is giving the patient some water, then she watches the patient's monitor as RN injects the drug into the patient's IV system. Both nurses appear calm and relaxed until they leave the room. Outside the room, RN shows signs of stress and agitation.

RN: [to unit secretary] Would you please page Dr. {name}!

Example G – From observation – Many things are going wrong, but the nurse smiles and laughs with the patient

RN has just dealt with a difficult family situation for one of her patients. She retrieves and prepares a medication for her other patient. In spite of her high level of stress, she changes her expression just before she enters the room. She walks in cheerful and relaxed.

RN: [to patient] You're not going anywhere until you get stable. [smiles]

Patient: Am I acting out?

RN: You're not acting out. This will help.

Patient tells an off-color joke.

RN: [smiling] *Now* you're acting out! [laughs]

RN: I'm going to give you a fluid bolus. Right now you're just a little bit dehydrated. Your pressure is dropping and that can make you nauseated. You're just a little dehydrated.

RN and patient laugh and chatter while she administers the bolus.

RN returns to PYXIS® and medication room to retrieve and prepare an anti-nausea medication. The IVAC machine (malfunctioning) beeps in the patient's room.

RN: I *hate* that thing!

RN goes to patient room. Again, her body language changes at the door. She lifts her head, drops her shoulders and smiles as she enters the room.

RN: [to patient] OK, sweetie, I gave you some fluid and I'm giving you some medicine for the nausea.

Patient coughs up something.

RN: [looking at it] Is this the first time you've coughed up ...?

Patient describes what he has been coughing up. They discuss it.

RN: You're coughing up some pretty gross looking stuff here. I'm going to get you something for that.

RN goes to the nurses' station and calls the pharmacy. She gets voice mail instead of a real person. She leaves a message.

RN: I *hate* that! I need that for him ASAP!

RN goes to one of the mobile computers parked at the nurses' station. She sits down to chart. She sighs heavily.

RN: [tense, with a set jaw, talking to herself while entering data] You are a positive, loving person. You are sweet and kind.

Another nurse asks RN where something is.

RN: [grumbling] We don't have that. If it costs money, we don't get it.

Yet another nurse speaks to RN and tells her that she is leaving the unit to get a tray for one of her patients and that she will be back soon. RN agrees to watch her patients while she is gone.

RN: If you see {family member} of {patient room number}, tell her to talk to {family member} in the waiting room.

Example H – From observation – I have to be good

Researcher: You're good when you go in the room. Very good.

RN: I have to be good. One good thing about the computer is that I can growl at the computer.

Example I – From observation – Frown to smile to frown

RN is charting at nurses' station for 20 minutes. An alarm on a monitor goes off.

RN: [to Researcher] What's his pressure?

Researcher reads numbers off of the remote monitor at the nurses' station.

RN growls.

RN goes to patient's room, putting on a smile on the way in. RN pulls up the covers over the patient, says soothing things, checks monitor, repositions oxygen and oxygen sensor. She checks the monitor one more time before returning to charting at the nurses' station. The frown returns as she leaves the room.

Example J – From observation and interview – Once you're flustered everything just goes out the window

RN [who is charge nurse this shift] goes to the staff room to check on scheduling, patient assignment and staffing again.

RN: [to researcher] There are too many things to do. You have to keep trying not to get frustrated. You just keep plugging away. If you get frustrated, it gets bad. Am I running too much for you?

Researcher: No

[interview of same nurse later]

RN: And I think ... I forgot what we were talking about earlier ... but a lot of things, especially since I'm in charge, I get bombarded with questions.

Researcher: Right

RN: ... constantly. About half the time I'm still charting things and answering questions or pointing things out ... doing five different things at once... and I don't really think about what I'm doing.

Researcher: The "multitasking"?

RN: Yeah. That's right.

Researcher: Are some nurses better at it than others?

RN: Oh, yeah. I think so. I know there are some that are very knowledgeable about areas and different things, but whenever you start doing two or ... things at once with 'em, they just get flustered and real upset with it.

Researcher: Their train of thought gets derailed?

RN: Yeah. You know, it's hard to do. As much as I hate being in charge, I think being in charge has helped me do that. It's taught me not to get flustered and upset; that just makes things worse.

Researcher: Right.

RN: If I just stay calm and just plug away at it one thing at a time, eventually it all gets done. It's just a matter of ... and some nights are worse than others.

Tonight has been pretty quiet and things like that ... and ...

Researcher looks up surprised.

RN: Yeah, I said the "Q" word. You know there are nights whenever you got two or three codes running at once. Those nights really get unnerving and that's when you kind of lose track of ... and just get flustered and everything. Once you're flustered then everything just goes out the window.

Example K – From observation – It's serious, but keep a sense of humor

RN: You still have some fluid and an extra heart sound. They're also going to be up later to do a chest x-ray.

Patient: They're bound and determined not to let me sleep.

RN: [smiling] You thought you could rest here? This is the Weight Loss Clinic!

They laugh.

Example L – From observation – Distract and give choices

Patient: I want to know if I can get up.

RN: Well, let's let the {drug name} do its work. Maybe this evening. I don't want to stress your heart too much. Let's look at your meals.

RN picks up the menu option form for the patient to order the next day's meals. She spends several minutes giving the patient many choices about what

he will get to eat. Researcher notes that just after telling the patient that he can't do something he wants to do (get up), the nurse has immediately given him some control – making meal choices.

RN: [just before leaving the room]: If your lungs and heart sound better this afternoon, you can sit up this evening.

Example M – From observation – Don't say that it's quiet; there's too much to do

RN: [to researcher] Awful quiet now tonight.

Researcher registers surprise. RN grins. She knew that another participant had expressed some superstition about using the Q word.

RN: If it isn't we say it is a "time management problem". Any time that we are "too busy" it's a "time management problem"... Five to seven a. m. is our very busiest time. There are so many labs [specimens that must be obtained and sent to the lab for analysis], x-rays and things that have to be done "in the a.m." ... in time for the results to be back when the docs make their rounds just before seven. Evidently, the people who write the {care plan clinical pathways system} never worked here, because they've added all sorts of things that have to be done between five and seven a. m. Since the staff is understaffed, some nurses even start drawing labs as early as 3:30 to be sure that they will be done by seven.

Researcher's comment: It happened that the researcher's spouse was a patient in a critical care unit for two weeks late in the study. In the role of patient's

family member, the researcher was aware of how different the nurse's role appeared from the other side of the curtain. During the writing of this study, the researcher briefly was an inpatient in a hospital. Patients and family members have almost no awareness of the nurse-chart interaction that cycles with the nurse-patient interaction. The nurse's calm, reassuring demeanor completely hides her very intense and busy activities outside of the patient room. Patients and family members may believe that a nurse is not responsive to the patient's call button summons; they don't realize how many information systems the nurse must deal with just to bring the patient a seemingly simple medication.

4. Informative Interaction: Health Care Workers

The narrative and examples below illustrate the fourth part of the model, informative interaction with other health care workers (such as housekeepers and engineers) and health care providers (such as physicians, therapists and other nurses). The examples presented below are:

Example A – From observation – An x-ray would tell if there's a problem with this lung

Example B – From observation – Informative interaction with the patient's doctor

Example C – From observation – Informative interaction with the doctor in the patient's room and with a computer technician

Example D – From observation – Informative interaction with a housekeeper

The hospital critical care nurse does not do medical diagnosis or issue medical orders. In a community hospital, most, if not all, doctors are not hospital based and tend to make rounds [visits to hospitalized patients] before and after their office hours. The nurse will see her patients' doctors only very briefly. The nurse is responsible for the execution or coordination of all of the doctor's orders for her patients during her shift. This requires informative interaction with a number of different of health care providers – including dieticians, respiratory therapists, phlebotomists, radiology technicians, and others. The nurse also coordinates activities of other hospital workers on behalf of her patient.

Example A – From observation – An x-ray would tell if there's a problem with this lung

RN has noticed some sounds in a patient's lung that may be signs of {disease}. An x-ray will give the physician more information about the condition of the patient's lung. The RN calls the doctor to ask for an order for a lung x-ray. The RN tells the Unit Secretary about the order (which will be confirmed in writing by the doctor later) and the Unit Secretary calls the Radiology Department to schedule the x-ray. When the radiology technician arrives with a portable x-ray machine, the RN asks the {family member} to leave the room for a few minutes. The radiology technician takes the x-ray and leaves. Later in the shift the radiology technician comes back and asks the RN if she has heard the results of the x-ray. She has not and she will not before her shift is over. The protocol is for a radiologist to read the x-ray and send a report to the physician. Both the x-ray

technician and the nurse suspect that something is amiss with the patient's lung, but they do not get any new information from the doctor before the end of their shifts.

Example B – From observation – Informative interaction with the patient's doctor

Doctor writes progress notes in patient's chart.

RN reports blood glucose levels to doctor.

They discuss the patient's blood glucose levels.

Doctor: Where do you record finger sticks?

RN shows him.

Doctor: His [bacterial] culture?

RN reads lab reports to doctor.

Doctor writes new orders for lab tests.

RN tells Doctor blood gas levels.

Doctor: The x-ray looked slightly worse.

RN: He's passing gas – no major poop – but is passing gas.

Doctor: [smiling] much to the nurse's dismay!

[They laugh]

RN: Any other questions? I'll meet you in there [the patient's room]

Example C – From observation – Informative interaction with the doctor in the patient's room and with a computer technician

The doctor arrives at the nurses' station. The nurse gives report to the doctor. The doctor asks quick, short answer questions and the nurse replies. They go together to the patient's room.

Doctor: Hey, {gender diminutive}, how are you doin'?

Patient: The same

RN: [gesturing to wound site] This is looking good ... much better.

Patient: My nose and head hurts.

Doctor: We got you fixed up. We [describes procedure].

Patient: Can I have something for my nose?

Doctor: [to RN] Have you had him up?

RN: No, I was waiting because of this [complication].

Doctor: We're going to get you up and walking around ... give you lunch.

Patient: I lost my breakfast.

Doctor: Well, this is lunch. We'll get you up and out of here by 4 or 5 o'clock or so

you can go home.

Doctor checks feet.

Patient: Are my legs OK?

Doctor: yes

Doctor and nurse go to nurses' station.

RN: DC [discontinue] Foley catheter?

Doctor: Yes [writes order in chart]

RN: Want me to culture it before I pull it out?

Doctor: yes

RN: DC the oxygen?

Doctor: yes

Information Technology person: How many patients do you have now?

RN: {number}

IT person: You may lose the monitors for a few minutes.

Example D – From observation – Informative interaction with a housekeeper

RN checks on the room in the step-down unit to which the patient is to be moved. The door is open and a housekeeper has just set up a fan blowing on the newly waxed floor.

RN: How soon can we use this room?

Housekeeper: By 11:15

RN: OK, by 11:30.

RN knows that there are two patients in the emergency department that need to transfer to the intensive care unit. The sooner patients can be transferred out of the intensive care unit, the sooner the patients in emergency can be transferred in.

5. Informative Interaction: Patient's Family, Friends and Visitors

The narrative and examples from the data illustrate below the fifth part of the model, informative interaction between the nurse and the patient's friends, family and visitors. The examples that follow are:

Example A – From observation – Death is approaching, but when?

Example B – From observation – Family member wants to understand and wants to help

Example C – From observation – many family members with different issues

Some of the nurse's most difficult information interactions may be with the people who are closest to the patient. When the nurse is in the patient's room and a there is a visitor, she picks up many subtle clues about the visitor's relationship to the patient and the patient's disease. She may notice signs of strain or signs of support among family members. Some may have a great need for information about the patient; some may not want to know. Some may be unable to accept what is happening or be unable to deal with the disruption in their lives. They may have unrealistic expectations for the patient or they may be unable to make necessary decisions about the patient's care. The nurse cannot ignore them because they, too, are important in the patient's care. A family member may spend more time in the patient's room than any other person.

If the patient has a large number of concerned family and friends, their repeated calls and questions can be very disruptive to the nurse's work. Usually, the nurse asks the family to choose a spokesperson with whom the nurse will communicate. When others call, the Unit Secretary can direct them to contact the spokesperson instead of interrupting the nurse.

The nurse knows she is not only caring for the patient, but the patient's family as well. She must communicate openly with the family, encourage effective coping behaviors and often provide emotional support.

Example A – From observation – Death is approaching, but when?

Family member: Do we need to stay here?

RN: He's going down, but it's not {unintelligible}. You know – it could be any time, but my guess is that it won't be tonight. Most of the time we can make an educated guess ... If you go home, we'll call you if it looks like he's going to pass.... I know you live only {number} minutes away... Let me look at his [vital] signs.

RN explains to family member the medications the patient is receiving.

Family member: Keep him comfortable.

RN: He's probably not responding to pain. He's not responding to any external stimuli so he's probably not experiencing pain internally.

Family members are all watching the monitor anxiously.

RN: We may see some brief drastic changes on the monitor. The respiratory distress and the pneumonia will get worse until the system cannot take it anymore.

Family member: How long does it take?

RN: I'm not an expert.... I can't tell you here tonight.... It might be a day, it might be a week. Only he and the Big Guy Upstairs know the hour.

Family member: God's time.

RN: Some people wait for stuff. You know I told you that it's OK to tell him that it's OK to go... It's hard to tell what it is [they wait for].

Family member: Have you ever heard of "out of body" experiences?

RN: Not directly, I haven't. I don't believe this [gesturing toward patient] is a body experience right now There's just a small chain between him and this body now.

Family member mentions another family member who has just found out that she is expecting a baby.

RN: Tell him that. I don't know if he could hear; I don't know how much he is here. You can tell him anything you want to. I don't need to know. I'm going away and you can say in his ear anything you think he would like to know.

Example B – From observation – Family member wants to understand and wants to help

RN goes to patient's room and checks monitor.

Family member asks about heart rhythms. RN gives family member some explanation and points to good and bad rhythms on the monitor screen.

RN: His heart's still not happy yet.

RN explains how the medication works.

Family member: He's pretty congested tonight.

RN: Yes, pneumonia is the number one complication with this kind of surgery.

RN: [to patient] You have a ton of {class of medications} here.

Patient explains what each one is.

Family member: Do you get all of them at night {patient name}?

Patient: No

RN explains medication orders and what medications are taken when.

Patient: Have I had my {drug name} today?

RN: Yes [reading MAR and pointing to bottle] This one you get three times a day and this one twice. This is for your {diagnosis}.

Patient: When did I get {drug name}?

RN: [reading] {drug name} at {time}

Patient: I don't remember.

RN: [about to use glucose monitor] You're going to feel a finger stick.

RN checks chart to see how much insulin to administer based on glucometer.

RN: [about to give injection]

Patient: What was that?

RN: Insulin. Your blood system after surgery tends to mess things up in your body. When you feel better you won't need the insulin.

RN: Take a deep breath. Are you having any pain? Cough real deep for me.

Patient coughs.

RN: Good job! Remember the oxygen is in your nose tube, so take in deep breaths through your nose and breathe out through your mouth.

Patient obviously concentrates on doing this.

Family member encourages patient.

RN: {patient name} can you stand to sit up a little higher?

RN raises bed, turns patient a little.

RN to Family member: Can I get you to help?

(Nurses sometimes involve the patient's family members in the patient's care; it's good both for the family member and for the patient.)

Family helps RN reposition patient a little.

Family member notices that Foley monitor registers a temperature. RN explains how it works.

Family member: Can he have some orange sherbet?

RN: Sure.

RN goes to the clean utility for orange sherbet and brings it to the patient.

Example C – From observation – many family members with different issues

The telephone rings.

Unit secretary: {nurse name}, it's {family member name} on the phone, line {number}.

RN: [on phone] What's the first name? Let me see if we've got the right person.

Oh, yes, other than his {condition} he's doing well. Yes. You know about the {complication}? There is a {complication} in {body part} where the blood leaked. He'll have a nice bruise. What happens is that they start out pretty light then they get darker looking.... No, my guess is he [the doctor] will want him to stay one more day for observation.

Telephone rings.

Unit secretary: {nurse name}, {different family member} of {same patient name} wants to speak to you.

RN takes the call and explains that she has already talked to {other family member} and that policy is to inform one family spokesperson rather than repeat the entire report to everyone who calls in.

RN: I've already talked to {family member}. I'll talk to you now, but in the future you should contact {family member}. He has a {complication} so he will be in bed a little longer. He has a bruise and some {symptom} and {symptom}, but that is under control. He still needs bed rest but could go home today if it weren't for the {complication}. He will probably go to another room for observation.... Yes, I'll tell him.

Patient's physician comes to nurses' station and releases patient.

Physician tells spokesperson in the waiting room.

Family member comes to nurses' station where RN is charting.

RN: Yes, he did release him, but not until 5 or 6. He's doing some better. Ask your {family member} who is in the waiting room.

Family member: His {body part} is OK?

RN: Yes, he's doing well.

Family member: His blood pressure?

RN: Yes, the medication is working.

Family member: Thank you.

RN: You're welcome

RN goes to patient room.

[Yet another] Family member: How much is he going to be able to do when he goes home?

RN: That's what we are trying to figure out.

Family member looks very anxious.

Later RN is dealing with major crisis with her other patient.

RN: [to Unit secretary] If you see the other {family member} of {room number}, tell {family member} to talk to {family member} in the waiting room.

Hospital Patient Relations person (HPR) from executive offices comes to nurses' station.

HPR: We've had calls from {patient name}'s {family member}. They heard that {patient name} is going home.

RN: I don't know what's going on. I told {family member} that I wasn't sure.

HPR: {family member} said he had some complications.

RN: He's had some meds that helped. The doctor came up and said he could go home.

HPR: I explained to them the idea of a family spokesperson.... You can't spend all day talking to different family members; you have to take care of the patients.

RN reviews patient's chart.

HPR asks questions about patient's status with RN answers.

RN explains {complication} to HPR.

RN: ... somewhat better ... I think because of his age and condition the family needs to check on him ... but there's some kind of weird dynamic going on ... {family member} really keeps his distance. I don't know what's going on.

HPR: Perhaps the person in {distant city} felt the need to come in to help.

RN: {Patient name} has had problems in the past.... {condition} but not something that critical that could not be fixed. He needs to go to a family doctor.

HPR: Yeah, he was admitted through the Emergency Department. Normally after a {procedure} they go home.

RN describes patient's condition today.

RN: I don't know what that thing was this morning. They don't like the idea of a family spokesperson.

HPR: Do you know what kind of discharge instructions?

RN: He needs to be checked by a family doctor.... Could be {diagnosis}... but as far as doctor {name ... a specialist} is concerned, he's done everything he can.

HPR: People don't understand that you don't just stay in the hospital until you figure out everything.

RN: There are some decisions that have to be made and no one wants to.

HPR: Yeah, someone's going to have to take charge and that's not easy.

RN: That's right.

HPR: I'll go see what I can do.

Finally, toward the end of the shift the nurse will press on to make sure that everything has been done for the patients and entered into the chart before it is time to do report with the patients' new nurses. After report, she gets her backpack out of her locker, clocks out, and goes home for a well-earned rest.

This chapter described the Nurse's Patient-Chart Cycle, a grounded theory model of the core process observed. It was illustrated with a graphic diagram and a narrative description with examples.

The model has three major and two minor parts. The nurse's shift begins and ends with report, an informative interaction between the nurse who has been caring for a patient and the nurse who is about to care for the patient. The nurse will take report for each patient in her charge. After an initial review of the patient's record in paper and computer systems (called the "chart") the nurse has

her first informative interaction with the patient. During the rest of the shift she alternates informative interactions with the chart and the patient. Near the end of the shift, after her last informative interaction with the patient, she makes her last data entry into the chart. The shift ends after report with a nurse (or nurses) coming on duty for each of her patients.

The two minor parts of the model, informative interactions on behalf of the patient, are with health care workers and with the patient's family, friends and visitors.

The model described in this chapter delineates the core process observed and addresses the study's central question, "What is the observable information behavior of on-duty critical care nurses in a nonteaching hospital?". The following chapters address findings for the secondary research questions with descriptions and examples of the subsidiary processes observed. The next chapters address the research questions "What is on-duty critical care nurses' observable information-seeking behavior?" and "What information sources do they use?" with descriptions and examples from the data of subsidiary processes observed.

CHAPTER 5

FINDINGS: INFORMATION-SEEKING BEHAVIOR AND INFORMATION SOURCES USED

This chapter describes the subsidiary processes observed which address these two research questions (1) “What is on-duty critical care nurses’ observable information-seeking behavior?” and (2) “What information sources do they use?”

Overview of Information-Seeking Behavior

The nurses were observed seeking information almost constantly. Critical care nurses seek information from many sources: from people (including the patient, other nurses, physicians, the unit secretary, other health care workers and the patient’s family and visitors), from the patient’s record, from various local computer systems, from a few other varied information sources (for instance, information posted on a white board) and, last and not least, from sources of published information. They seek information verbally (using both oral and text media) and they use their four senses of sight, smell, sound and touch. There were no examples in these observations of nurses seeking information through the fifth physical sense, taste. The findings are presented in this chapter in description, narrative and examples from the data.

On-duty critical care nurses use patient assessment protocols repeatedly during the shift. They frequently check and recheck the contents of the chart.

They do ask people questions, although most of their information seeking can be described as monitoring or scanning the environment. In general, on duty they do not seek any information unrelated to their patients.

Sections below describe their information seeking from people, from the patient's record (the chart), from various computer systems and from other sources.

Information Sought From People

The nurse participants sought information from patients, other nurses, family members, physicians, and other health care workers. Of their informative interactions with people, most were with patients.

Patients

The nurses sought information directly from the patients by asking them and by using their senses. They sought it indirectly through real time monitoring devices and tests. Sometimes when they asked the patients questions, they were seeking only a factual answer. More often they were not only seeking such an answer but also establishing a relationship with the patient and assessing the patient's condition, including the patient's cognitive, emotional and psychosocial state. Their information seeking is illustrated by these six examples from the data:

Example A – From observation – Are you in pain?

Example B – From observation – Who's your doctor? Do you want ice?

Example C – From observation – Communicating with a patient who cannot talk

Example D – From interview – What I see in the patient's eyes

Example E – From observation – Nurse hears patient coughing

Example A – From observation – Are you in pain?

RN: Are you in pain?

Patient: Yes

RN: Where do you hurt?

Patient: Leg

RN: How would you rate your pain right now ... from 0 to 10, 10 being the maximum?

Patient: [wearily] Oh, about 6 to 7.

RN: That's not good.

Example B – From observation – Who's your doctor? Do you want ice?

RN: Are you still tender there? ...

Patient nods.

RN: Who's your doctor? [The nurse knows this, of course. She is checking on the patient's awareness.]

Patient: Dr. {name}. When will he come by?

RN: It would be unusual for him to come by this early in the morning. Do you have any numbness or tingling in your feet?

Patient does not answer.

RN: I'll be back to check on that {surgical wound}. How does it feel?

Patient: It hurts some, but I'm not in pain.

RN: If it gets to be 8:30 and I've not brought your breakfast yet, call me. Do you like ice with your juice?

Patient: No. No ice – if I drink anything chilled my throat closes up. I don't know why. I've been like that as long as I can remember.

Example C – From observation – Communicating with a patient who cannot talk

[The patient is alert and oriented, but cannot talk because of a specialized mechanical ventilation device. The nurse does not just barge ahead, but respectfully asks before doing each thing.]

RN: I have bad news. Your lungs are congested. I need to suction a little. May I?

Patient nods "yes."

Nurse performs suction procedure.

RN: You want a cool rag?

Patient nods. Nurse moistens a washcloth with cool water and places it on patient's forehead.

RN: Cool rag on your chest too?

Patient nods.

After putting the wet washcloth on chest, the nurse hands the letter board [a laminated card with alphanumeric characters, short phrases and pictograms] back to the patient.

RN: Is there anything else I can get you?

Patient points to letters on the board and spells "ICE."

RN: I'll give you some ice.

Example D – From interview – What I see in the patient's eyes

Researcher remarks on how much information the nurse appears to be gathering from many sources – other nurses, the chart, the monitors, computer records, the white board, her watch, her beeper..

RN: But the most important information comes from looking right into the eyes of the patient. I look for affect, for strength of grip. Mr. {name of patient} *wanted* to shake my hand tonight. Last night he could not do that. I'd take his hand and there was a bit of a reflex, but he wasn't there.

Researcher's comment: The nurses sought information from patients through a formal assessment procedure that included using four senses. They listened to heart, lung and bowel sounds with a stethoscope. They looked at the patients' eyes, skin, and wounds. They noticed the patient's facial expression and body position. They felt different parts of their body for different reasons, including checking for pulses, edema, or distention. The nurses were very sensitive to smells coming from the patient's bodies or any of the machines used in their care.

The nurses used sounds (especially alarms) and displays on real time monitoring device to find information about the patient. Monitoring devices include thermometers, blood pressure measuring devices, electrocardiography monitors, and pulse oximeters that use light to measure the oxygenation of the blood (a sign of how well the patient's lungs are working). When a nurse was at the nurses' station charting, she was often informed by the sound of a patient's retching or moaning, the bell activated by the patient's call button, or the alarm from an intravenous infusion device running low. For example:

Example E – From observation – Nurse hears patient coughing

RN is charting at nurses' station.

Patient coughs deeply.

RN goes to the PYXIS® automated storage, dispensing and tracking machine (Pyxis Corporation, San Diego, California), which dispenses clinical supplies, for a container for a sputum sample to culture.

RN goes to patient room, comforts patient and gets sample.

RN prints out label, labels container and sends to lab through the tube system.

Other Nurses

The RNs sought information from other nurses a little less than they did from patients. They read nurses' notes in the patient's chart, but most of their

informative interaction with other nurses was oral, usually in person but occasionally on the telephone. In addition to taking report, nurses often asked other nurses for social and logistic information. Other nurses as information sources are illustrated by the following examples from the data:

Example A – From observation – Is {drug name} not an overwrite?

Example B – From observation – What's this prep?

Example C – From observation – Where we hide it

Example D – From interview – A resource nurse

Example E – From interview – Who are your best sources?

Example A – From observation – Is {drug name} not an overwrite?

RN: [at PYXIS® drug dispensing machine, entering commands] Is {drug name} not an overwrite? [An overwrite is a drug that nurses on this unit are authorized to give at their discretion even if it is not in the PYXIS® order record for their patient.]

Other nurse: No, it's not, but it should be on the MAR.

Example B – From observation – What's this prep?

RN: [to passing nurse] What's this prep? [holds up a prepackaged kit for preparing a patient's skin for surgery]

Passing nurse: This was for {room number} to prep, but he'd had chemotherapy and there was no hair to take off.

Example C – From observation – Where we hide it

Other nurse: I almost forgot. I have to show you where the {specialized piece of equipment} is. There's only one left.

RN: We used to use 'em all the time.

Other nurse: It's a charge item [now]. We have to have an order. We call 'em and tell 'em we need to and they say to put one on.

The nurses discuss when it is appropriate to use the {specialized piece of equipment}.

RN: I do it when {condition}

Other nurse: They want to know when you do. There's no other one. I almost forgot to tell you where the secret hiding place is.

Example D – From interview – A resource nurse

Researcher: And you have a resource nurse? What's a resource nurse? I heard somebody use that word.

RN: Resource Nurse more ... uh, she's worked here a long time. They know.

They'll say, "this nurse is a good resource nurse"... [You] go to the charge nurse and say "you know what, you know how," you know in critical care I think we are into helping each other, asking each other... information lots of times we share with each other. Because, you know, something, you cannot be sure, so you ask another nurse. Even if you think you know you

ask so you can be really sure. You're always confident asking each other questions.

Researcher: Double-checking?

RN: Double-checking. That's good. Making sure you know it.

Example E – From interview – Who are your best sources?

Researcher: How good a source of information are other people, other than the patient? Who are some of your best sources of information?

RN: As far as, like, around the unit?

Researcher: um-hmm.

RN: Just kind of a combination of everybody. We kind of all feed off of everybody's skills and stuff. Different people have different knowledge bases. A lot of our nurses are very experienced and know a lot about cardiac and things like that. We have different nurses that's been here for long periods of time...

Researcher: Right

RN: ... that know hospital workings and policy procedure and things like that ...

Physicians

The nurses asked the physicians questions during the brief periods of time when the physicians were on the unit. Occasionally they would try to contact the physician by phone. That usually involved a series of calls, pages and leaving

messages. (The unit secretary always helped the nurse with that process.) The following examples from the data are presented below.

Example A – From observation – Discussion at the nurses' station

Example B – From interview – Are the physicians helpful?

Example A – From observation – Discussion at the nurses' station

Doctor sits down near nurse at the nurses' station and is looking through the paper part of the chart.

Doctor: You can read my orders?

RN: Yes, but ... [they discuss the patient's care].

Doctor: OK, the {imaging procedure} can be done tomorrow.

RN: He's a lot more coherent than before.

Doctor: Yes, I hear.

RN: Is it the {class of drugs}?

Doctor: Yes. I can't give {therapy} until I check his blood. Tell him I'm not going to do anything about getting his family members to donate unless his count gets much worse.

Example B – From interview – Are the physicians helpful?

Researcher: Are the physicians helpful?

RN: Um ... [long silence]

Researcher: I know that there is information from them directly in the orders ...

but when you actually talk to them do they tell you more than you get from the orders?

RN: Yeah, a lot of them do. And a lot of them you have to kind of ask them questions and things. Some of them don't really volunteer a lot of information but a lot of them are receptive to questions and teaching. There's not a lot of 'em that are real good teachers and are willing to stop and explain something to you. And some of 'em are. You kind of learn who's willing to and who's not.

Researcher: Yeah ...

RN: With a little time ... [looks at tape recorder] I'd say overall, most of 'em are receptive to questions and teaching and things like that. [Shrugs shoulders] A lot of 'em are also very receptive to suggestion ... they're not opposed to somebody actually asserting [sic] a little bit of knowledge into the conversation and saying "do you think this might help?" or something like that. Some of 'em aren't.

Researcher's field note: I sensed here that the RN really didn't believe the physicians to be very good information sources, but didn't want to say that on tape.

Unit Secretary

The unit secretary does much more than answer the telephone. The unit secretary directs many kinds of information flow within the unit and with other hospital departments and patient care units. In many ways the unit secretary is the gatekeeper. A nurse the researcher observed in another study on a medical surgical unit remarked that she had to be very nice to the unit secretary because the unit secretary could easily expedite or delay the delivery of information the nurse needed. Here is one example from the data:

Example A – From observation – The Unit secretary

RN: [to unit secretary] I need a carrier for bed {number}. That's it ... just a carrier [patient transporter].

Unit Secretary: Yes [puts order for transporter into computer system]

RN: {room number} has not moved in yet?

Unit Secretary: No, has not moved yet.

Unit secretary telephones the registration [the department that admits patients and assigns rooms] to find about ask about the next patient coming to the unit.

Unit Secretary: [to RN] What happened with the patient was that they couldn't get a hold of Dr. {name} so they had the chief of staff to get Dr. {another name}.

RN: And then?

Unit Secretary: He [the patient] did better so he's not going to transfer after all.

RN: We still have that [patient waiting in the] ER?

Unit Secretary: Yes.

Other health care workers

The nurses frequently asked questions of other health care providers (or nonpatient care health care workers) who came on the unit, particularly the clinical pharmacists. Their typical conversations with PharmDs were longer than their conversations with MDs and DOs. As Byrd (2002, p. 74) has written, health sciences librarianship could well take the change in pharmacists' practice from the pharmacy to the clinical unit as a model for transforming "... its professional training and practice roles for more effective work in clinical health care settings". The examples presented below are:

Example A – From interview – Ask the PharmD.

Example B – From observation – What are the {respiratory device} settings?

Example C – From observation – Respiratory Therapist hears something in a lung

Example A – From interview – Ask the PharmD.

[After a discussion of sources of knowledge based information, including a library...]

RN: But, like, you know, every day we try to do that, we try to do education things, we ask them and I'm sure we could find a lot of information ... you, know, in the library. And also pharmacy, they ...

Researcher: Oh, yeah ...

RN: They do.

Researcher: Is it better since they've had the PharmD. people there, like {name} and {name}?

RN: Oh, yes, they're so much help.

Researcher: Yeah...

RN: Because, uh, they're always here.

Researcher: Mm-mm

RN: Always here. If you have any questions, stuff like that, they're here. You can ask them. And then you can know. We had a patient the other day. He took {drug name} for his, you know {diagnosis}. Finally we got that {drug name} here and then he said "No, wait, I don't take this much". He [said that] this was too big a dose, like we were giving him too much more.

Researcher: Oh

RN: You know, but actually it was just diluted a little more.

Researcher: OK

RN: So what he had been taking was more concentrated. But when you have a PharmD. right there, you can have him talk to him so he [the patient] felt more comfortable.

Researcher: That's good.

RN: And, you know, I like to ask ... the dosage ... what time to give this ... a lot of those type questions I'm always asking. I think it helps the physician that I can ask. How much to give when.

Example B – From observation – What are the {respiratory device} settings?

The patient has a {respiratory device} at home. The patient is having some respiratory problems here and the RN believes that the {respiratory device} might help. The RN can get one here in the unit, but does not know the settings the one at home has. The patient lives some distance from the hospital city and the {respiratory device} was ordered by a physician near where the patient lives. The unit secretary and the RN find an emergency phone number for the home health care agency that monitors the patient's use of {respiratory device} at home. The unit secretary calls the agency emergency number and gives the phone to the RN. The person calling from the agency does not know how to find the information the RN needs but will contact the agency's respiratory therapist who can. Somewhat later the phone rings. The unit secretary answers the phone call from the home care agency's respiratory therapist and gives the phone to the RN.

RN: I hate to ask you to go out [to the agency office] to get this after midnight.

Can you call it in when you first go in tomorrow morning? He's not in distress now. [listens] ... yes, if he goes into distress, is there a number where I can call you? [writes down number] ... He's doing OK ... He had pretty extensive surgery and I want to keep him out of distress. [hangs up]

RN to Researcher: He's got it in the office.

Example C – From observation – Respiratory Therapist hears something in a lung

[on a night shift] RN goes to patient room where Respiratory Therapist is administering a treatment.

Respiratory Therapist: I'm very concerned about the {side} lung. [Describes symptoms noticed.]

RN: We should get an x-ray just to be sure.

RN calls the doctor to ask for oral order for x-ray. RN gives the order to the unit secretary and the unit secretary calls the radiology department to request the x-ray.

RN calls the Emergency Department (E.D.) and tells them about the stat x-ray. Someone in the E.D. will call in an on-call radiologist to read the x-ray.

Patient's family, friends and visitors

Nurses seek some information from the people who know the patient best. Often the patient's visitors are eager to do whatever they can to help the patient, and that usually includes telling the RN more about the patient. The examples from the data presented below are:

Example A – From interview – Learn things from family members

Example B – From observation – Light conversation reveals where family member lives

Example C – From observation – Family member notices patient is not doing well

Example A – From interview – Learn things from family members

Researcher: [after discussing the patient, charts, monitors and systems as information sources] What else did you learn things from {this shift} that you didn't know before?

RN: Family members would be the first one I would say...

Researcher: Yeah ...

RN: Uh, but that's just themselves, of course ...

Example B – From observation – Light conversation reveals where family member lives

RN: [cheerily to patient whose bed is elevated at head so he can see the television]. You're watching the {area university} game? Do you like football?

The patient moves his tray.

RN: You had something to eat. You ate it all?

Family Member: Yes.

RN: [to Family Member] Are you a {area university} fan?

Family Member: No {name of rival university}.

RN: Did you graduate from {rival university}?

Family Member: No, I live in {rival university city}. In fact, I'm going back there in fifteen minutes.

Example C – From observation – Family member notices patient is not doing well

Nurse is charting at nurses' station. A Family Member comes up to her.

Family Member: He's the sweetest man in the world, but right now he's a little anxious.

RN: I know. I would be too if I were in his place.

Family Member asks more about patient.

RN: Just had him do breathing exercises. He did well.

Family Member: He's hurting.

RN: Yeah, I noticed he was holding himself. [RN checks something in the chart.]

He's had progressive problems with breathing ... though he did well on his breathing exercise.

RN explains the respiratory therapist's concerns about the patient.

Family Member: OK.

RN: Is he resting?

Family Member: No.

RN: Let me figure this out.

RN: [to Respiratory Therapist] He's short of breath.

All go to the patient's room.

Information Sought From Patient Record (The Chart)

The paper and digital elements of the patient's record, collectively and colloquially called "the chart" by the nurses, might be the critical care nurse's largest source of information. As noted in the grounded theory above, the nurse seeks information from the chart immediately after (and sometimes during) report at the beginning of each shift. The nurse will return to different parts (some more than others) many times during the shift. The following examples from the data are presented below:

Example A – From interview – What do you look for in the chart?

Example B – From interview – What the doctor wants done

Example C – From observation – Reading the paper chart

Example A – From interview – What do you look for in the chart?

Researcher: Uh, when you are going through the chart, uh, what do you look for

first? What, what do you ...?

RN: [shuffling through the chart] First of all I ...

Researcher: It looks like a mess in there.

RN: Well, um ... it's kind of like uh ... you know when you're assessing a patient,

the first thing you want is for them to be able to breathe.

Researcher: All right

RN: I check the breathing, then everything else is inconsequential.

Researcher: OK

RN: First thing I want to know is what has the doctor ordered? What is he saying needs to be done? And particularly the new orders. What has the doctor ordered recently? And ...

Researcher: Are they pretty much toward the top of the [stack in the] chart?

RN: Yeah. Usually the first few pages are really what affected treatment for the night. [shuffles through the first few pages of a three-inch chart] Actually ... this ... this is really important.... This is what the doctor is standing here telling me to do. It's what I'm bound to do.

RN: Second, really I don't go through the whole thing. Uh ... if there's been a recent x-ray report, you know you may, you may take a glance at that. Sometimes, in the night I may look up the history and physical. Because you have to kind of know. Check for procedures today and medications used ... just old MARs just how ... this first sheet, um ... this is my reaction to that [makes a face] ... Certainly different people would treat it differently. I'm not saying this is the best way at all. It's not a computer and I treat it differently. I'm certainly not trying to digest all of it. But probably the most important section of the chart is here, the front of the chart ... sometimes in the progress notes ... sometimes are the best part ... like tonight, we didn't know exactly ... kind of see what the doctor does ... want to see what the doctor wrote.

Researcher: Um-hmm

RN: Try to understand ... he says the patient {medical description}... he says he tolerated it well. Why? So we can help the patient. Also what is the outcome for this procedure? So [noise from something arriving through the tube system] properly these reports are pretty clear. You have kind of a recent history of something that the doctors did. You know, sometimes you pick it up and find it again ... the doctor's orders ... and you look at the MAR and anything else ... and this is work {drug names} the treatment this patient has ... can summarize it and then you can see the vital signs [the patient assessment form goes on for several pages] and you can see them once you put them in the paper charts and then on other thing that's really easy to do, you take these medications and you plan them out [she shows notations on her personal note sheet]

Researcher: Oh, yeah, yeah

RN: So any kind of medication – like I've got it planned out – first of all it gives me an idea of what I'm going to have to do tonight. But second of all, it makes me check the chart and make sure that nothing is actually left to chance ... sign everything off.... You can go to the PYXIS® and at least you can see if they took [the dose] out of the PYXIS®.

RN: And then if you see that, you can say, well, it was administered at approximately this time according to the PYXIS® records. And then the next morning at the end of the day, I can't sign it out for you, but at least you know what med orders you've had. You know – med errors are BIG! And from the chart [sound of turning pages] you want to know who the

doctor is, you want to know how old the patient is, you want to know what kind of treatment, what kind of labs are ordered, if there's anything you need to do about this. Uh... I don't like to know about the {last shift nurse's} assessment. I don't like them to tell me that this person is such-and-such – unless there's something out of the ordinary. You know “I can't feel a pulse from the right foot.” Then I want to know. Everything else is uh ... I'll figure it out myself ... I like to do my own assessment. [Report] just takes up time. But it's part of the tradition ... people want to know what the assessment's like. [tube noise again] palpable pulse, bowel sounds, alert and oriented [tube noise] It's kind of a ... again, it's probably more culture than it is effective.

Example B – From interview – What the doctor wants done

RN: [commenting on how the doctor communicates with the nurse through the chart] See – these orders are much more detailed. I mean the doctor says he wants {what doctor wants} ... he says he wants IV fluids, uh, you know run over this many hours, told us what he did, told us when to stop the {drug name} drip ... uh, told us when to check his {property of blood} ... and these are much more detailed orders right here ... but I'm glad to have the other ones [standing orders for a particular diagnosis] so that we have extra pain reliever.

Example C – From observation – Reading the paper chart

RN checks and marks meds on MAR and Kardex® printed card
(Remington Rand, Buffalo, New York).

RN signs MAR.

RN puts papers on the clipboard and opens the patient chart.

Researcher's field notes: The patient chart is a little thinner that it was before the hospital implemented {name of clinical information system}, but not as much thinner as I had expected. The main difference I see is that the vital signs that used to be entered on a tripartite folding form now are entered in multiple screens on the {clinical information system}. On the tripartite form the nurse could easily see a history over more than one shift as she enters new numbers. That's not possible on the new {clinical information system}.

RN checks the patient chart against the MAR ... is on an information quest ... reads out loud part of the patient history.

RN: I don't know why she {has a certain symptom}. She's not taking any medication that should do that.

Information Sought From Computer systems

The nurses seek information from many different computer systems. They appear to be fairly comfortable with the technology. Most of the participants used computers at home and some even had their own web sites. In contrast, the physicians rarely paid much attention to the online functions of the systems,

preferring to read printouts. Some computer systems on the unit are for patient records, others are for monitor systems, and administrative functions. During the observation period a few patient record functions moved from paper to an online clinical information system.

The various systems at this site were not well integrated. They were obviously of different vintages. Some had graphic interfaces and some had purely text interfaces. (Perhaps this is what the RN below meant by a DOS-based system.) Several different systems were sometimes available on the same terminal; others were physically completely separate.

For instance, the system for monitoring patient cardiopulmonary functions was not linked to any other systems. The RN would observe the readings on a monitor in the patient's room and enter commands in the monitor unit to make reports printout at the nurses' station. Then the nurse would manually enter some of the numeric data from the monitor printout into the online clinical information system.

There was one system for admissions, transfers and discharges and another for some kinds of requests for service from other departments. Pharmacy and Laboratory had separate systems designed only for their services. After a doctor wrote orders on paper (or gave an oral order over the phone), the unit secretary transcribed them into the appropriate system. The orders for a laboratory test were entered in one system and the results came on a printer dedicated to another – the laboratory's own system.

The unit secretary faxed drug orders to the pharmacy and they were entered into the pharmacy system there. The RN logged into the pharmacy system in order to see what orders the pharmacy had for the patient and to printout an MAR (medication administration record). The pharmacy system was integrated with the PYXIS® medication dispensing system. The PYXIS® machine is a large cabinet with many locked transparent doors and small opaque drawers. The RN used its small terminal to log in herself and then to log in to view the drug orders and records for each patient. Only the drugs prescribed for the patient appeared on the list as dispensing options. The nurse selected a drug and its little drawer (or door) is unlocked and opens.

In a sense, a PYXIS® dispensing machine is analogous to the Horn & Hardart Dine-O-Mat (trademark abandoned) food dispensing machines used in “automat” restaurants decades ago in large cities. Pharmacy staff regularly stock it by hand. If there is more than one of the item stored in the same locking module, the nurse enters the count of remaining items (vials, pills or whatever) into the system. The system keeps records of when which nurse retrieved what drug for which patient. It is linked into the patient billing system, so any supplies that are charged to the patient are also dispensed from a PYXIS® machine. Thus the PYXIS® not only assures high security for narcotics and other items, but it also records their use for both clinical and billing purposes.

The new system introduced during the observation period was a clinical information system commonly referred to on the unit by its proprietary name. The nurses used it to read nurse’s assessment and progress notes from earlier shifts.

It also included a number of proprietary clinical pathways – standard medical care plans with a timeline – for a number of common diagnoses.

Internet access was available, but none of the participants ever used it during the observations. These examples from the data are presented below:

Example A – From interview – What about computer systems here?

Example B – From observation – How do you use the mobile computer?

Example C – From interview – There are problems, but the computer has its place

Example D – From observation – Information from a real time monitor system

Example A – From interview – What about computer systems here?

Researcher: Let's talk about computer systems. Are they reliable?

RN: Hell, no. [laughs]

Researcher: What are the positives and negatives about the computerized clinical information systems you've dealt with so far? [Nurse has worked at several hospitals with different systems.]

RN: Uh ... the operating and interface systems are too old... too clunky. My [own] computer doesn't even have DOS on it anymore, you know. Yet that's the basis of this system. It's ... not so much to it ... but all clinical providers are ... maybe don't understand its capabilities. There are several things it could do that it doesn't.

[From observation of systems on the unit, the researcher surmised that the RN was commenting on text-based command interfaces (as opposed to graphic user interfaces), rather than true DOS operating systems.]

Researcher: OK ... in a crisis or an emergency, which would you rather grab, the computer or the paper record?

RN: Oh, I'd grab the paper record. The computer's ... at this point ... you know it takes me a while to log in. It takes the computer a while to access the data. Then it may not display it in the way I want it to display to give me the information I need... and I have no ability to alter that for myself.

Researcher: Right

RN: You know, maybe with a certain patient, I want x, y, and z shown. I don't have the ability to modify that frame at all. So that I would say, "that'll work".

Example B – From observation – How do you use the mobile computer?

RN gets a mobile computer and brings it to the nurses' station. The researcher asks her about how she uses it.

RN: I do write things on the paper chart anyway because when somebody's [in a crisis] ... you need it immediately. It takes too long to log into the computer. I carry this [a clipboard with some current papers from the chart] all of the time. All I have to do is grab this and I have it in the paper chart. ... The patient information I need during a code [full cardiac arrest] inside the computer is too hard to get. It takes too much time to sign on

and go through several screens to get to it. If I'm calm and I'm sitting here doing it I can get into it in a couple of minutes – but during a code you need to be able to roll ... then you need to punch in an access code and all that. It's easier to just open up an assessment sheet and see 24 hours at one look.

Researcher: I haven't seen anyone actually take a mobile computer into a room.

RN: If I'm doing report or entering stuff into the {mobile computer nickname} I prefer to do it at the nurses' station where I can sit down.

Example C – From interview – There are problems, but the computer has its place

RN: [pointing at a computer record print-out that has a handwritten remark] For example, the vital signs are missing for {time}. If you're taking them every hour you can print it out and the printout will be in the permanent chart. The problem is that the arterial [sensing] line quit working ... and you have to handwrite the problem on the record ... but that record can still be printed out with the wrong reading. There is the [urinary] output for 3a[m] to 7p[m] ... q [every] 15 minutes. So the {clinical information system name} shows it no more often than q hour. Some stuff is handwritten, some is on paper print-outs, some stuff is only in the computer ... it's all different ... There are different opinions on what people like and need. A lot of places have proved that patient charges were more accurate on a manual system like our old sticker system. [In that system all charge items

had brightly colored identifying stickers which the nurse peeled off and attached to the paper chart. If they did not have the chart with them at the time they were using the equipment or drug, they would stick them on their own ID badges or collars and attach them to the record later.]

RN: The [assessment] sheet is slower to come up on the computer ... vital signs, things like that.... The bad thing right now with the paper chart, however, is things do not get put on the paper chart. People are assuming that they are being put into the computer that, as you saw earlier, there were some gaps in that, too.

Researcher: Sometimes they need their place?

RN: Their place, yeah. So, then you're just kind of stuck.

Researcher: Yes

RN: I mean I still believe in both. The computer has its place, but I also think that the paper chart needs to hang around, too.

Researcher: ... in general you'd like to have things in both places?

RN: Ummm ... yeah. You know I think that the computer is good for ultimate storage of information and print-outs and things that make it more legible and things like that, but I do like having the immediate access of my paper chart and 24-hour flow sheet and things like that. So I think it's kind of redundant charting when you have to write it down and type it into the computer, too.

Example D – From observation – Information from a real time monitor system

RN checks monitor screen.

RN: Oops. I've got to get him his blood pressure med.

RN checks vitals history on monitor; orders print-out.

RN gathers various papers and print-out from monitor. RN marks some significant numbers on the print-out.

Information Sought From Other Information Sources

The nurses looked at various white boards and bulletin boards for some information. Only twice did any of the participants seek information from books, journals or online published information sources. One used a phone book and another read part of the instruction manual for a monitor system. When the researcher asked about it, the RN said, "Yes, we asked for manuals when they put in this system, but they didn't have them. We've been using them for several weeks and now we finally got the manuals."

The participants also used thermometers and glucometers [devices for measuring glucose in blood] to gather information about their patients. They checked readings on various pieces of equipment, including ventilator air volume. The scales in the beds were set to zero before the patients were placed in the beds, so the nurses could check on patients' weight by reading the display on the bed frame. They read the time from their watches and clocks.

They paid attention to the television sets in the patients' rooms only to talk to a patient about what the patient was watching or to watch weather radar when the hospital was under a Code Black (storm watch, warning or alert).

They also paid attention to various other important codes announced on the hospital's public address system. Here is an example from the data:

Example A – From observation and field notes – A possible emergency

Emergency codes (Code Red=fire, Code Orange=multi-casualty disaster, Code Blue = full cardiac arrest) are announced on the hospital public address system. The hospital had three stages of emergency codes for severe weather. A Code Black Watch announcement came when the National Weather Service issued a Tornado Watch for the Area. A Code Black Warning was announced if the National Weather Service or local weather information sources reported rapid circulation, funnel clouds or tornados in the area. A Code Black Alert signified that the hospital was in imminent danger of being hit by a tornado.

During a Code Black Watch, the procedure was for the nurses in critical care to do a rapid inventory of emergency supplies and patients who were on critical life support systems. In a Code Black Warning, all visitors (and ambulatory patients) would be moved to safe areas. Precautions would be taken for patients who could not be moved, including elevating the head side of the beds (and turning them so that the elevated part of the bed was between the patient and the window), preparing protective coverings, and bedside life support systems. Everything had to be ready for a Code Black Alert.

During one observation on a night shift, a Code Black Watch was announced on the public address system. The RN participant was the charge nurse that night and had many responsibilities.

The hospital has a backup power system should the main system fail, but the unit's standard procedures for a Code Black Watch includes verifying the locations of all flashlights (and batteries) and surveying the life support systems in use. The RN knew the procedures. The researcher and participant tried out a number of flashlights to make sure they were working. Several patients were on mechanical ventilators at that time.

RN: If the power should go off, we'll have to bag 'em [manual resuscitation respiration with a bag valve unit]. And [looking at the researcher] *everybody* bags.

Researcher: OK.

Researcher was very glad that the power did not go out. She'd had CPR training, but had never had to bag a patient who had been on a ventilator.

This chapter, the second of five chapters presenting findings, described in some detail the information-seeking behavior and use of information sources by the participant critical care nurses – subsidiary processes revealed by grounded theory analysis of the data. As described by the Nurse's Patient-Chart Cycle in Chapter 4, the nurses used a core process with a pattern of informative interaction which included seeking information related to the patient (and the

patient's care) from people (especially the patient), other health care workers (especially nurses), the patient's records and other information systems. The next chapter, Chapter 6, discusses another subsidiary process, their observable use of the information they gathered, with descriptions and examples from the data of subsidiary processes observed. Two more chapters follow describing subsidiary processes observed.

CHAPTER 6

FINDINGS: INFORMATION USE

This chapter describes the subsidiary processes observed which address the research question “What is their observable information use behavior?”

On-duty critical care nurses were often observed using information in three ways. They acted on that information, they passed on that information, or they recorded it in personal notes. Typically, they passed on information orally to people, they wrote it on paper, or they entered it into digital records intended to be read by others. The nurses also wrote down information that was not intended to be read by others, but was just for their own temporary use. The participant observer presumed that some information (for instance some information the nurse received in report) was not acted on, passed on, or recorded for personal use.

Nurse Acts on Information

The nurses frequently were observed acting on orders and other information retrieved from the chart. They acted on information retrieved from a monitor, from the patient or from other people. The examples from the data of nurses acting on information presented below are:

Example A – From observation – Nurse sees on a monitor the evidence of an adverse physiological change and takes action to reverse it

Example B – From observation – Nurse acts on physician's drug order

Example C – From observation – Nurse acts on doctor's order and patient's evidence of pain

Example D – From observation – Nurse responds to audio information that IV medication is not flowing and patient's request for a dressing change

Example A – From observation – Nurse sees on a monitor the evidence of an adverse physiological change and takes action to reverse it

RN is looking at a monitor at the nurses' station.

Researcher asks what the RN is watching.

RN: I'm watching {patient name}'s sats [blood oxygen saturation numbers].

They're changing. I think I'll go increase his oxygen.

RN goes to the patient's room. Several family members are present.

RN explains that she is increasing the oxygen.

Family member: He's sleeping.

RN: That's good.

Example B – From observation – Nurse acts on physician’s drug order

A doctor stands at the nurses’ station writing in the paper chart. He writes some prescriptions on sheets from a prescription pad.

RN puts bar code labels which identify the patient on each prescription sheet, and then gives them to the unit secretary.

The unit secretary enters the orders in the pharmacy system. Someone in the pharmacy enters them into the PYXIS® automated storage, dispensing and tracking system (Pyxis Corporation, San Diego, California). Later, when the patient needs the drug, the RN retrieves it from the PYXIS® system.

Example C – From observation – Nurse acts on doctor’s order and patient’s evidence of pain

RN reads the patient’s MAR. RN goes to the PYXIS® and gets some {pain medication} which she prepares in a syringe.

RN goes to the patient’s room. A respiratory therapist is in the room.

Respiratory Therapist: He’s in pain.

RN: [to patient] Are you doing OK?

Patient shakes his head “no.”

RN: I’ve got some {drug name} here.

RN administers drug.

Patient moves his hand around and RN notices that he cannot reach the call button. She puts it in his hand.

Example D – From observation – Nurse responds to audio information that IV medication is not flowing and patient’s request for a dressing change

An IVAC is beeping. RN goes to the patient’s room and adjusts the tubing so that the infusion can flow freely.

Patient: I need my dressing changed.

RN gets dressing materials and changes the wound dressing.

Nurse Passes on Information

To People

The nurses pass on much information orally to other nurses, especially in report. They tell the patient, family members and other health care providers some of the information they have gathered. The examples from the data that are presented below are:

Example A – From observation – Nurse passes on information to another nurse and to the unit secretary

Example B – From observation – Nurse passes on information to the doctor, the doctor acts (writes an order) on the information, nurse seeks additional information

Example C – From observation – Nurse passes on information to a family member

Example D – From observation – Nurse passes on information (in report) to a nurse who will care for the patient after he is transferred to another unit.

Example A – From observation – Nurse passes on information to another nurse and to the unit secretary

A nurse helping RN mentions seeing a new bruise on the patient “just from rubbing his skin”.

RN: That doesn't surprise me. He bleeds so freely.

The unit secretary asks RN how to spell {drug name}. RN spells it for her.

Unit Secretary: Does it go in prn [as needed] or ...

RN: It's bid [twice a day]. Didn't I write 150 mg bid?

Example B – From observation – Nurse passes on information to the doctor, the doctor acts (writes an order) on the information, nurse seeks additional information

Doctor comes to the nurses' station.

RN tells the Doctor about the {respiratory device} that the patient told her he uses at home.

Doctor: That's news to me.

RN: We could use the {respiratory device} for him.

Doctor: OK. Can you find out the setting?

Doctor writes order for {respiratory device}.

RN seeks the setting information.

Example C – From observation – Nurse passes on information to a family member

RN: [to family member] {patient's name} does not respond well to pain medications. We don't want him to hurt but there always is some pain when you've had a doctor cut into your {body part}. The {class of drugs} help his mental state, but make his veins fragile. [looking at IV site] We don't want to lose this one.

Example D – From observation – Nurse passes on information (in report) to a nurse who will care for the patient after he is transferred to another unit.

RN calls a nurse on the unit to which her patient is about to be transferred.
RN: So you're going to have this gentleman? I don't know how to pronounce his last name. I think it's {name}. He is {number} years old. Dr. {name} and Dr. {different name}. He's been good the last two hours. He's going to transfer to {name of specialty facility} on {day of the week}.

To the Chart

The observed nurses frequently passed on information by writing it in paper charts or entering it in a digital patient record system of one kind or another. After their first reading of the charts at the beginning of their shift, they added information to them every time they returned to the chart. The following examples are presented below:

Example A – From observation – Nurse adds a change in doctors' orders and other information to the chart

Example B – From observation – Nurse adds data from her observation of the patient's monitor and Foley urinary catheter bag to the chart.

Example C – From observation – Nurse copies data retrieved from one medium to another, sometimes copying the same information several times

Example D – From observation – Nurse enters numbers from one digital system into another, but in a different order

Example E – From observation – Nurse entering information from her personal notes into the online and paper charts experiences distractions, interruptions and other barriers to passing on information

Example F – From observation – Nurse enters data from her personal note sheet into the patient record, while participant observer attempts to minimize interruptions for the nurse

Example G – From interview – Nurse's frustrations with entering data into online chart

Example A – From observation – Nurse adds a change in doctors' orders and other information to the chart

RN writes the order received over the phone on a doctor's-orders form.

RN: [to unit secretary] DC [discontinue] {drug name} per {doctor name}.

RN tears up prescription paper for the discontinued drug and throws it away.

RN charts for about a half an hour.

RN looks at lab results and comments on them to researcher.

RN writes in order chart from the Kardex® printed card (Remington Rand, Buffalo, New York). RN rechecks orders against Kardex®.

RN writes on Kardex® something about the new orders, crosses out some things on the Kardex® and checks item order.

RN initials items on the orders that have been done.

Example B – From observation – Nurse adds data from her observation of the patient's monitor and Foley urinary catheter bag to the chart.

RN encourages patient to breathe deeply and to cough.

RN checks monitor.

RN checks Foley bag.

RN writes in chart.

Example C – From observation – Nurse copies data retrieved from one medium to another, sometimes copying the same information several times

RN goes to the printer and retrieves a report from the physiological monitoring system. She copies all of the readings from the print-out to a paper form on her clipboard. Researcher notes that the clipboard has “documentation hints” taped to its cover.

RN fills in a different patient assessment form.

RN tells researcher that all paperwork must be in order before the patient can transfer.

RN hand writes data into the paper chart for fifteen minutes. Then the RN uses one of the computer terminals to enter most of the same data into the {clinical information system name}.

RN carefully reads the ambulance form, reads another form, reads a letter, signs her name on the doctor's-orders form, adds a few nursing progress notes and signs.

RN copies notes from handwritten orders to the MAR printed from the pharmacy computer system and closes the paper chart.

Unit Secretary: Are you ready to transfer in the computer?

RN: No, not yet.

RN enters more information into the {clinical information system}

[some notes about moving the patient to another floor omitted]

Getting off the elevator, the RN is still writing in progress notes.

Example D – From observation –Nurse enters numbers from one digital system into another, but in a different order

RN looks at monitor print-out.

RN: This is so dumb.

RN copies numbers from monitor print-out into {clinical information system}

RN: This one takes respiration first. The vitals [vital signs] are in a different order in the print-out from the {clinical information system}. I think they should change my title to “Data Entry” ... then I’d get paid more!

Example E – From observation – Nurse entering information from her personal notes into the online and paper charts experiences distractions, interruptions and other barriers to passing on information

[RN is at the nurses’ station writing in the paper chart.]

A soft alarm sounds.

RN: [to researcher who is closer to the remote monitors] What’s the blood pressure?

Researcher tells her.

RN: I need that checked q 15 [every fifteen minutes], not q 30.

RN goes to the patient’s room and changes the settings on the monitor.

RN returns to nurses’ station.

RN: OK, I have to chart.

RN sits down at the computer, opens the {clinical information system program}, signs in with ID and password, pulls up the patient record and goes through several screens to find an assessment page in the patient record.

RN reads from her personal note sheet and copies the numbers to small boxes on the screen. She chooses some selections available and clicks on several check boxes.

The phone rings. The unit secretary answers and tells RN that it’s for her.

RN makes hand gestures at several people in the area who are talking so loudly that she cannot hear.

After the phone call she goes back to the {clinical information system}.

The same people are still talking.

RN: [muttering to self while entering data] Wrong! Wrong! Wrong! Wrong!

Researcher: What?

RN: I thought that I was in my patient, but I wasn't ... grr...

RN takes out what she has just entered, changes screens and reenters data.

Pharmacist arrives at nurses' station.

Pharmacist: What's happening?

RN: {nurse's name} took all the notes – before I was able to see the chart...

RN reads her personal note sheet and enters comments into the small area in the {clinical information system} for narrative notes.

RN: [to researcher] Unfortunately, they only give you a little bit of space ... but there are tricks ...

Researcher: You abbreviate?

RN: The entry time is up here ... you click on it again and you've got a new screen for entering info one minute later... that's how you get more in. Of course it's *really* hard to get back to see what you've written before, let alone change it ...

Example F – From observation – Nurse enters data from her personal note sheet into the patient record, while participant observer attempts to minimize interruptions for the nurse

The most common phrases in the observation data are “enters data in” or “writes in”.

RN enters data from personal note sheet.

Family member walks past nurses’ station to patient room.

Researcher: [to RN] Your patient had a visitor come in.

RN: OK.

RN concentrates on entering data into the {clinical information system}

Researcher notices that lunch trays have been delivered to the nurses’ station and volunteers to deliver them so that RN can continue to chart.

An alarm goes off. The patient’s sats have dropped.

RN goes to the patient’s room to adjust oxygen.

RN writes on personal note sheet.

Example G – From interview – Nurse’s frustrations with entering data into online chart

Researcher: Does using the computer take more time?

RN: It depends upon what you are looking for. In general I like keeping things in the computer and in the chart, too.

RN: [after expressing frustration with the online system] Yeah, yeah, I really do think it's not just interface from what I've seen ... that it has a lot more ... it's got some smart thing ... it's also got some dumb things it'll do.

Researcher: What are some of the smart things it has?

RN: Um ... well one of the smart things it does is ... if your patient's respiration falls below 90% then the alarm goes off ... it will stay on until someone turns it off. This is really wonderful.

RN: You know, our monitors print off heart rate, blood pressure sp O₂, and we have to enter it ... respirations, blood pressure

Researcher: in a different order.

RN: ... in a different order. So it compounds the problem.

RE: Makes it easier to make a mistake.

RN: Yeah. Very easy. I find that probably makes ... in that, I catch probably 10 to 20 times the errors that I use to have. Uh, but I may not even know that in so many places that they may be ignored.

Researcher: Um-hmm.

RN: You know, like, while I entered it right over here ... yeah, all right, that'll be good ... just fixing those blood sugars, I kind of ... yes {number}, yes [number]ish [laughs].

Researcher: OK.

RN: But if I, if I was dealing with less sets of numbers instead of backtracking at the end of the {shift}, it would become a hassle to look at each place and make sure you documented them exactly the same.

Researcher: Really.

RN: ... in every single slot. ... So instead you tend to get in the neighborhood.

Researcher: Yeah.

RN: You know ... in your ones that aren't like on computer or something like that, you just round... I mean there's not much difference between 280 and 281 ... because I think that's the way I've done charting on other people. I use my common sense. I know. I know people who do other things, and I'm like ... No-o-o-o ... you can mischart [by entering data in the wrong place] easily. If that's the way you chart ... you're just streaming along and I know before I've had people come back and tell me that I didn't chart for one or two hours ... the previous day or the previous week on a patient. Well, I just didn't realize I'd skipped ahead beyond where I was at.

Nurse Writes Information in Personal Notes

The nurses frequently wrote information down for their own use. They wrote on printed forms, blank pieces of paper. (One nurse said she used a pocket PC, but the observer did not see it.) What they write may be information they intend to act on during the shift, it may be information they might use if necessary, or it may be information they are going to pass on or record later. They called these pieces of paper called "jot sheets" or "brains." Several said that that was where they kept the information they would need most in a crisis when there would not be time to retrieve it from the chart. They took great care not to

lose their “brains” during the shift, and carefully destroyed them at the end of the shift. One of the nurses used the back of her hand for making temporary notes. She wrote far enough back that she could wash her hands without destroying her data.

Ash et al. (2001) and Gorman et al. (2000) have described the use of such ephemeral notes by physicians, residents and other clinicians in critical care units. They refer to collections of such notes as “bundles” (as discussed in Chapter 2.) Gorman et al. (2000) write

In field observations of expert clinicians caring for patients in critical care units, bundles appear to be a widely used means of managing information to support diverse, complex, and often simultaneous tasks. This may be especially useful in settings that are characterized by high uncertainty, low predictability, frequent interruptions, and potentially grave outcomes; where time and attention are highly constrained ... (p. 266).

The following examples from the data that describe use of personal notes are presented below:

Example A – From observation – Nurse makes notes at the beginning of and during shift for transfer to the chart later. Nurse does not want to lose personal notes during the shift.

Example B – From observation – Nurse makes personal notes during report

Example C – From observation – Nurse disposes of personal notes

Example D – From interview – Nurse talks about personal notes

Example E – From interview – Nurse explains why she does not use a personal note sheet

Example A – From observation – Nurse makes notes at the beginning of and during shift for transfer to the chart later. Nurse does not want to lose personal notes during the shift.

RN: Before I start the night I like to get the evening kind of sketched out. I can work all night off of this sheet of paper [gestures at plain paper with notes] and I can do my documentation in the morning -- but if I lose this, I'm hung... because you can't always come back to your desk.

Example B – From observation – Nurse makes personal notes during report

RN calls the Emergency Department and takes report over the phone for the patient about to transfer to her unit. She uses a preprinted "jot sheet" from a pad at the nurses' station.

RN: How old? What's his name? And he's Dr. {name}'s patient? Are there family members with him? What time are you fixin' to bring him up here? I'm ready.

Example C – From observation – Nurse disposes of personal notes

RN going off duty makes a face and obviously looks around the room in a pantomime of doing something secretly. She takes her jot sheet out of her pocket and tears it up into little pieces over the waste basket.

RN: My brains. Don't tell. <grins>

Example D – From interview – Nurse talks about personal notes

Researcher: Another thing I've been looking at and asking lots of questions about
is what you use to write notes to yourself on... while you're on duty

RN: Yeah

Researcher: And I noticed you had some blank sheets of paper that you put a
bar code [sticker] across the top ...

RN: mm ... mmm...

Researcher: This is something you always use ... and what ... am I guessing
right?

RN: Right

Researcher: That's your way of doing it?

RN: Actually I made out a form, but then I ran out of forms ... well, let me back
up, I made out this form that I used to use, I used to use it and I really
liked to use it.

Researcher: Uh-huh

RN: But the problem with it was ... was ... getting ... getting to ... keeping a copy
of it, keeping copies, you know, copy it ... so I changed from just using
that preprinted form that I had developed to just using a blank piece of
paper ... because ... and, too, it ... the other form was a reminder of what
I needed to know about ... but I've got it memorized now so I don't need it
as much...

Researcher: You know what it is you need to know ...

RN: I know what I need to know and in what order I need to know it and where I need to put it and ... uh, yeah ... and I go to just doin' it with blank [paper]

Researcher: I've seen the preprinted "jot sheets" on the unit and had gathered from watching the ... sometimes beginning nurses used the preprinted ones that the more experienced ...

RN: Well

Researcher: just have their own way of doing it.

RN: Yeah, I never use that little half-sheet.

Researcher: Right.

RN: I made my own.

Researcher: What do you do with it at the end of the shift?

RN: I throw it away.

Researcher: You tear it up and throw it away?

RN: Yeah

Researcher: So they're completely ephemeral, they don't go into anybody's record anywhere and they're not meant for anybody else but you?

RN: I ... you know when they went to this computer charting ... there's no way I can remember all the information especially when things start going awry. I *have* to write it down in chronological order and I tried several different ways to try and make it [the computer] make the chronological order run more effectively and the way I do it now is about the best way I've found. "Cause no matter what I've always got my notes and I can go back ...

Researcher: Right

RN: I mean I ... it could be documented ... it would be faster if I was writing it down initially ... which I used to do, but now they've taken that away so now I can't spend more time writing it down and having it ... I'm data entry now ... that's all I am.

Researcher: Yeah

RN: It's not, you know I mean ... they say it's supposed to save time, but it takes more time ... I would be done [in] half the time if I didn't have to stop and get ... you know, get into the computer.

Researcher: Right. That was going to be my next question ... is whether the difference is that since they've added {clinical information system name} you keep more, you write more on your personal paper than you did before? Or did you write on it and copy it?

RN: Well, it depends upon where I work. I mean when I work on [a] med-surg [unit] I probably wrote more there because there the nurses' notes were less detailed. Now, in critical care, they had such swell detailed nurses' notes that ... uh ... it to me was a lot easier to keep track of what I was doin', where I was doin' it, when I was doin' it ...

Researcher: mm – mmm

RN: I had an overall picture of what I was doin'.

Researcher: Yeah

RN: And now, I have no overall picture except for what I write down myself.

Researcher: Yeah, they had that kind of fold-out card [Kardex®] and the three pages [assessment form] and ...

RN: Right, which was really great. And once you figured out where everything was on it, it made things flow easier I thought ... and, uh, I can't, now ... now I can't, now [getting agitated] I hate I can't ever read the computer, I mean to even review my notes to make sure I've charted everything, it's a real hassle 'cause everything you see I've got that long, narrow abbreviated list. I mean, it's hard to read. It's small. There's no flow of information and see if there's anything I have honestly left out but ... yeah ... the computer's just totally for people who want to do research. I mean, it's not for the nurses at all.

Researcher: mm- mmm

RN: It's total, totally un-user friendly for the nurses ... and it's even [unfriendly] for the medical staff.

Researcher: It's eating your time?

RN: Yeah, it is mine. I mean, I've already written down everything by the time ... then I have to go back and enter it and they say "well, you're not supposed to write it down"... Well, I have to write it down otherwise I have nothing to look at.

Researcher: mm-mmm

RN: I've got to store that kind of information just automatically in the correct chronological order in my head? I can't do it. I'm not ... maybe some people are capable of that, but I'm not. So I have to write it down.

Researcher: That's very important.

RN: It is to me. Yeah, I like to know what's goin' on. So that's what I do.

Example E – From interview – Nurse explains why she does not use a personal note sheet

One nurse did not use a personal note sheet.

Researcher: I've noticed that you don't use a jot sheet.

RN: I used to use one a lot. It was taking up a lot of time. It was just one more thing I found I could eliminate. I still use them for taking telephone report ... but usually there's no point in writing it twice. I guess the same argument could be used for writing something in both the paper chart and the computer. When I first started [nursing], I taped it to the front of the chart. I still use it when I float [work a shift] upstairs [to a medical surgical unit]. Here I have only two or three patients, but upstairs I will have five or six so I use it and tape it to the top of the chart.

The previous sections of this chapter described what the nurses did with the information they gathered during the shift. Some of the vast amounts of information they encountered they did not act on, pass on or record for personal use. The last section of this chapter discusses that phenomenon.

Nurse Does Not Act on, Pass on or Record (Even for Personal Use) Information

Some information that the nurses learned on the shift they neither acted on nor passed on. A 15- to 20-minute report has to summarize the events of the past 12 hours and something is always left out. The precise data that were not acted on or recorded could not be documented with this methodology. These two examples presented below from interview data report discussions about this issue:

Example A – From interview – Researcher asks nurse about information left out of report and chart

Example B – From interview – Nurse says that most of what she writes on her personal note sheet will be recorded someplace else

Example A – From interview – Researcher asks nurse about information left out of report and chart

Researcher: How much of all that will go into your report later on, how much goes into the chart and how much you just ...?

RN: Probably 80% of the information I have disappears with me.

Researcher: [surprised at the high percentage] OK.

RN: Whether I pass it on or not ... if I give report to the same nurse [that cared for the same patient the previous shift] it becomes much simpler because I can then just explain changes in what we've done. If I'm explaining things

to a new nurse I will tell her things and I will emphasize things that I think are more difficult to discover. I could tell the nurse about this [unintelligible – phone ringing in the background] that he was on ... you walk in the room and you're pretty much going to notice that. On the other hand, I might really focus on insensitivity, or nonsensitivity to the {drug name} drip [on IV delivery] with {drug name} in conjunction ... to see how that works ... it'll give them a good status. How or why I think it is helping would be completely inappropriate ... not completely appropriate.

Researcher: OK

Example B – From interview – Nurse says that most of what she writes on her personal note sheet will be recorded someplace else

Researcher: Are there things that you write down on that sheet for yourself that are not ever recorded anyplace else? That are just for your own use?

RN: Uh, not generally. I mean, there might be some things, yeah ... like that lady's phone number.

Researcher: Yeah, yeah

RN: I wrote it down.

Researcher: That's information that there's no necessity for being filed ...?

RN: It ... but it might be in the file record. I may put it on the Kardex®.

Researcher: Right

RN: But, uh, most of the stuff I'm writing down is stuff that's gonna be recorded.

This chapter, the third of five chapters presenting findings, described and gave examples of how these nurses were observed acting on, passing on and recording information. It addressed the grounded theory's subsidiary processes related to the secondary research question, "What is their observable information use behavior?" The next chapter, Chapter 7, describes and gives examples of processes related to the secondary research questions, "What kinds of questions do they have on the job?" and "How do they choose which of these questions to pursue?" It is followed by one more chapter presenting findings, Chapter 8 on Barriers to Information Acquisition.

CHAPTER 7

FINDINGS: INFORMATION KINDS AND CHOICE OF QUESTIONS TO PURSUE

This chapter describes the subsidiary processes identified in that data which address the secondary research questions “What kinds of questions do they have on the job?” and “How do they choose which of these questions to pursue?”

Patient-Centered Information Seeking

The critical care nurses' information seeking often did not take the form of a syntactic question or an articulated query. As described in the first chapter, this process of acquisition of new information very broadly described as questioning can also take the form of browsing or scanning the environment, monitoring, encountering, and awareness of new information. It has a quality of vigilant surveillance. While the nurse is charting, she is also aware of people in her vicinity and of sounds from equipment alarms and patients' rooms. When she enters a patient's room she's aware of anything that is out of the ordinary in the room, even while she's performing a routine assessment.

For the most part, the kinds of information the nurses used could be classified in the categories of information Gorman (1995) observed physicians using. They are (a) patient data (generally corresponding to the JCAHO's patient

specific information), (b) population statistics or epidemiological information (generally corresponding to the JCAHO's "aggregate information"), (c) medical knowledge (generally corresponding to the JCAHO's "knowledge based information"), (d) logistic information and (e) social information.

As the grounded theory model developed in this study – the Nurse's Patient-Chart Cycle – illustrates, most of the on-duty information behavior of these critical care nurses pertained to patient specific information. In addition to patient specific information, they sought and used some social and logistic information to help them care for their patients and do their jobs. They were observed seeking, using and passing on only a small amount of knowledge based information. In no instance were they observed in any activity involving epidemiologic information. There is only one clear question in the data that does not fall into any of Gorman's (1995) categories of kinds of information used by health care providers. That question is "What time is it?"

The participant nurses' choices to pursue questions appeared to be based primarily on their sense of responsibility to the patient and to the patient's chart. They pursued social and logistic questions that they believed they needed for the care of the patient. Other kinds of questions always had a much lower priority for these nurses.

Occasionally they expressed curiosity about a knowledge based issue. If it was convenient, they asked another nurse or other knowledgeable person. Although there were some reference books on the unit and Internet access from one of the computers, only once did the researcher observe (and participate in)

seeking knowledge based information from those sources. When asked about why that appeared to be rare, some expressed the opinion that it was ethically and morally wrong for on-duty nurses to take time away from patient care “to read”. It didn’t matter whether the reading was from a book or an online source – it was still perceived as taking time away from their duties.

The rest of this chapter describes the nurses’ observed interaction with patient specific information, social information, logistic information, knowledge based information and epidemiologic information.

Patient Specific Information

Patient specific information is the primary content of the Nurse’s Patient-Chart Cycle. No other kind of information was more important to the on-duty critical care nurses. The following examples from the data of participant nurses’ questions or surveillance are presented below:

Example A – From observation of report – Questions about the patient’s condition

Example B – From observation – Are you in pain? Can you understand?

Example C – From observation – Questions for the patient about the patient

Example D – From observation – A glass of water or a glass of ice?

Example E – From observation – Why is he on this drug?

Example F – From observation – Patient has “the weak trembles”

Example G – From observation – What medicines are you taking at home?

Example H – From observation –“Is this patient allergic to this drug?” and other questions

Example I – From observation – Time for routine assessment of patient

Example A – From observation of report – Questions about the patient’s condition

Previous Nurse reports on patient vitals and activities.

Previous Nurse: Some progression today. Talking more.

New Nurse: And it’s coherent?

Previous Nurse: Yes – sometimes he’s hard to assess though – you know he rolls his eyes up – hard to see his pupils – Doctor wants him to get up with a walker

New Nurse: What’s he getting for pain relief?

Previous Nurse: {drug name}

New Nurse: He’s awake. I saw him staring at the TV in his room.

Previous Nurse: He [the doctor] said to get him up twice during the way. We only got him up once but he was up for a while.... He’s kind of demanding ... asking for something for pain. Called doctor for an order for {drug name} every four hours.

New Nurse: No [unintelligible]?

Previous Nurse: No – just juice and ice – did want graham crackers. {drug name} is on the second IV... has two IV’s

New Nurse: Both in the same hand?

Previous Nurse: Yes

New Nurse: Are they oozing or anything?

Previous Nurse: No, they're fine.

Example B – From observation – Are you in pain? Can you understand?

RN: Are you in pain?

Patient: Yes

RN: Where do you hurt?

[pause]

Patient: {body part} [one word]

RN: Would you like something for the pain?

Patient: [unintelligible – very soft]

RN: Do you want [unintelligible]?

Patient looks confused.

RN: Would you like someone in your family to translate?

Family member translates into the patient's first language.

Patient answers in first language; family member translates for nurse.

RN: [to family member] {Patient name} does not respond well to pain

medications. We don't want him to hurt.

Example C – From observation – Questions for the patient about the patient

RN: How are you feeling?

Patient: Well, I've been better but I've also been worse ... a lot worse... I'm getting better.

RN checks temperature, pulse, monitors and continues with assessment.

Patient: This hand here's really cold.

RN: Your hand is cold?

Patient: The whole arm is cold.

RN: Is that new? I'm concerned about this blood pressure cuff on your arm.

RN takes blood pressure cuff the cold arm and waits a minute before putting it back on in a different spot.

RN talks about patient's heart rate.

Patient told a story about his normally low pulse surprising the nurse in his doctor's office. He then talked about his other medical problems.

Patient: I'll call Dr. {name} and ask if he's signed for me to take {drug name}.

RN: I'll take a look and see if he's ordered that to continue. OK? I'll check on it.

Patient: I've got some here.

RN: In your [suit]case over there?

Patient: Yes

RN: I'll get your case later.

Patient: I want to sleep once I get my medicine.

RN explains that if his heart rate has problems during the night, she'll come in to check on him, but that she won't turn the light on so as not to disturb his sleep any more than necessary.

RN: Now I'm going to check your pulse in your feet ... and check your heart and lungs.

Example D – From observation – A glass of water or a glass of ice?

RN: Would you like me to leave you with a glass of water?

Patient: I just would like to have a glass of ice. I have a hard time drinking.

The patient cannot sit or roll over because of a device left in after surgery.

Patient reaches for glass of water with the arm that has both an IV and a blood pressure cuff.

RN: Don't.

RN holds water for patient to drink.

Patient: Thanks.

RN: You're welcome. I'll be right back.

Example E – From observation – Why is he on this drug?

RN pages through the chart, reads handwritten notes slowly.

RN: He's on {drug name} That doesn't make sense... this says here {x} but he's really {x}.

Another nurse explains what happened recently before RN came on duty.

RN: Oh, that's it.

Example F – From observation – Patient has “the weak tremblies”

RN goes to patient room to take patient’s temperature.

Patient is impatient with waiting for the doctor to come in.

Patient: [wryly] I’m going to fuss at him if I ever see him again. Even the preacher took off yesterday, then I woke up and my {family member} was gone.

RN: [smiling] They all abandoned you.

[All laugh]

Patient: [looking at meal tray] I need to eat slowly or I’ll get sick.

RN: You’re shaking a little. Do you usually do that?

Patient: Sometimes I just get “the weak tremblies”.

RN: “The weak tremblies”?

Patient: Yeah, that’s what my {family member} always called it.

RN and patient discuss what “the weak tremblies” really are.

Example G – From observation – What medicines are you taking at home?

RN: Mr. {patient name}, what medicines are you taking at home?

Patient describes medications.

RN retrieves chart from the nurses’ station and brings it to the patient room.

RN: You’re getting {drug name} q 6 hours.

Example H – From observation – “Is this patient allergic to this drug?” and other questions

RN asks patient about medications.

RN: It makes you break out? You actually get a rash from it?

RN and researcher move patient.

RN: OK, I'm going to get you up for a urine sample.

Researcher leaves the room.

RN returns to nurses' station to enter urine quantity in I's and O's record.

RN checks MAR.

RN: Well, I don't know what we are going to do. He never called me back.

RN calls pharmacist again about patient's drug allergy.

RN: Is that patient allergic to {drug name}? I'll try to page him [the patient's doctor].

RN goes through procedures to retrieve drugs [all but the one in question] from PYXIS® automated storage, dispensing and tracking system (Pyxis Corporation, San Diego, California) and record them in the MAR and the {clinical information system}.

RN goes to patient room and administers drugs.

Patient asks for milk and crackers which RN retrieves from the clean utility room.

Patient says he likes skim milk.

RN: Yes, I'm used to it now. Whole milk seems to leave a thick coat on your tongue.

RN is checking monitor while she is talking.

RN goes to nurses' station and checks personal note.

RN returns to patient room.

RN: Is that helping?

Patient nods.

RN listens to patient with a stethoscope.

RN: I can hear your tummy all the way up to your chest. Are you feeling
nauseated again?

Patient: No, not bad.

RN checks feet.

Patient: Did I get a lot of orders?

RN: The big one is {drug name}, but you're allergic to it.

Phone rings at nurses' station. Unit secretary answers then asks RN if she
wants to speak to Dr. {name}.

RN goes to the phone.

RN: [to doctor on phone] Apparently {patient name} is allergic to {drug name}.

He's had a reaction...

RN gives doctor the phone number of the pharmacy to check the history
there.

RN to patient room.

RN: He's going to call something in to the pharmacy. The pharmacy keeps a
record and they have a record of it ... it's their job. Be sure to let Dr.

{patient's family physician} know so he can prescribe something you can take.

Example 1 – From observation – Time for routine assessment of patient

The lights in the room are out. Two family members and the RN chat amiably for several minutes. RN checks patient's feet and legs.

RN: All right guys, lights on! [Turns on the lights]

RN: [to family member] His blood gases looked good this morning.

Family member: Potassium?

RN: {number}

RN takes patient's temperature, marks observations on assessment form on clipboard. RN checks Foley and other drainage equipment. RN checks monitor.

Family member asks RN questions about patient's medications, which RN answers.

RN: I've got to shine a light in your eyes. I'm sorry.

RN checks patient's pupils.

RN checks pulse, checks fingers, checks all lines and electrode connections. RN listens to patient with stethoscope.

Family member: Is Dr. {name} here yet?

RN: Not yet.

RN flushes a tube.

Family member, anxious, asks more specific questions which RN answers simply and clearly. RN finishes assessment and turns the overhead light off again.

RN: If you need anything, let me know.

Social Information

The critical care nurse has questions not only about social information about the patient but also about other health care workers. For instance, some physicians get angry if a nurse calls during the night with patient information that other physicians would definitely want the nurse to call in. The nurses discuss with each other what pleases and displeases different physicians.

At one point, when a patient was coughing, one of the nurses sent a sputum specimen to the lab (without an order). She was unsure of whether the patient's doctor would want her to take that opportunity to get diagnostic data, or want her fired for doing it without having the order yet. Technically it was against approved procedures, but if the lab results were back before the doctor arrived, he could order the appropriate medication sooner. She asked some of the other nurses and they, too, had their doubts about the doctor. She was relieved when a different doctor showed up for the patient, one who appreciated her having done it, wrote the order for the test, and used the information to order the right medication for the patient's infection.

The family conflict noted above (page 110 in Example C of the description of part 5 – Informative interaction with the patient's family, friends and visitors – of the Nurse's Patient-Chart Cycle) also demonstrates a nurse's necessary seeking and use of social information.

The following other examples from the data illustrate nurses' interaction with social information:

Example A – From observation – Family communication patterns

Example B – From observation – A coworker gives birth

Example C – From observation – A family member fears drug addiction from pain killers

Example D – From interview on a night shift – Workers on the night shift are different

Example E – From interview – Cultural considerations in staff assignments and when a family member wants to help

Example F – From observation – Power control for convenience rather than healing

Example G – From interview – Family dynamics

Example A – From observation – Family communication patterns

RN and other nurses are discussing the care of a patient who has suffered major head trauma. The patient is unconscious but not in a coma. Occasionally the patient suddenly gets agitated, sits up and cries out for several minutes. The nearest nurse immediately goes to him, and, speaking gently and softly, tries to help him relax and lie back down. Their attempts to calm him during these episodes are not working very well. The nurses fear that this behavior may exacerbate the patient's injury. One nurse had noticed that when the family came

to visit, they talked very roughly with each other, “almost barking.” It appeared to be their normal communication style. The next time the patient sat up and cried out, one of the nurses went in and said firmly “Lie down.” He did. The nurses had discovered a piece of social information very important to this patient’s care, a piece of information that would be passed along from nurse to nurse and never entered in any record.

Example B – From observation – A coworker gives birth

Someone comes in to tell the nurses that one of their coworkers has just had her baby on another floor of the hospital. RN and the others go to see mother and baby during their meal breaks.

Example C – From observation – A family member fears drug addiction from pain killers

Patient is restless and in pain. Family member is in the room.

RN: I can always give him some morphine.

Family member: [looking worried] Can he get off that?

RN: At this point it really doesn’t matter. When he’s off the {mechanical breathing device} then we’ll worry about that. His lungs have to heal and they will heal better if he is not upset. I’ll go ahead and give him a little morphine because I don’t want him getting upset.

RN and researcher go to PYXIS® drug dispensing machine. RN explains to researcher.

RN: People that age so often don't want drugs. They've heard so much about addiction that they are so afraid. They really react. They don't understand. Even if they are in pain, they think they shouldn't have it, that it's wrong.

Example D – From interview on a night shift – Workers on the night shift are different

Researcher: It's a different kind of thing here at night.

RN: It is. True.

Researcher: How's it different?

RN: Um... a couple of things. One is the family ... are typically ... they can be here, but a lot of them ... up to ... around 80% probably ... leave ... at night... at night. So you can focus ... because when the families are here you have to treat the family as well as the patient... You're not just with the patient. You have to keep a balance. And that's valid because the family is here supporting the patient... you want to say to the family member "step out of my way" ... but no, no, no ... "I'll work with you" ... because that person is probably doing the patient as much good as I am. We have a common denominator. Part of it [the night shift difference] is interaction ... interactions are fewer.

RN: And there's a certain camaraderie among us ... like we're all a little sleep deprived like we're on a ship or something ... And that's not spoken, but that's kind of understood, On the night shift, we stick together.

Researcher: OK

RN: And you get the feeling around that if you had to go to [working] days there'd be more politics involved. And I think most nurses you'd talk to would say something along those lines, if not exactly that. And patients are different at night. Uh ... pain is exacerbated at night than on the day shift. But, uh, on the other hand, you don't have a lot of flow of activity [including transfers of patients] – the doctors are not very apt to be around. They don't call us and give us new orders over the phone. We're the ones who contact them. They don't contact us.

Example E – From interview – Cultural considerations in staff assignments and when a family member wants to help

RN and Researcher were discussing how the charge nurse decides which nurse to assign to which patient each shift.

RN: You know staffing is difficult. You have to know each nurse's personality and different patient's [personalities]. It's match-making. Some family members have problems with ... have problems with [RN hesitates to name the problem]

Researcher: Cultural differences?

RN: Yeah.

RN talks about how nurses, patients and families all like to have a nurse they have had before, a nurse they know and trust.

RN: It's good for the nurse, good for the patient, so ... they are comfortable, they know you. And the best side, you know the patient, so anything that

changes, that's different, you would notice. You can notice their condition, you can notify the physician, you know, something like that.

Researcher: Right

RN: And the patient feels more attached to you because you're comfortable... it helps both sides ... so we do like that, you know.

Researcher: Yeah

RN: Unlike when there's a conflict ... you know. So that's good.

Researcher: I noticed how that the wife of the patient that left, how many times she touched you.

RN: Yeah, yeah exactly. Because, you see, I had this patient ever since he was sick.

Researcher: OK

RN: If the family knows you, they are comfortable and less stressed. They can reassure ... If the family talks to you, you can find out a lot, you can help a lot. They get to know you and you can take better care.

Researcher: She appreciated you.

RN: Yes, that she did. So that's very good. That way I know better what the patient needs. She helps, you know. There's nothing wrong.

Example F – From observation – Power control for convenience rather than healing

RN and another nurse discuss family dynamics.

RN: I had a patient last week whose wife wanted [him] transferred out of here because she couldn't bring the kids in here and had to get a sitter.

Researcher: Really?

RN: Yeah, she called {a hospital executive} and insisted that he be moved out of critical care and into a regular room.

Researcher: That's not best for the patient.

RN: That's for sure.

RN describes more about the family's effect on patient recovery.

Example G – From interview – Family dynamics

RN: You may have not been there, I don't remember, but anyway we were discussing the fact that I didn't, I don't know what their dynamics are ... they're ... and, yes, that is a concern to me ..., and yes, I do look at that because I knew it wasn't anything I had done ... I knew there was some sort of dynamic going on in that family ...

Researcher: Social dynamic?

RN: Yeah ... that was creating that power trip. I'm not sure what it was, and yes ... we were discussing that.

Researcher: I remember that; I'm thinking that's social [information].

RN: Well, I talked to the patient about it, too, and apparently they have had some history of being really angry with physicians [specifics deleted] and, uh, they're pretty good about confronting those issues and at one point they were going to fire one and even thinking about suing him simply because of something that was said.

Researcher: Oh, no ...

RN: And he, he just ... and he ... and my point was, you know, people have to be able to reach a point where they're taking personal responsibility for your illness, it's not my fault he's sick. So even though people come to us and view it as our fault, even though we're trying to help them, they'll view it like ... "well, you haven't fixed me, so there must ... you must have done something wrong to me because you're not making me well".

Researcher: mm-mm

RN: And that is the most frustrating part about nursing that there is. You know, because that's not from where we come.

Researcher: Right

RN: You know, we're here to help people. We're here to try and help them get better ... but, we cannot change the circumstances of their life ... we can only teach them about what they need to do to change the circumstances and a lot of people don't want to hear that.

Researcher: Right.

RN: You know, they don't.

Logistic Information

Sometimes nurses have questions about how to get something done. Procedures and contacts change, especially as automated systems replace manual ones. Logistic questions may be as simple as asking where something is kept, or as complicated as asking how to use a particular program. Critical care nurses may work at more than one hospital; many processes are different at one hospital from those at another. Examples from the data illustrating the nurses' logistic questions are:

Example A – From observation of report – When and how we can use this and where we keep it

Example B – From observation – How to mark a supply order

Example C – From observation – We need more thermometer covers

Example D – From observation – How do we get more batteries for the flashlights?

Example E – From observation – Where do we keep the Band-Aids® [adhesive bandages, (Johnson & Johnson, New Brunswick, New Jersey)]?

Example A – From observation of report – When and how we can use this and where we keep it

Previous nurse: I almost forgot. I have to show you where the {specialized piece of equipment} is. There's only one left.

New nurse: We used to use 'em all the time.

Previous nurse: It's a charge item. We have to have an order. We call 'em

[physicians] and tell 'em we need to and they say to put one on.

Both nurses discuss when it is appropriate to use this piece of equipment.

Previous nurse: They want to know when you do. There's no other one. I almost

forgot to tell you where the secret hiding place is.

New nurse: OK. Where is it?

Previous nurse shows her.

Previous nurse asks unit secretary to order more.

Another nurse: We used to use them all the time.

Previous nurse: They're expensive, so you have to have an order.

Another nurse: Yeah, they cost \$150.

New nurse: So you *do* have to have a doctor's order for ...

Previous nurse: At first we just used them, then Dr. {name} told us not to use 'em

all the time – just when ordered.

Example B – From observation – How to mark a supply order

Employee from supply department comes to the nurses' station.

Employee: Hey, you guys, when you order supplies and stuff be sure to mark

them {three-letter unit abbreviation} instead of {another three-letter unit

abbreviation} 'cause we get 'em mixed up.

The nurses discuss the historic origin of the confusion.

Example C – From observation – We need more thermometer covers

RN gets a thermometer and discovers that there are no disposable sanitary covers with it.

She goes to the clean utility room to get some.

RN: [to unit secretary] There's only one box left.

Unit secretary: I'll get some more

Example D – From observation – How do we get more batteries for the flashlights?

RN: Where are some fresh batteries? The batteries in these [flashlights] are all dead. The supply cabinet is locked at this time of night.

Another nurse tells her who to call.

Example E – From observation – Where do we keep the Band-Aids® [brand adhesive bandages]?

RN: Where are we keeping our Band-Aids®?

Another nurse: I don't know.

Yet another nurse: Here, I knew I saw them in this drawer.

Knowledge Based Information

The nurses very rarely sought knowledge based information, and when they did, they most often asked colleagues rather than “looking it up.” Surprised

by this, the researcher frequently asked about it in the interviews. The participants knew, of course, that the researcher was a librarian and in the interviews they may have inflated their use of knowledge based information to seek her approval. Even so, there was a common theme that there simply is not enough time to read (from a book or from a computer) on the job. The following examples from the data are presented below.

Example A – From interview – Paid to take care of patients, not to go to the library

Example B – From interview – Access to knowledge based information

Example C – From interview – I'm too tired after work

Example D – From interview – I like learning new things

Example E – From interview – Most nurses have a pocket drug book

Example F – From observation – Can we catch the patient's disease?

Example A – From interview – Paid to take care of patients, not to go to the library

Researcher asks RN if she uses the hospital library.

RN: Patients pay me to take care of them. I can't go to the library.

Example B – From interview – Access to knowledge based information

Researcher: I won't take much more of your time, but I'm ... being a librarian I

have to ask about how you, uh, you view your access to knowledge based

information ... the things that would be in textbooks like those over there
[points to a few books on the shelf] uh ... do you ever, do you have time
on the job to look up such things?

RN: Sometimes.

Researcher: You do sometimes?

RN: Yes. One nice thing about this unit is that we have Internet access.

Researcher: OK

RN: It's been a great help.

Researcher: Are you comfortable with the Internet?

RN: Oh, yeah, totally ...

Researcher: OK ... that's right ... you said you have your own web site

RN: Yes

Researcher: So you must be ...

RN: And I, and I have a lot of books that I carry with me on a regular basis. Of
course I have a pocket PC that I'm downloading a lot of information on it
and entering myself. [The researcher never saw it.] It's for my own
personal reference. I'm a real big reference person. ... I think it's our place
as nurses to be educated and informed and that's how we do the best job
for our patients by knowing what's wrong with them.

Researcher: Right.

RN: And so that we can help them better. I mean ... uh, how are you taking care
of them if you are ignorant?

Researcher: [What about] on-duty time?... which is what I'm looking at here ...
and you're very, very, very busy on duty.

RN: If there is, if there is something that I totally do not understand I will not
hesitate to stop and try and figure it out.

Researcher: OK.

RN: I mean, it was like, the thing with the {drug name}, you know I called
somebody and I said "Tell me what this is" and I know what it is, but I'm
going to go to the person that I think is the smartest ... "you can give me
this information"...

Researcher: The pharmacist?

RN: Yeah ... so they give me the information the quickest and I can move on ... if
I'm still not satisfied with the answer I may later, when I've got time ...
even if it's after hours ... look it up ... if it's something that I feel like I want
to know the answer to ..

Researcher: Right

RN: And it's going to make a difference.

Example C – From interview – I'm too tired after work

Researcher: ... which brings me to asking about, quote "knowledge based
information", a library euphemism for stuff you get from textbooks and
articles and computers in the sense of text rather than patient specific
information.

RN: I feel like I have plenty of access to it. I feel like my problem is finding the energy and time to actually sit down and read it and learn it. Whenever I go home, it's like ... I'm tired of that for a while. I try to study some at home, but ... I feel like I've got good access to the information. I just need more energy and more ...

Researcher: OK ... so you see it as something that you don't have time to get to when you're on duty ... and it's an off-duty sort of thing?

RN: Oh, yeah ... I mean ... sometimes I'll sit down and I'll read a little bit on duty ... but, most of the time through my twelve-hour shift I feel like there are plenty of other things that I *need* to be doing. I shouldn't have time to sit down and read or study if I'm doing my job correctly. It's a rare occasion in {unit name} that you have two patients stable enough that you can just ... let them go ... and not ...

Researcher: Right

RN: So many times, I'm just up in and out of rooms the whole day.

Example D – From interview – I like learning new things

RN: A couple of weeks ago we had a case of {eponymic syndrome}. No one was sure what it was so we looked up some information. Sometimes there's no time to look anything up. I like doing that. I like learning new things. I just took a pathophysiology course. I enjoyed it; helped me pick up a few more things. One time, I got some stuff from the library. I know I looked up some infection control stuff.

RN: Well, like the {disease name} thing that we were talking about all day long. It would have been good to either walk over to the ... but the thing ... but the next issue is, even if I walk over to the phone and say “I need some information [from the library]” ... or I go to a book and we’ve got a couple of books ... is to decide whether I have the time to sit down and absorb it.

Example E – From interview – Most nurses have a pocket drug book

RN: I have seven or eight books in my locker.

Researcher: Here at work?

RN: Then if I need to access information, then I’ll ... you saw one of them earlier, the {name of handbook}.

Researcher: Yes

RN: I also keep a drug book, my own test book, uh, I keep an emergency ... to talk about emergent field of medicine, I guess because sometimes, you know when you’re in an emergent situation it’s almost the same thing as being out in the field. [RN used to be in an emergency profession.] You need to know beforehand.... That’s what you’re doing. I also keep a procedures book which explains, you know ... gives a diagram of how you do different things... how to explain them.

Researcher: Cool

RN: And I’m trying to think if I have any other books ...

Researcher: Most of the nurses have something?

RN: Yeah, most nurses will have a drug book and probably a lab book and almost every one has some kind of critical care book. It may be a pocket critical care book or a big critical care book ... but almost everybody's got at least one. So I have those kind if I need them. The books we have here [gestures towards the drug preparation room where there are some books on a shelf] are ... generally twenty years old [laughs] ... so they tend to be cast-offs. I tend not to pay too much attention to those. And every one in there is doctor-related instead of nurse-related.

Researcher: That too,

RN: So we tend not to use those very much. Every once in a while if you get a rare kind of deal you may go in there and see if you can't find something on it. But by and large we just ignore those books.

Researcher: Umm-hmm.

RN: If I, if I really need some information, I'd call some people to help me look up the information on the Internet ... [some people] at home while I'm at work.

Researcher: Do you have Internet access here?

RN: No.

Example F – From observation – Can we catch the patient's disease?

At the nurses' station, RN and other nurses are discussing the diagnosis of a patient; the condition relatively rare, but dangerous. They were particularly

interested in how it spreads and what their risks were of contracting it. One nurse wants to call a friend and ask the friend to look it up on Yahoo! on the Internet.

Researcher: OK. I've got to do something here.

The researcher goes to MedlinePLUS.gov (from the National Library of Medicine) and quickly pulls up and prints out a page that answers their questions.

Another nurse attempts to look it up in some textbooks on the floor, but does not find it.

RN remarks that it would be great if the hospital's librarian could come by the unit for fifteen minutes to teach them how to search on the Internet.

Epidemiologic Information

Unlike the physicians that Gorman (1995) studied, this researcher did not observe the nurse participants having or pursuing any epidemiological questions. When asked during the interview, one participant did comment on the subject.

Example A – From interview – It doesn't help now

RN: Yeah. Yeah. Epidemiological information ... that doesn't do me a lot of good though. Information for me ... is only useful in communication with ... usually my families or if the patient is very alert and talking with the family. Uh, a lot of people ask different questions ... and, uh ... you know, statistics, stuff like that. Most often for me if that information isn't readily

available ... and there's something I really, you know, I want people to try and focus on that when they're in a critical illness. And I usually give them the feeling that ... you know, statistically it doesn't matter if you were the one hit by the meteorite ...

Researcher: That's right

RN: ... how many other people are going to get hit! You got hit! You know, so quit worrying about it... worry about the meteorite that's comin' at you. So I try not to, I try not to ... since I don't ..., I'm not overly conversant with that material. We don't have anything up to date on it up here. You know, I can tell it may be an unusual disease or something like that ... but I try not to let them focus on the "why."

Researcher: "Why me?"

RN: versus the, you know, how exactly ... The "why" turns into the "why me?"

Researcher: Right.

RN: You know. So, we focus on ... rather than the epidemiological, on the "how to get better," on how to go from where you are right now ... toward how to get down the road ... But if you start getting into ... with your patients and family ... if you start getting into that epidemiological stuff you're stuck in a big old bog.

This chapter presented data demonstrating that these nurses' decisions as to what questions to pursue are mostly guided by the nurses' perception of the use and value of the information in the care of the patient. Most of their informative interactions involve patient specific information; occasionally they

seek social or logistic information. They were observed seeking knowledge based information only rarely and there were no observed instances of their seeking epidemiologic information. They do not have time to read much knowledge based material on duty. The next chapter (the final chapter of findings) discusses observed barriers to nurses' retrieval of desired information.

CHAPTER 8

FINDINGS: BARRIERS TO INFORMATION ACQUISITION

This chapter describes the subsidiary processes identified from the data analysis that address the secondary research question “What barriers to information acquisition do they encounter?”

Major observed barriers to information acquisition include illegible handwriting, difficult navigation of computer systems, equipment failure, unavailable people who have information and social protocol barriers. Some confusion appeared to result from busy peoples’ interaction mistakes with complex systems; this created other barriers to information acquisition. Sometimes the nurses could not find the information they needed because (a) they could not figure out how to get to the part of the system they expected to have the information, (b) it was not recorded where they expected it to be or (c) it had never been recorded at all. As mentioned above in the discussion of kinds of information, the nurses did not have time to read knowledge based information sources even if they could easily find them. Other barriers are presented at the end of this chapter.

Illegible Handwriting

The nurses found barriers to information acquisition in both manual and computer systems. The most common problem in manual systems was illegible handwriting. The following examples are presented below:

Example A – From observation – Four nurses can't read this, have to call the doctor to find out what he meant

Example B – From observation – Ask the pharmacy

Example C – From observation – Cannot read what the previous nurse wrote

Example D – From observation – What does this doctor's order say?

Example A – From observation – Four nurses can't read this, have to call the doctor to find out what he meant

RN sits at desk in nurses' station and looks through the patient's chart again.

RN: [to another nurse] It's hard to read this handwritten stuff.

Two more nurses come over to look. All four are puzzled by the handwritten notes.

RN: If you can read that you're way ahead of me. I don't see anything here but routine meds [medications].

Another nurse: I'd call the answering service [for the doctor]. Tell the answering service what you want. I think they may wait until they have several messages before they call him.

Example B – From observation – Ask the pharmacy

Unit secretary and RN are scrutinizing a chart. They can't read the handwriting in the doctor's orders.

RN: Yeah, that's a pharmacy question. He writes orders for them that are unusual.

They call the pharmacy for help.

Researcher's comment: The answer will not necessarily come from a pharmacist. Pharmacy technicians and other workers in the pharmacy often answer this kind of question.

Example C – From observation – Cannot read what the previous nurse wrote

RN: [reading previous nurses' notes] I can't read her writing. Very bad writing.

RN reads carefully, following words with her finger.

RN: [to Unit Secretary] I think she reversed these bp's [blood pressure readings]
Unit Secretary agrees.

Example D – From observation – What does this doctor’s order say?

RN: What does this say?

Unit secretary: [helping interpret the doctor’s handwriting in a handwritten order]

It looks to me like “other meds.”

RN: “Other meds”? [Sighs] We were already doing those meds.

Unit secretary: That’s what he wants.

Difficult Navigation of Computer Systems

Electronic records systems eliminate the difficulties of handwriting interpretation. However, navigability of electronic systems presents another set of barriers to finding information. The following examples from the data are presented below:

Example A – From interview – It’s hard to find what I entered earlier this shift

Example B – From observation – I can’t find it fast enough on the computer and it’s too easy to miss a mistake I’ve made

Example C – From interview – Some things I have trouble finding

Example D – From interview – Comparing paper and online records

Example E – From interview – Poor emergency information retrieval and lack of system integration

Example F – From observation – Easy to make a mistake, hard to follow the whole shift

Example G – From observation – Search strategy error

Example A – From interview – It's hard to find what I entered earlier this shift

Researcher and RN are discussing the transition from paper to online charting.

RN: To me it was a lot easier to keep track of what I was doin', where I was doin' it, when I was doin' it.

Researcher: mm-mmm

RN: I had an overall picture of what I was doin'.

Researcher: Yeah

RN: Yeah, they had that kind of fold-out card [Kardex® printed card (Remington Rand, Buffalo, New York)] and three pages and ... And once you figured out where everything was on it, it made things flow a lot easier, I thought ... and, uh, I can't, now ... now I can't, now [getting agitated] I hate I can't ever read the computer, I mean, to even review my notes to make sure I've charted everything, it's a real hassle 'cause everything, you see I've got that long narrow abbreviated list. I mean it's hard to read. It's small.

There's no flow of information. It's very difficult to read. I don't think I ...

Researcher: So you find it really difficult to go back and find something even that you put in?

RN: I don't even try anymore. I mean ... I, you know, I'm trying to check some information and see if there's anything I have honestly left out but, yeah,

the computer's just totally for people who want to do research. I mean it's not for the nurses at all.

Researcher: mm-mmm

RN: It's total, totally un-user-friendly for the nurses ... and it's even for the medical staff.

Researcher: It's eating your time?

RN: Yeah, it is mine. I mean, I've already written down everything by the time ... then I have to go back and enter it and they say "well, you're not supposed to write it down." Well, I have to write it down, otherwise I have nothing to look at.

Researcher: mm-mmm

RN: I've got to store that kind of information just automatically in the correct chronological order in my head? I can't do that. I'm not ... maybe some people are capable of that, but I'm not. So I have to write it down.

Researcher: That's very important.

RN: It is to me. Yeah, I like to know what's goin' on. So that's what I do.

[Both laugh]

Example B – From observation – I can't find it fast enough on the computer and it's too easy to miss a mistake I've made

RN goes to get a mobile computer and brings it to the nurses' station and sits down. The researcher asks her how she uses it.

RN: I do write things in the paper chart anyway because when somebody's crashing, you need it immediately, I carry this [a clipboard with some papers] all of the time. All I have to do is grab this and I have it in the paper chart. Even in the paper chart it's easy to make a mistake. On the computer you don't even catch it because you're moving right through the stuff and there's nothing to prompt you. When I put it in a computer I may look at it once a shift – but on paper I see it all many times – and I'm more likely to catch an error. [On the computer] I'm not correcting things that I may use while I'm working. The patient information that I need during a code [full cardiac arrest and attempted resuscitation] inside the computer is too hard to get. If I'm calm and I'm sitting here doing it I can get into it in a couple of minutes – but during a code you need to be able to roll... then you need to punch in an access code and all that. It's easier to just open up an assessment sheet and see twenty-four hours at one look.

Researcher: I haven't seen anyone actually take a {mobile computer nickname} into a [patient] room.

RN: If I'm doing a report or entering stuff into the {mobile computer nickname} I prefer to do it at the nurses' station where I can sit down.

RN has a problem with the computer program.

RN: I've assigned myself to a patient that's not mine. How do I change it? I've done this a couple of times ... but I can't find [RN opens six different pull-down menus without finding the command she needs] where is one of those books?

RN retrieves a plastic bound collection of help pages for the system. It takes several minutes for her to find the instructions to do what she needs to do.

RN: I don't see where it says how to unassign a patient ... oh, there it is.

RN reads instructions.

RN: What happens is that someone will accidentally assign themselves to my patient and record vital signs. Then I can't chart my patient. Say they've entered vital signs for 10:00 and I try to enter for 10:00. I can't because I can't change someone else's charting. [The system will not allow it.] And it won't let you chart outside of a four-hour window. It keeps asking you if you know you're trying to chart outside ... Oops, I just remembered what I forgot to chart. Now I'm charting the wrong vital signs on the wrong person ... so I have to go back and fix it. If I get called to court they are going to say "Why did you modify these?"

Example C – From interview – Some things I have trouble finding

Researcher: Have there been any times in the last few hours when you were looking for something and you couldn't find it? Or couldn't get it as fast as you wanted it?

RN: Umm. I mean some of the things, you know that the computer has, you have trouble finding... like things that I don't use in the computer frequently.

Researcher: um-hmm. You know they're there, but you ...

RN: They're there but don't know where they're at. Things that I don't use frequently that aren't as easily pulled up. Overall, everything else, I can't

really think of anything right off hand that ... well, I guess ... it's not that they're not there ... but there are things in the chart, orders you have to go back and review ... you know, several days worth of orders and it would be so nice to ... the Kardex® helps a lot with that to keep the orders straight and stuff, but you still, if you have a question about an order or something it can be hard to find the original. There was one question tonight I still haven't found, an original order for something that's on the Kardex®.

Example D – From interview – Comparing paper and online records

Researcher: Are there things that you wish were more available ... if you were designing an ideal information system to help you do your job ... what would it look like?

RN: Things that I wish for more available?

Researcher: Or even available more quickly ... more easily. We talked earlier about how you could read the assessment sheet much faster than you could retrieve it from ...

RN: Yeah, it's slower to come up in the computer ... the vital signs, things like that. It's still kind of slow for me personally because, you know, typing in everything and having to pull up screen by screen to find what you're looking for. I still do faster with the ...

Researcher: Yeah

RN: with the paper chart than ...

Researcher: And at one level with the paper chart is that it doesn't require a password.

RN: Right. The bad thing right now with the paper chart, however, is things do not get put on the paper chart. People are assuming that they are being put into the computer that, as you saw earlier, there were some gaps in that, too.

Researcher: Sometimes they need their place.

RN: Their place, yeah. So then you're just kind of stuck.

Researcher: Yes.

RN: I mean I still believe in both. The computer has its place, but I also think that the paper chart needs to hang around, too.

Researcher: Good. In general you'd like to have things in both places?

RN: Ummm ... Yeah. You know I think that the computer is good for ultimate storage of information and print-outs and things that make it more legible and things like that, but I do like having the immediate access of my paper chart and twenty-four-hour flow sheet and things like that. So I think it's kind of redundant charting whenever you have to write it down then type it into the computer, too.

Researcher: Yeah. And what do you do if the two things are different?

RN: Hopefully nothing, but if it got called to court you know it would be a good question for a lawyer... "Why is it here this way and here this way?" I mean I don't know how to explain ... typographical error or it depends ...

nor for instance with like art[erial] lines and Swanns [catheters that monitor the heart internally] the values actually change second to second...

Researcher: Right

RN: ... and it's not a constant thing. If you write down or print up the numbers that are stored in the computer, the computer takes a set time and then it stores that number. If you'd use those and you may match as far as what says your computer as far as what you are writing down. But a lot of times I sit in the room with my patient.... Like if someone's on a postop[erative] [coronary artery] bypass or something like that ... and I don't pull up in the computer exactly what it's recording. I look at the clock and if it's fifteen after, I write down what I see on the screen. So sometimes my written down numbers do not match what the computer has stored.

Researcher: Right. Because the computer is not storing everything that's registered on the screen, on the monitor in the room, it's only sampling certain things.

RN: Yes, right. And there's sometimes it also stores like averaged values and things like that ... I assume that that's ... for instance oxygen saturation ...

Researcher: umm-hmm

RN: If I'm just looking at one-hour interval, then it goes through that whole hour and picks what the best O₂ ...or the most common and best O₂ SAT was and that's what it stores. You know, that might not be an accurate level of exactly what the patient's done, for instance on this gentleman, I mean,

most of the time he's SATing 92 and 93 per cent, but with any activity, he drops to 85.

Researcher: Umm... hmm

RN: If I get on that quick and I remedy that, the computer won't even pick that up unless you break it down into like one- or two-minute increments, it'll show it was that low, but otherwise it'll just show that it's in the 90s.

Researcher: Yeah ...

RN: It's just kind of ... you have to assess the information that it saves ... you can't just blindly record what's going on.

Example E – From interview – Poor emergency information retrieval and lack of system integration

Researcher: OK ... In a crisis or an emergency, which would you rather grab, the computer or the paper record?

RN: Oh, I'd grab the paper record. The computer's... at this point ... my own personal lack of familiarity ... even though I'm pretty familiar with it. It's not like my home computer... you know ... my home computer I say "Oh, I'll use my home computer!" but my lack of familiarity and the balkiness of the data retrieval system is the problem.

Researcher: OK.

RN: You know it takes me a while to log in. It takes the computer a while to access the data. Then it may not display it in the way I want it to display it

to give me the information I need ... and I have no ability to alter that for myself.

Researcher: Right

RN: You know, maybe with a certain patient, I want X, Y and Z shown. I don't have the ability to modify that frame at all so that I would say "that'll work."

Researcher: I've heard other people say that. They say it takes too long to log on, put in your ID and password and go through too many screens.

RN: um-hmm

Researcher: ... for something you could find in a paper chart in seconds.

RN: umm-hmm [nods "yes"]

Researcher: Do you find yourself doing a lot of redundant charting with both the computer and the paper?

RN: [laughs loudly] You have to log blood sugars in five places!

Researcher: Five places?

RN: Yeah ... most of us choose to just conveniently ignore one or two or three of them. But technically, we're supposed to log 'em in five places. They don't get logged there, but all we really need is ... if it's in the database ... and we have a database system Go from machine to database to plug spots [in another database].

Researcher: They'd refer to each other, yeah.

RN: So ... plug it up in another database ... but it can't. That's what I was told. It would cost them thousands and thousands of dollars to get that ... I asked

them, I said “That’s a database, right?” “Yup.” Databases work numbers, right? You know ... what’s wrong? [Laughs]

Example F – From observation – Easy to make a mistake, hard to follow the whole shift

RN: This is not simple to read, not easy to do. I accidentally hit “head” [from a pull-down menu] when I wanted “headache” ... takes me to a completely different page. Is it worth it to go back? Sometimes, no ... You can’t see the whole shift. You can’t track the old stuff without going through a whole bunch of screens. On paper I could follow it easily.

Example G – From observation – Search strategy error

RN: [at PYXIS® automated storage, dispensing and tracking machine (Pyxis Corporation, San Diego, California)] I can’t find this drug [on the screen display resulting from her search].

RN finds it after discovering a truncation error in her search strategy.

Nurses often need to look back over a patient’s record for a period of time so that they can be aware of any important changes. I saw nurses on the night shift trying to remember to make a print-out of vital signs records before midnight. The system would allow access to only the current day, but a nurse working 7 p.m. to 7 a.m. needed data from two different calendar days.

Equipment Failure

A critical care unit is a very high-tech environment. Another information barrier for these nurses was equipment failure. These examples from the data are presented below:

Example A – From observation – The physiologic monitoring system isn't working right

Example B – From observation – Even if you record the correct data on the paper printout, the incorrect data in the monitor system record will persist

Example C – From observation – I don't know what to do about this equipment error

Example D – From observation – The monitor leads aren't working. Everybody tries to help, but to no avail

Example A – From observation – The physiologic monitoring system isn't working right

RN checks monitor – one [ECG] lead is not reporting.

RN adjusts lead and checks monitor again.

RN counts respirations – not the same as what the monitor shows.

RN swaps out cables to see if that makes a difference; that doesn't help.

Example B – From observation – Even if you record the correct data on the paper printout, the incorrect data in the monitor system record will persist

RN has been discussing difficulties with information in the chart.

RN: [pointing at monitor computer printout that has a handwritten remark] For example: the vital signs are missing for 5:00. If you're taking them every hour you can print it out and the printout will be in the permanent chart. The problem is that the arterial [sensing] line quit working ... and you have to handwrite the problem on the record ... but that record can still be printed with the wrong reading.

Example C – From observation – I don't know what to do about this equipment error

RN looks at monitor printout with a big gap in the data.

RN: Look at these vitals. What do you do with this? Several hours it's there then for several hours there are no readings... then when it comes back on it's all different. What to do? I don't know. I just work here.

Example D – From observation – The monitor leads aren't working. Everybody tries to help, but to no avail

Unit secretary is reattaching monitor leads while RN cares for patient.

They are trying to get ECG readings.

RN: Are you finished?

Unit secretary: No – I can't get these to ... still no lead ... [looks at monitor] says
"leads off"

RN makes light conversation (about a piece of jewelry) with patient while she reapplies and adjusts the ECG leads. [RN acting calm even though annoyed]

The patient describes the symbolism of the piece of jewelry while Unit Secretary, RN and researcher try to improve lead connections.

Respiratory therapist enters the room and asks what patient's O₂ SATS are. RN responds with number.

Respiratory therapist leaves the patient room. Unit secretary goes back to nurses' station.

RN checks monitor again and sees an O₂ SAT number [different from what she had said before]... relays the number to researcher [standing in the doorway] who relays it to the respiratory therapist.

RN: Did it work? Did you get a reading?

Researcher can see the monitor from where she is standing ... occasionally there is data from one lead, but mostly the display shows garbage.
Unit Secretary: [from nurses' station]: It didn't say "no lead" again, but it's still not registering right.

RN adjusts the lead again.

RN: Tell me when it's ready.

Unit secretary: Wait! Don't do anything else!

Researcher sees a brief signal, then noise again.

Unit secretary: "Leads off"

RN makes changes.

RN: Is that worse?

Unit secretary shrugs.

RN: My suggestion would be to get [someone from] {heart monitoring department} up here and let them troubleshoot. They're the experts. In the meantime let the experts do it.

Researcher: [joking] "An expert is just a drip under pressure."

Patient laughs, and then laughs so hard he chokes.

RN: [smiling] Stop laughing

Patient asks researcher to repeat the line. Researcher repeats it. Patient laughs again. Participant observer researcher is learning from RN how to protect the patient from the stress of the staff's frustrations.

The People Who Know Are Unavailable

As noted in the discussion of information sources earlier in Chapter 5, other people are important sources of information for on-duty critical care nurses. Unfortunately, the person who knows something the nurse needs to know is not always available. The following examples from the data are presented below:

Example A – From interview – Missed Report

Example B – From interview – I want an answer from the person who knows

Example C – From interview on a night shift – I've not seen this before, is it OK?

[Knowledge Based Information need]

Example D – From observation – I need to talk to a real person, not voicemail!

Example E – From observation – Who can I ask about your {respiratory equipment} settings?

Example A – From interview – Missed Report

Researcher's Comment: This nurse arrived on shift to find that the previous nurse for her patients had left early, therefore she could not learn the valuable information normally passed on in report. She was able to get some information about her patients from another nurse, but not nearly as much as she needed. She talked about the problem during the interview.

Researcher: What kind of information would you like to have gotten [*sic* I'm embarrassed by my grammar here on the tape] from the nurse who was on last night that [*sic* you didn't see this morning? [Information] that you didn't get because that nurse was not here? Are there things that might have been...?

RN: Yeah, uh, you know, like his blood pressure being low ... there was no ... I didn't know if that was something new or something that had been occurring or what ... because was hard to read what ... how she wrote it in that little brief, you know, thing that she gave me ... the little written report

she gave me. I was confused, but fortunately {another nurses' name} was here to tell me exactly what had happened ...

Researcher: It took a person?

RN: Right, it took a person to tell ... and why she left at five after seven I don't know...because the shift ends at 7:30 ... so ...

Researcher: Right

RN: Why she couldn't wait ... I mean, I wasn't ... I mean really, report under policy isn't supposed to start until 7:10 ... So, I, you know ... but there's some people with the attitude around here ... if you don't start at seven you're late... which is dumb ... I mean, I start as soon as I walk in, you know, I don't mind that. But I don't know why she couldn't wait to give me report.

Example B – From interview – I want an answer from the person who knows

Researcher: OK I've been watching you for eleven hours or so and I have some questions I wanted to ask but didn't want to ask while you were so busy working... have I got the light on? [the recording indicator light] yes, I do ... and some questions I'm just asking everybody and the first one I usually ask is, uh, thinking back over today were there some times when you really wanted to know something and couldn't find it out And why?

RN: Well, I mean it's obvious that it's always a matter of being a detective.

[Laughs] It's always a matter of being a detective on anything. Putting the pieces together ... knowing where, where things are, where to find them,

know who to ask, who to talk to ... I mean you just learn that from talking to all the wrong people. [Both laugh.]

Researcher: By experience

RN: Oh, it's like, for example, when I needed something from the pharmacy, you know, I call, I don't talk to the person who answers the phone, I always ask for the pharmacist , because ...

Researcher: Right

RN: That's a waste of my time. Always a waste of my time. Because no matter what you do or how you word it or have them get back to me, it's always "Well, I'm going to let you talk to the pharmacist" after you've wasted all that time and energy.

Researcher: Right

RN: So, it's like "why do you answer the phone?" ... you know, I mean ...

Example C – From interview on a night shift – I've not seen this before, is it OK?

[Knowledge Based Information need]

RN: Then there was this {day of the week} night. I found blood hung on the same IV with {name of substance}. I'd seen it hung with normal saline, but I'd never seen it hung any other way. I'd never seen it done. I had no idea. Should I do something? Tell the physician about the blood ... you just give him a call. I said that I'd never seen it done any other way. I had no idea it could happen. I had no idea it could happen. [RN was unable to contact the physician.]

Researcher: Uh-huh

RN: Although ...yeah it was ...and now I know.

Researcher: Right

RN: But there was a little bit of concern for a while because nobody knew for sure.

Researcher: Right

RN: No one knew quite what should be done about this. I even called the blood bank. I thought somehow it shouldn't be done that way. They could maybe tell me what was going to happen. And we never got a real solid answer. Most percentages of cases it still happens. It doesn't hurt anything... but still ... there must be a percentage where they've had those reactions... anything like that. No real solid information. That's not normal. We never did find that information. It works like that some ways between the nurses that are here we've got years and years of experience. Most of the experienced people work the day shift.

Example D – From observation – I need to talk to a real person, not voice mail!

RN goes to nurses' station.

RN calls the pharmacy and gets voicemail instead of a real person. She leaves a message.

RN: I *hate* that. I need that for him ASAP!

Much later ... after no response from the pharmacy

RN: I'm hacked off at that voicemail in the pharmacy.

[Later]

RN: [looking at MAR] I don't know what we are going to do. He never called me back.

RN calls pharmacy again.

Example E – From observation – Who can I ask about your {respiratory equipment} settings?

RN: [to patient] Is there anyone I can call to find out your {respiratory equipment} settings?

Patient: A nurse was supposed to get it.

RN: Who?

Patient names an agency in a town more than fifty miles away.

RN: Who was the doctor who prescribed it?

Patient: {doctor name}

RN: How long have you had one or has another doctor other than {doctor name} been out [to see you]?

Patient: About every six months

RN: Could your {family member} bring the machine in here?

Patient: He's real sick with {diagnosis}. We shouldn't bother him. There is the {name of agency}.

RN: I'll do some searching and see what I can find out.

RN makes a series of phone calls off and on for hours trying to catch up with someone who knows or even knows how to find it. Eventually someone from

the agency contacted someone who was home for the night who called the RN and said the information is on file at the agency office.

RN: [on the phone] I hate to ask you to go out to get this after midnight. Can you call it in when you first go in tomorrow morning? He's not in distress now. ... [Listens] yes, if he goes into distress is there a number where I can call you? ... [Writes down number] He's doing OK. He's had pretty extensive surgery and I want to keep him out of distress. [Hangs up].

RN: [to researcher] He's got it in the office.

As the patient's condition varied during the night, the RN considered calling the agency person again.

Social Protocol Barriers

In the previous example, part of the RN's reluctance to call the person from the agency again was because of the social cost of that action. There were a number of times when RNs could not get information because of the (sometimes hierarchical) social roles of different people and the accepted communication protocols within the culture. The example below illustrates a social protocol barrier.

Example A – From observation and interview – I won't find out what the x-ray showed; the radiologist will only tell the doctor.

On a night shift, RN goes to the patient's room where a respiratory therapist is giving the patient a breathing treatment. The respiratory therapist expresses concern about one lung. The RN listens with a stethoscope, agrees with the respiratory therapist and decides that an x-ray would confirm or deny their suspicions. The RN calls the doctor who orders a stat [immediate] x-ray. The RN passes the order on to the Unit Secretary who calls the radiology department to order the x-ray. The RN calls the Emergency Department [E.D.] to find out who will read the x-ray this time of night on this day of the week, and gives the person in the E.D. a number to call to contact the RN.

Sitting at the nurses' station, the RN and the researcher discuss recent advances in teleradiology in specific and telemedicine in general.

RN: Treat your patient, not your monitor.

The X-ray technician arrives on the unit with a mobile x-ray machine. The RN asks the patient's {family member} to leave the room during the x-ray. The RN chats with the radiology tech while the x-ray is made.

[Later]

RN: I probably won't hear the results of that x-ray tonight [even though I want to].

The doctor [radiologist] will read the x-ray and call {patient's doctor} and {patient's doctor} will call me only if there's a problem.

[Later]

Respiratory therapist: [to RN] have you heard about that x-ray yet?

RN: No, not yet.

Respiratory therapist: He's bleeding.

[Later]

Researcher: Isn't it frustrating to order an x-ray, an x-ray whose results can make a difference in this patient's care ... and know it will be so long before you get the results?

RN: Yeah, in this case my instinct is that there is no {suspected problem} ... but the RT [respiratory therapist] wanted the x-ray. We will probably not see it. When {the doctor who reads it} has the report, he'll call {the patient's doctor}. I won't [even] see the chest x-ray itself.

Researcher: Is there a hierarchy of who finds out ... especially on a Saturday or Sunday night?

RN: Say, if I ordered a CT [computed tomography] scan ... if the order didn't go through until after 11 p.m., the on-call radiologist would not read it that night. If I were an on-call nurse, I couldn't do that, but they can.

Researcher: Is it different at teaching hospitals [RN works in other hospitals as well] where they have resident doctors on duty all of the time?

RN: Yes, and it's different at other hospitals. {Name of hospital in neighboring city} has radiologists [on duty] 'round the clock. Same at {names another hospital in the area where she also works}.

[Later, during interview]

Researcher: Can you think of some times when you wanted to know something and you couldn't find it out? And why?

RN: Uh, x-rays!

Researcher: Uh-huh

RN: mmm

Researcher: The situation was ... you learned from the lung sounds something
that wasn't just right and ...

RN: ... had an x-ray performed. We don't have access to that data yet, it's been
two hours – close to two hours.

Researcher: And you don't expect it any time ...

RN: No. No. But our patient's not getting any worse, so ...

Researcher: OK

RN: If he was getting worse I'd continue to do something ... but he's staying just
the same.

Researcher: OK

RN: Uh... any other things [thinking]

Researcher: So there might be some information that actually exists out there in
the world ...on the basis of that that you might not be able to get?

RN: That's right. Not unless I ... raised Cain. I was tryin' to think of a polite way to
say that.

[Both laugh]

Researcher: Exactly

RN: Yeah ... I would have to ruffle some feathers to get that information right
now.

Researcher: OK

RN: It's a typical ... sort of a ...

Researcher: ... and you save that for when it counts because you don't want to do that too many times.

RN: That's correct.

Researcher: Yeah, you choose your battles.

RN: Um-hmm [nods "yes"]

People Interacting Simultaneously with Multiple Complex Systems

One person wholly concentrating on using one complex system is one thing; many people dealing with several complex systems at once is quite another. Something may be different in one information system from what is in another. Someone who is interacting with one information system (human, paper or automated) may be interrupted with another and not complete the task begun in the first system. The resulting ambiguous, conflicting or missing messages can create barriers to information the nurse needs. Examples from the data are presented below:

Example A – From observation – The doctor changed the drug orders, but they haven't changed in the medication administration record system.

Example B – From observation – Obsolete, conflicting or missing orders

Example C – From observation – Is he diabetic? This isn't filled out.

Example D – From observation – These orders are vague

Example E – From observation – The patient isn't in the system. The nurse can't find her personal note sheet and can't remember. Filled syringes have to wait.

Example A – From observation – The doctor changed the drug orders, but they haven't changed in the medication administration record system.

RN: [reading patient chart] "All medications hold"? But there are administration times on the MAR. What does this mean?

RN calls the pharmacy and asks to speak to a pharmacist.

RN identifies the patient to the pharmacist and asks about the discrepancy.

RN: Yes, he [the doctor] did [change orders], but the MAR still shows times ...

OK.

RN hangs up.

RN: [to researchers] It's good to hold the meds, but still showing it on this printout makes it easy for someone to make a mistake ... see, it says right here "9:00 {drug name}"! He [the pharmacist] did tell me that the PYXIS® wouldn't let you have it ... the medications hold order is in the system ... but still ... these computers...

Example B – From observation – Obsolete, conflicting or missing orders

RN: Don't have a printed MAR.

RN goes to the computer to print it out ... accesses the relevant program and orders a printout of the MAR for today's date. RN makes notes on her personal note sheet from the MAR.

[Data irrelevant to this example omitted]

RN: [to researcher] Sometimes there are big problems – some orders are obsolete, some are illegible. Once I paged a doctor six times in 90 minutes about a patient with severe {clinical condition} but never got him [the doctor] to respond ... charted it all, but really worried ... [a doctor near the nurses' station appears to be listening] Not all docs are like that ... Dr. {name} here is great.

The doctor shuffles through the paper chart.

Doctor: You can read my orders?

Another nurse comes up ... they discuss his orders and whether or not one has been duplicated. They both shuffle papers. Eventually the original order is found and the doctor admits his mistake.

Example C – From observation – Is he diabetic? This isn't filled out.

RN: Is he diabetic? This [part of chart] isn't filled out.

RN goes to patient room.

RN: Honey, are you a diabetic?

RN returns to nurses' station.

RN: He says he's not. He doesn't take any insulin or anything.

Example D – From observation – These orders are vague

RN studies the doctor's notes on a sheet of paper.

RN checks the Kardex®; looks confused; compares two documents.

RN: [to unit secretary] will you please page Dr. {name}?

Unit secretary pages the doctor.

RN: [to researcher] He's [the doctor] very vague, very vague. He'll ramble on and on and never finish his order ... wants you to finish them ... He has trouble finishing his sentences.

Example E – From observation – The patient isn't in the system. The nurse can't find her personal note sheet and can't remember. Filled syringes have to wait.

RN: [to unit secretary] Will you please page {doctor's surname} again?

Unit secretary pages the doctor.

RN goes to the PYXIS®.

RN: [to unit secretary] They don't have that new person in the computer yet.

RN has a problem with the PYXIS® machine and swears at it.

RN prepares medication for patient.

The phone rings.

Unit secretary: [to RN] Line {number} is for you.

RN puts down the filled syringes and rushes to the phone. She tells the doctor what is going on with the patient, describing the crisis episode and current

condition. RN listens and looks for her personal note sheet on the clipboard. She can't find it. She puts the phone down and runs back and forth between the nurses' station and the medication preparation room before finding it with the MAR in the medication room. She tries to recall something from memory.

RN: [to herself] I don't remember if it is him or the other gentleman ... or, here it is ... no, can't find that ... my paperwork is scattered all over here.

Eventually the RN finds the notes in question and continues the conversation with the doctor on the phone ... watching her patient's monitors while she talks. After the phone call ends, she retrieves the syringes and goes to the patient's room.

Other Barriers to Information Acquisition

These examples presented below illustrate barriers to information finding that did not fit into any of the categories above:

Example A – From interview – The library is closed when I am working.

Example B – From interview – I couldn't find the orders buried in the paper chart.

Example C – From observation – Nurse does not have the right phone number for a family member.

Example D – From observation – Previous nurse does not know if the patient has eaten anything.

Example E – From observation – The test results won't be back until next week.

Example A – From interview – The library is closed when I am working.

Researcher and RN are discussing access to library materials during the night shift. Some are available online and some are available online in the physical library. Physicians can have a security officer open the library door so that they can use books after hours in a clinical emergency, but nurses do not have that privilege. Even if they did, they could not leave the unit to go get a book or journal during their on-duty time.

RN: [after discussing the library's daytime hours] ... but at 3:30 in the morning, that's not good. That's what I'm saying. That never, ever, ever does me any good.

Researcher: You can leave a message in voice mail and get it the next time when you come back to work.

RN: Yeah [very short] Yeah. That doesn't do me a lot of good though.
[knowledge based] Information for me ... is only useful in communication with ... usually my families or if the patient is very alert and talking with the family

Example B – From interview – I couldn't find the orders buried in the paper chart.

Researcher: Now – [looking through field notes] back at the beginning of the shift when you were looking for medication orders that they [who?] wanted to see right away ...

RN: It was ... um ... yeah, I want to show you ...

Researcher: Was it buried in the chart? Or in the wrong place?

RN: Yes – well it was just ... you know ... most of the current orders – I mean the working orders – typically are the ones, you know, on top like this [shows a chart] for the {names drug}. This is for the post-stent orders uh ...all the way from the very, very back ... way back here [deep into the stack of papers that is the paper chart] up to here [points to place on a paper near the top of the stack]. Anyway ... that was kind of the deal on that – I knew there should be some other orders in there, but looking through the top several I didn't find them.

Example C – From observation – Nurse does not have the right phone number for a family member.

RN tries to call {patient's family member} who is coming to take the patient home. RN discovers that the number she has is wrong.

RN: OK. I'll try another way.

RN finds in her personal notes the phone number for another family member. She calls that family member and asks that the message be relayed.

RN tries unsuccessfully to make some more calls.

RN: I feel like I'm having a bad dream.

Researcher: [quoting from Cool Hand Luke, an old Paul Newman movie] "What we have here is a failure to communicate."

Example D – From observation – Previous nurse does not know if the patient has eaten anything.

New nurse: [to previous nurse] Have you noticed if he's eaten anything?

Previous nurse does not know.

Example E – From observation – The test results won't be back until next week.

RN: You never know, some of these people with {specific disease}. Any results [back yet] on the {specialized test}?

Other nurse: I haven't seen any. I figure that stuff will come back next week.

This chapter, the last findings chapter, presented examples of barriers to the nurses' information seeking. They dealt with illegible handwriting, computer systems that were difficult to navigate, equipment failure, unavailable knowledgeable people, social protocol barriers, mistakes caused by multi-tasking people interacting with multiple complex systems and other barriers. The next chapter summarizes and discusses the study, its conclusions and its implications. It also makes recommendations for future studies.

CHAPTER 9

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes, discusses this study and presents findings and conclusions. It describes the significance and implications of the Nurse's Patient-Chart Cycle as well as implications for clinical systems, nursing education and library services. It makes recommendations for future research.

Summary

This study used observer participant data and in-context interview data to develop grounded theory describing the information behavior of individual on-duty critical care nurses in a community hospital. The primary research question of this study is "What is the observable information behavior of on-duty critical care nurses in a nonteaching community hospital?" Secondary questions addressed the nurses' information sources, their information use behavior, their kinds of questions, their decisions to pursue questions and the barriers they encountered to information acquisition.

The participant observer researcher gathered more than 4,500 paragraphs of data from fifty hours of observation of a representative sample of six on-duty critical care nurses in a community hospital critical care unit. Using open, in vivo and axial coding of this data, the researcher developed a grounded theory model,

the Nurse's Patient-Chart Cycle (see page 57), which describes the core process of critical care nurses' on-duty information behavior.

The Nurse's Patient-Chart Cycle describes the relationship of three major kinds of informative interactions – report, with the patient and with the patient's record (commonly called the chart) – and two minor kinds of informative interactions, one with other health care workers and the other with the patient's family, friends and visitors. All of these informative interactions are multi-directional and happen in many media. The nurse's shift begins with an oral report from the nurse or nurses previously caring for the patients in her charge this shift. (A similar report is exchanged whenever a patient transfers onto or off of the unit.) Report is followed by a period of time gathering information from the chart. At the end of the shift, the nurse spends time concluding entries in the patient record before giving report to the nurses about to care for the same patients. Most of the shift in between is a constant cycle of informative interactions with the patient and the patient's chart. There are brief interludes of the minor informative interactions mentioned above. The researcher observed that the participant nurses made a conscious change in exhibited affect between when they were interacting with the patient in the patient's room and when they were interacting with various information systems outside of the room. No matter how stressed and busy they might be, they always presented a relaxed and calm demeanor to the patient.

The next research question for this study is “What information sources do they use?” The participant nurses sought information from people (including

patients, other health care workers and patients' family, friends, and visitors), from the patient's chart in various media, from computer systems and a few other information sources. Most of the information the nurses were observed seeking on duty was related to the patients in their charge.

The next research question for this study is "What is their observable information use behavior?" They acted on (e.g., followed orders), passed on (e.g., reported or recorded) or did not use the information they found. Some information they recorded only for their own personal use.

The next research question for this study is "What kinds of questions do they have on the job?" The nurses were observed mostly using patient specific information. Social and logistic information was commonly needed for the care of the patient. They occasionally sought knowledge based information, but were never observed seeking epidemiologic information, Gorman's (1995) fifth category of information sought by physicians.

The next research question for this study is "How do they choose which of these questions to pursue?" Their decisions to pursue questions were based on their judgment of how important the answer would be to the care of the patient, their estimation of whether they had time to pursue the question and their estimation of whether or not they could get an answer. Some questions were not pursued not because of a conscious decision not to pursue the answer, but because attention to other duties distracted the nurse from the question.

The next research question for this study is "What barriers to information acquisition do they encounter?" They encountered barriers to information

acquisition in both paper (illegible handwriting) and online (difficult navigation) systems. Equipment failure, unavailable people, social protocols, and mistakes caused by multi-tasking with multiple complex systems hampered their information-seeking efforts.

None of the observational data showed evidence of nurses following all of the steps of the Nursing Process described in Chapter 1. The nurses' practice was dominated by medical diagnoses and medical orders rather than nursing diagnoses and nursing care built around personalized interventions for a particular patient. Most nursing care planning was either from standardized plans or pathways for a particular diagnosis or in informal notes on the nurse's personal note sheet. Nurses may have internalized the assessment, diagnosis, planning, intervention and evaluation cycle, but they were not observed recording formal NANDA (North American Nursing Diagnosis Association) nursing diagnoses, NIC (Nursing Interventions Classification) interventions or NOC (Nursing Outcomes Classification) outcomes (as described in Chapter 1). There was very little space allowed in the patient's record (either on paper or automated) for narrative nurse's notes. The information that the nurses did record was severely abbreviated to fit into the forms used.

One possible exception was nurses' assessment, diagnoses, planning, intervention and evaluation of patients' pain. This was a major emphasis on pain management in the unit; some called it "the fifth vital sign."

While most of the participant nurses showed or expressed a high regard for their continuing education and for practice based on good research, there was

simply no way that they could follow the formal steps of “Evidence Based Nursing” on duty. Any research that they might do had to be done off duty and – with the exception of hospital provided in-service education (short classes and an annual “skills fair”) – off the pay clock. Their vigilant surveillance for the patient precluded any “reading on duty.” (Refer to the discussion of Knowledge Based Information in Chapter 7.)

All nurses displayed and expressed frustration with their on-duty time management challenges, especially charting. They were skilled at multi-tasking, but feared making serious mistakes by missing something important. Most believed that their data recording systems (both on paper and online) had too many redundancies that wasted their time.

Although the researcher did not record it in the data, the researcher often could overhear how the participant nurse described the study to the patient and family when she was asking for their permission for the researcher to come into the room to observe. The nurse usually said something about the researcher studying their communication or communication patterns.

Member checking, the participant’s review of the researcher’s transcript of her field notes, helped verify the accuracy of the data. After reading the transcripts, the participants often comment on how they had not realized how often they had some interactions. On duty, the nurses’ concentration was clearly on the patients’ care and not the classification of their informative interactions. The use of thick description (only samples of which are quoted in this document) enriched the credibility of the data and the reliability of the findings.

Summary of Conclusions

1. Most of the observable on-duty information behavior of the participant nurses can be described in five kinds of multi-directional, multimedia informative interactions: (a) report, (b) with the chart, (b) with the patient, (d) with health care workers and (e) with the patient's friends, family and visitors.

2. The researcher observed that the participant nurses made a conscious change in exhibited affect between when they were interacting with the patient in the patient's room and when they were interacting with various information systems outside the room.

3. Most of the information the nurses were observed seeking on duty was related to the patients in their charge.

4. The participant nurses sought information from people, from the patient's chart, from computer systems and from other information sources.

5. The participant nurses were observed acting on information, passing on information or recording information for their own use.

6. The nurses were observed mostly using patient specific information. They also sought knowledge based information but were never observed seeking epidemiological information.

7. Their decisions to pursue questions were based on their judgment of how important the answer would be to the care of the patient.

8. They encountered barriers to information acquisition in both paper and online systems. Equipment failure, unavailable people, social protocols and mistakes caused by simultaneously using multiple complex systems hampered their information-seeking efforts.

9. Most believed that their data recording systems had too many redundancies that wasted time.

Implications of the Nurse's Patient-Chart Cycle for Clinical Systems

Most of these nurses' informative interactions were about patient specific information. Most of their information barriers were system failures, such as missing information or poor information retrieval design. In this unit at this time, there were many digital systems that were in no way integrated with other systems. The "integration" too often consisted of a nurse reading something in one system and then manually reentering it in another. The pharmacy system may have worked well for the pharmacy. The physiological monitoring system may have worked well for clinical engineers, monitor technicians and some record keeping. The laboratory test reporting system probably worked well for the laboratory. However, the links between these and another dozen systems the nurses used were poor or non-existent, resulting in both wasted time and the risk of lost information or errors. The dream of Integrated Advanced Information Management Systems has not come true for this, and many other community hospitals.

Most of the systems in this hospital were purchased from one provider – one of the largest vendors of such hospital systems. The administration and information technology department had chosen this vendor for many of their systems because of the vendor's promise of compatibility for integration between systems.

The nurses were well aware of the legal implications of all the data they recorded. The design of such systems is heavily driven by legal and regulatory considerations. The records must stand up well in a court of law, especially a malpractice suit. Malpractice law is intended to punish those who do not deliver good patient care.

The system integration, interfaces, data entry layouts and navigation must, however, be designed work with the information behavior of the very people who use it most: the nurses on duty. If the confusion and frustration of dealing with poorly designed and poorly integrated systems causes nurses to make mistakes, those mistakes could lead to poor patient care and, yes, malpractice litigation.

Implications for Nursing Education and Library Services

Nursing school faculties teach nursing students the Nursing Process and principles of Evidence Based Nursing. Nursing students may spend hours writing a single care plan for a single patient. Librarians serving schools of nursing often teach nursing students how to use information retrieval resources for their school work and research papers. These activities require time for both information

gathering and also thoughtful reflection. Individualized nursing care plans – with accurate nursing diagnoses, interventions and outcomes – are not generated by checking boxes on a form or on a screen. No one can retrieve reliable literature and systematically review it while watching monitors, checking on patients, administering and verifying therapies, and answering telephone calls.

The intelligent and educated participant nurses in this study are all passionate about giving their patients the best care possible. They are well aware of the difference between the Nursing Process and medical practice. They respect research-informed practice and want the best of what academia and libraries can give them to support the care of their patients. However, their duties leave no room for such pursuits.

One implication of the core process observed in this study, the Nurse's Chart Patient Cycle, is that there is neither time nor opportunity for these on-duty critical care nurses to use most of these academic skills. Given the economic realities of health care, hospital administrators are unlikely to pay nurses for off duty time for such pursuits. What they do, they have to do on their own time.

Librarians serving working nurses in hospitals must be wary of using academic models for delivery of their information services. On-call ready reference service (an expert reference interview followed by information retrieval incorporating literature filtering and simple highlighting of pertinent passages) would provide these nurses with more reliable knowledge based information than they currently get by asking people. It does not matter whether the knowledge

based information is delivered on paper or online – nurses still do not have time to read more than a few paragraphs (if that) on the job.

To a certain extent, hospital-based pharmacists are already providing similar services on a small scale. Librarians with a broader knowledge base and professional information retrieval skills can provide better on-demand information services.

Recommendations for Future Studies

Studies of nurses' patient care interactions and studies of the use of clinical information systems are common. However, neither of these two informative interactions exists without the other and they should be studied in relationship to each other. As stated in Chapter 2, there have been many studies of report, the first informative interaction in the Nurse's Patient Chart Cycle. Studies of the interrelationship of the second informative interaction, the chart, and of the third informative interaction, the patient, could be useful for improving both clinical care and clinical information systems.

It would be useful to replicate the study in different kinds of units and in different hospitals to check on the accuracy of the model in other settings. Other studies could measure the quantities of time that nurses spend in the five informative interactions of the model.

Nurses become nurses because they want to care for patients. Clinical information systems and knowledge based information systems built with an understanding of the Nurse's Patient Chart Cycle can improve nurses' informative interactions and allow them to do more of what they do best, care for patients.

APPENDIX A

OPEN AND IN VIVO CATEGORY CODES

Report Printed Using QSR N6® Software for Qualitative Data Analysis

(F)	//Free Nodes
(F 1)	//Free Nodes/COW
(F 2)	//Free Nodes/Multitasking
(F 3)	//Free Nodes/No reading on duty
(F 4)	//Free Nodes/Jot Sheet
(F 5)	//Free Nodes/Legal awareness
(F 6)	//Free Nodes/Not to pursue
(F 7)	//Free Nodes/Barriers
(F 8)	//Free Nodes/Entering field
(F 9)	//Free Nodes/Who are my patients this shift?
(F 10)	//Free Nodes/Report
(F 11)	//Free Nodes/Constant Info seeking
(F 12)	//Free Nodes/Talk with Doc
(F 13)	//Free Nodes/Consent
(F 14)	//Free Nodes/Assessment
(F 15)	//Free Nodes/Mood actor
(F 16)	//Free Nodes/Stress, frustration
(F 18)	//Free Nodes/The "Q" word
(F 19)	//Free Nodes/Codes and superstition
(F 20)	//Free Nodes/Redundant charting
(F 21)	//Free Nodes/Buried in the chart or file
(F 22)	//Free Nodes/Call the doctor
(F 23)	//Free Nodes/When the family's here
(F 24)	//Free Nodes/Night nursing
(F 25)	//Free Nodes/Charge nurse report
(F 26)	//Free Nodes/Lots of different people around
(F 27)	//Free Nodes/Care Plan
(F 28)	//Free Nodes/Reassurance
(F 29)	//Free Nodes/Write on paper as well as computer
(F 30)	//Free Nodes/Chart for wrong patient
(F 31)	//Free Nodes/Charting light
(F 32)	//Free Nodes/Can't get x-ray info - night
(F 33)	//Free Nodes/Seasonal talk
(F 34)	//Free Nodes/Are you a name or a room number?
(F 35)	//Free Nodes/Speak roughly to this patient
(F 36)	//Free Nodes/Change my title to "Data Entry"
(F 37)	//Free Nodes/FM wants transfer that is not good for patient
(F 40)	//Free Nodes/Confusion about orders
(F 41)	//Free Nodes/Call me

(F 42) //Free Nodes/paper chart problem
(F 43) //Free Nodes/This damn computer
(F 44) //Free Nodes/we do everything for the patient
(F 45) //Free Nodes/An hour before seeing patient
(F 46) //Free Nodes/Researcher participant
(F 47) //Free Nodes/The nurse's job is to record everything
(F 48) //Free Nodes/The doctor should do this
(F 49) //Free Nodes/hit by a meteorite
(F 50) //Free Nodes/rarely get to sit down
(F 51) //Free Nodes/Block charting
(F 52) //Free Nodes/Charts open
(F 53) //Free Nodes/Patients pay me to take care of them
(F 54) //Free Nodes/encounters dangerous sharps box
(F 55) //Free Nodes/writing on hand

APPENDIX B

AXIAL CATEGORY CODES

Report Printed Using QSR N6® Software for Qualitative Data Analysis

- (1) /Information Seeking
- (1 1) /Information Seeking/People
- (1 1 1) /Information Seeking/People/Patient
- (1 1 1 1) /Information Seeking/People/Patient/Asks
- (1 1 2) /Information Seeking/People/Family Member
- (1 1 3) /Information Seeking/People/Other Nurse
- (1 1 4) /Information Seeking/People/Physician
- (1 1 5) /Information Seeking/People/Unit Secretary
- (1 1 6) /Information Seeking/People/Other person
- (1 2) /Information Seeking/Chart
- (1 3) /Information Seeking/Computer systems
- (1 3 1) /Information Seeking/Computer systems/STAR
- (1 3 2) /Information Seeking/Computer systems/Care Manager
- (1 3 3) /Information Seeking/Computer systems/PYXIS®
- (1 3 4) /Information Seeking/Computer systems/OTHER
- (1 3 5) /Information Seeking/Computer systems/Printout
- (1 4) /Information Seeking/Published info
- (1 5) /Information Seeking/Other
- (1 6) /Information Seeking/Successful
- (1 7) /Information Seeking/Senses - nonlinguistic
- (1 7 1) /Information Seeking/Senses - nonlinguistic/Seeing
- (1 7 2) /Information Seeking/Senses - nonlinguistic/Smelling
- (1 7 3) /Information Seeking/Senses - nonlinguistic/Hearing
- (1 7 4) /Information Seeking/Senses - nonlinguistic/Touch
- (2) /Info Use
- (2 1) /Info Use/Acts on
- (2 2) /Info Use/Passes On
- (2 2 1) /Info Use/Passes On/To persons
- (2 2 2) /Info Use/Passes On/Writes
- (2 2 3) /Info Use/Passes On/Enters in computer system
- (2 33) /Info Use/Info not passed on
- (3) /Info Kind
- (3 1) /Info Kind/Patient Specific
- (3 2) /Info Kind/Logistic
- (3 3) /Info Kind/Social
- (3 4) /Info Kind/Knowledge based
- (3 5) /Info Kind/Epidemiological
- (3 6) /Info Kind/Other Info kind

(4) /Base data
(4 1) /Base data/Gender
(4 1 1) /Base data/Gender/Male nurse
(4 1 2) /Base data/Gender/Female nurse
(4 2) /Base data/Education
(4 2 1) /Base data/Education/BSN
(4 2 2) /Base data/Education/Diploma
(4 2 3) /Base data/Education/AD
(4 3) /Base data/Experience
(4 3 1) /Base data/Experience/2
(4 3 2) /Base data/Experience/10
(4 3 3) /Base data/Experience/4
(4 3 4) /Base data/Experience/22
(4 4) /Base data/Age
(4 4 1) /Base data/Age/39
(4 4 2) /Base data/Age/41
(4 4 3) /Base data/Age/45
(4 4 4) /Base data/Age/30
(4 4 5) /Base data/Age/32
(4 4 6) /Base data/Age/48
(4 5) /Base data/Day
(4 5 1) /Base data/Day/Weekday
(4 5 2) /Base data/Day/Weekend
(4 6) /Base data/Shift
(4 6 1) /Base data/Shift/Night
(4 6 2) /Base data/Shift/Day

REFERENCES

- Allen, B. L. (1996). *Information Tasks: Toward a user-centered approach to information systems*. San Diego, CA: Academic Press.
- American Nurses Association. (2003). *Nursing World 3.3*. Last Updated November 17, 2003. Retrieved November 17, 2003, from <http://www.nursingworld.org/pressrel/index.htm>
- Ash, J. S., Gorman, P. N., Lavelle, M., Lyman, J., Delcambre, L. M., Maier, D. et al. (2001). Bundles: meeting clinical information needs. *Bulletin of the Medical Library Association, 89*, 294-296.
- Asselin, M. E. (2001). Knowledge utilization among experienced nurses. *Journal for Nurses in Staff Development, 17*, 115-124.
- Baker, C., Wuest, J., & Stern, P. N. (1992). Method slurring: the grounded theory/phenomenology example. *Journal of Advanced Nursing, 17*, 1355-1360.
- Ball, M. J., Hannah, J. H., Newbold, S. K., & Douglas, J. V. (2000). *Nursing informatics: Where caring and technology meet*. New York: Springer.
- Barta, K. M. (1992). Information-seeking, research utilization, and perceived barriers to research utilization of pediatric nurse educators. *Dissertation Abstracts International, 54*, 2427A (UMI AAT 9334055).

- Barta, K. M. (1995). Information-seeking, research utilization, and barriers to research utilization of pediatric nurse educators. *Journal of Professional Nursing, 11*, 49-57.
- Bawden, D. & Robinson, K. (1997). Information behaviour in nursing specialties: a case study of midwifery. *Journal of Information Science, 23*, 407-421.
- Beitz, J. M., Fey, J., & O'Brien, D. (1998). Perceived need for education vs. actual knowledge of pressure ulcer care in a hospital nursing staff. *MEDSURG Nursing, 7*, 293-301.
- Belkin, N. J. (1980). Anomalous states of knowledge as a basis for information retrieval. *The Canadian Journal of Information Science, 5*, 133-143.
- Belkin, N.J., Oddy, R. N., & Brooks, H. M. (1982a). Ask for information retrieval: Part I: Background and theory. *Journal of Documentation, 38*, 61-71.
- Belkin, N.J., Oddy, R. N., & Brooks, H. M. (1982b). Ask for information retrieval: Part II: Results of a design study. *Journal of Documentation, 38*, 145-164.
- Blythe, J. B. & Royle, J. A. (1993). Brief Communications: Assessing nurses' information needs in the work environment. *Bulletin of the Medical Library Association, 81*, 433-435.
- Brewer, C. S. & Frazier, P. (1998). The influence of structure, staff type, and managed-care indicators on registered nurse staffing. *JONA, 28(9)*, 28-36.
- Brown, M.E. (1991). A general model of information-seeking behavior. In J. M. Griffiths (Ed.), *ASIS '91: Proceedings of the 54th ASIS Annual Meeting*:

Vol. 28 (pp. 9-14). Medford, NJ: Learned Information for the American Society for Information Science.

Buiser, M. (2000). Surviving managed care: The effect on job satisfaction in hospital-based nursing. *MEDSURG Nursing*, 9, 129-134.

Bunyan, L. & Lutz, E. M. (1991). Marketing the hospital library to nurses. *Bulletin of the Medical Library Association*, 79, 223-225.

Bunyan, L., Lutz, E. & DuMont, R. (1990). Application of the "sense-making" model in designing library services for nurses. *Medical Library Keys to Health Information*, 65-69.

Byrd, G. D. (2002). Can the profession of pharmacy serve as a model for health Informationist professionals? *Journal of the Medical Library Association*, 90, 68-75.

Canadian Institute for Health Information/ Institut canadien d'information sur la santé (2001). Hospital report: Acute care. Retrieved November 27, 2003 from <http://secure.cihi.ca/hreports/public.shtml>

Case, D. O. (2002). *Looking for information: a survey of research on information seeking, needs, and behavior*. Amsterdam: Academic Press.

Charmaz, Kathy. (2000) Grounded theory: objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln (Eds), *Handbook of Qualitative Research* (2nd ed.) (pp. 509-535). Thousand Oaks, CA: Sage.

Clarke, S. P. & Aiken, L. H. (2003). Failure to rescue: needless deaths are prime examples of the need for more nurses at the bedside. *AJN*, 103(1), 42-47.

- Cogdill, K. W. (1998). The Information needs and information seeking of nurse practitioners (drug therapy, diagnosis). *Dissertation Abstracts International*, 59 (12), 4310A. (UMI AAD9914825).
- The Compact edition of the Oxford English dictionary: Complete text reproduced micrographically.* (1971). Glasgow: Oxford University Press.
- Corcoran-Perry, S. & Graves, J. (1990). Supplemental-information-seeking behavior of cardiovascular nurses. *Research in Nursing & Health*, 13, 119-127.
- Crawford, P., Brown, B., Anthony, P. & Hicks, C. (2002). Reluctant empiricists: community mental health nurses and the art of evidence-based praxis. *Health and Social Care in the Community*, 10, 287-298.
- Creswell, J. W. (1998). *Qualitative inquiry and research design (2nd ed.)*. Thousand Oaks, CA: Sage.
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed method approaches*. Thousand Oaks, CA: Sage.
- Dalrymple, P. W. (2003). Improving health care through information: research Challenges for health sciences librarians. In M. J. Lynch (Ed.). Research questions for the twenty-first century, *Library Trends*, 51, p. 525-540.
- Darbyshire, P. (2000). User-friendliness of computerized information systems. *Computers in Nursing*, 18, 93-99.

- Dawes, M & Sampson, U. (2003). Knowledge management in clinical practice: a systematic review of information seeking behavior in physicians. *International Journal of Medical Informatics*, 71, 9-15.
- Dervin, B. (1976). Strategies for dealing with human information needs. *Journal of Broadcasting*, 20, 324-333.
- Dervin, B, and Nilan, M. (1986). Information needs and uses. In M. E. Williams (Ed.), *Annual Review of Information Science and Technology (ARIST)*, 21. (pp. 3-33). Medford, NJ: Knowledge Industry.
- Detlefsen, E. G. (1998). The information behaviors of life and health scientists and health care providers: characteristics of the research literature. *Bulletin of the Medical Library Association*, 86, 385-190.
- Dey, I. (1999). *Grounding grounded theory: Guidelines for qualitative inquiry*. San Diego, CA: Academic Press.
- Dochterman, J. M. & Gulechek, G. M. (2000). *Nursing interventions classification (NIC): Iowa intervention project (3rd ed.)*. St. Louis, MO: Mosby.
- Dorland's Illustrated Medical Dictionary (30th ed.)*. (2003). Philadelphia: Saunders.
- Ekman, I., & Segesten, K. (1995) Deputed power of medical control: the hidden message in the ritual of oral shift reports. *Journal of Advanced Nursing*, 22, 1006-1111.
- Fetterman, D. M. (1998). *Ethnography: Step by step*. (2nd ed.). Thousand Oaks, CA: Sage.

- Forsythe, D.E. (1998). Using ethnography to investigate life scientists' information needs. *Bulletin of the Medical Library Association*, 86, 402-409.
- Forsythe, D. E., Buchanan, B. G., Osheroff, J. A., & Miller, R. A. (1992). Expanding the concept of medical information: an observational study of physicians' information needs. *Computers and Biomedical Research*, 25, 181-200.
- Glaser, B. G. (1978) *Theoretical sensitivity*. Mill Valley, CA: Sociology Press.
- Glaser, B.G. (1992) *Basics of grounded theory analysis*. Mill Valley, CA: Sociology Press.
- Glaser, B.G. & Strauss, A. L. (1967, 1999). *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine de Gruyter.
- Glesne, C. (1999). *Becoming qualitative researchers: An introduction* New York: Longman.
- Gonnerman, K. (2003). The health sciences library and professional librarians: important resources for busy ED nurses and nurse managers. *Journal of Emergency Nursing*, 29, 183-186.
- Gorman, P. N. (1995). Information needs of physicians. *Journal of the American Society for Information Science*, 46, 729-736.
- Gorman, P., Ash, J., Lavelle, M., Lyman, J. Delcambre, L., Maier, D., et al. (2000). Bundles in the wild: Managing information to solve problems and maintain situation awareness. *Library Trends*, 49, 266-289.

- Grandjour, A. (2000). The effect of managed care penetration on hospital staffing in Tennessee, 1991-1995. *Managed Care Interface*, 13, 62-6, 70.
- Henry, S. B., & Mead, C. N. (1997). Nursing classification systems: necessary but not sufficient for representing "what nurses do" for inclusion in computer-based patient record systems. *Journal of the American Medical Informatics Association*, 4, 222-232.
- Hicks, C. & Hennessy, D. (1997). Mixed messages in nursing research: their contribution to the persisting hiatus between evidence and practice. *Journal of Advanced Nursing*, 25, 595-601.
- Jakob, S. M. & Rothen, H. U. (1997). Intensive care 1980-1995; change in patient characteristics, nursing workload and outcome. *Intensive Care Medicine*, 23, 1165-1170.
- Janesick, V. J. (2000). The choreography of qualitative research design. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (2nd ed.) (pp. 379-399). Thousand Oaks, CA: Sage.
- Johnson, M., Maas, M., & Moorhead, S. (2002). *Nursing outcomes classification (NIC)*. (2nd ed.). St. Louis, MO: Mosby.
- Joint Commission on Accreditation of Healthcare Organizations. (2003). *CAMH: Comprehensive Accreditation Manual for Hospitals: The Official Handbook*. Oakbrook Terrace, IL: JCAHO.

- Kelly, R. (1999). Goings-on in a CCU: an ethnomethodological account of things that go on in a routine hand-over. *Nursing in Critical Care*, 4, 85-91.
- Krikelas, J. (1983). Information-seeking behavior: Patterns and changes. *Drexel Library Quarterly*, 19, 5-20.
- Lally, S. (1999). An investigation into the functions of nurses' communication at the inter-shift handover. *Journal of Nursing Management*, 7, 29-35.
- Lange, L. L. (1993). Information seeking by nurses during beginning-of-shift activities. *Proceedings of the Annual Symposium on Computer Application [sic] in Medical Care, American Medical Informatics Association*, 317-321.
- Lathey, J. W., & Hodge, B. (2001). Information seeking behavior of occupational health nurses. *AAOHN Journal: Official Journal of the American Association of Occupational Health Nurses*, 49, 87-95.
- Layton, B. & Hahn, K. (1995). The librarian as a partner in nursing education. *Bulletin of the Medical Library Association*, 83, 499-501.
- Marriott, J. & Mable, A. L. (2000). *Opportunities and potential: A Review of international literature on primary health care reform and models*. Ottawa, Ontario, Canada: Health Human Resource Strategies Division, Health Policy and Communications Branch, Health Canada.
- Mayer, G. (1997). The impact of managed care on hospital nursing. *Best Practices and Benchmarking in Healthcare*, 2, 162-167.
- McKibbin, K. A. (1998). Evidence-based practice. *Bulletin of the Medical Library Association*, 86, 396-401.

- McKnight M. (1996). Building a useful hospital library book collection. *National Network*, 21(1), 10-11.
- McKnight, M. (2001). Beyond surveys: Methods for finding out "why?". *Journal of Hospital Librarianship*, 1, 31-39.
- McKnight, M. & Peet, M. (2000). Health care providers' information seeking: recent research. *Medical Reference Services Quarterly*, 19, 27-49.
- Malestic, S. L. (2003). A quick guide to verbal reports. *RN*, 66, 47-49.
- Medical Subject Headings (MeSH), (2003) National Library of Medicine, National Institutes of Health, United States.
<http://www.nlm.nih.gov/mesh/MBrowser.html>
- Nardi, B. A., & O'Day, V. L. (1999). *Information ecologies: Using technology with heart*. Cambridge, MA: The MIT Press.
- North American Nursing Diagnosis Association. (2001). *NANDA nursing diagnoses: definitions and classification, 2001-2002*. Philadelphia: North American Nursing Diagnosis Association.
- Odell, A. (1996). Communication theory and the shift handover report. *British Journal of Nursing*, 5, 1323-1326.
- Osheroff, J. A., Forsythe, D. E., Buchanan, B. G., Bankowitz, R. A., Blumenfeld, B. H. & Miller, R. A. (1991). Physicians' information needs: analysis of questions posed during clinical teaching. *Annals of Internal Medicine*, 114, 576-581.

- Parker, J., Gardner, G., & Wiltshire, J. (1992). Handover: the collective narrative of nursing practice. *Australian Journal of Advance Nursing*, 9, 31-37.
- Patterson, P. K., Blehm, R., Foster, J., Euglee, K., & Moore J. (1995). Nurse information needs for efficient care continuity across patient units. *Journal of Nursing Administration*, 25, 28-36.
- Perley, C. M. (2001). Underlying meanings of the physician curbside consultation. *Dissertation Abstracts International*, 62 (10), 3219A. (UMI No. AAT 3028623)
- Pettengill, M. M., Gillies, D. A., & Clark, C. C. (1994). Factors encouraging and discouraging the use of nursing research findings. *Image - the Journal of Nursing Scholarship*, 26, 143-147.
- Pettigrew, K. E. (1999). Waiting for chiropody: contextual results from an ethnographic study of information behaviour among attendees at community clinics. *Information Processing & Management*, 35, 801-817.
- Ramming, E. E. (1992). The use of learning resources by registered nurses. *Dissertation Abstracts International*, 53, 690A (UMI AAT 9223056).
- Rasch, R. F. R. & Cogdill, K. W. (1999). Nurse practitioners' information needs and information seeking: implications for practice and education. *Holistic Nursing Practice*, 13, 90-97.
- Richard, J. A. (1988). Congruence between intershift reports and patients' actual conditions. *IMAGE: Journal of Nursing Scholarship*, 20, 4-6.

- Richardson, L. (2000) Writing: a method of inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (2nd ed.) (pp. 923-948). Thousand Oaks, CA: Sage.
- Roberts, J., While, A. & Fitzpatrick, J. (1995). Information-seeking strategies and data utilization: theory and practice. *International Journal of Nursing Studies*, 32, 601-611.
- Royle, J.A., Blythe, J., DiCenso, A., Bauman, A., & Fitzgerald, D. (1997). Do nurses have the information skills and resources for research utilization? *Canadian Journal of Nursing Administration*, 10, 9-30.
- Simpson, R. L. (1992a). Informatics: nursing's newest specialty. *Nursing Management*, 23, 26.
- Simpson, R. L. (1992b). The new careers in nursing informatics. *Nursing Management*, 23, 26-27.
- Smeltzer, S. C. & Bare, B. G. (2000) *Brunner & Suddarth's textbook of medical-surgical nursing*. Philadelphia: Lippincott.
- Spath, M., & Buttlar, L. (1996). Brief communications: Information and research needs of acute-care clinical nurses. *Bulletin of the Medical Library Association*, 84, 112-116.
- Spradley, J. P. (1979). *The Ethnographic Interview*. Fort Worth, TX: Harcourt Brace Jovanovich.
- Strauss, A. (1987). *Qualitative analysis for social scientists*. New York: Cambridge University Press.

- Strauss, A. & Corbin, J. (1998). *Basics of qualitative research: techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage.
- Thelan, L. A., Lough, M. E., Urden, L. D., & Stacy, K. M. (1998). *Critical Care Nursing Diagnosis and Management* (3rd ed.). St. Louis, MO: Mosby.
- U.S. Census Bureau. (2002). *Statistical Abstract of the United States: 2002*. Last Revised February 12, 2003. Retrieved November 17, 2003, from <http://www.census.gov/prod/www/statistical-abstract-02.html>.
- Urquhart, C., & Crane, S. (1994). Nurses' information-seeking skills and perceptions of information sources: assessment using vignettes. *Journal of Information Science*, 20, 237-246.
- Wakeham, M. (1993). Nurses - their information needs and use of libraries: the views of some librarians. *Health Libraries Review*, 10, 85-91.
- Wakeham, M. (1996a). What nurses think of library services: a research study. *Nursing Standard*, 10, 40-42.
- Wakeham, M. (1996b). What nursing researchers think about librarians. *Health Libraries Review*, 13, 109-112.
- Wollcott, H. (1990). *Writing up qualitative research*. Newbury Park, CA: Sage Publications.