Article ■

Perceived Information Needs and Communication Difficulties of Inpatient Physicians and Nurses

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Abstract In order to understand the differing perceptions of information needs and communication patterns of healthcare professionals as they relate to medical errors, we conducted a survey and 5 focus group sessions of inpatient physicians and nurses. Although nurses and physicians stated differing information needs, both groups expressed significant problems with obtaining patient, domain and institution-specific information in a timely manner. Identification of appropriate providers and establishing contact with those people was perceived as the most pressing communication need. All focus group participants felt that communication difficulties were common and could give examples in which such difficulties led to adverse events. Our studies suggest that information needs and communication difficulties are common and can lead to medical errors or near misses. Many of these problems may be amenable to information technology solutions.

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Introduction

The Institute of Medicine (IOM) report on medical errors[1] has heightened awareness of the relationships between systematic processes and adverse events. The report argues both that medical errors are common[2,3] and that many errors are preventable.[4] Specifically, the report references the work of Leape[5] and Reason,[6] and calls for critical review of system processes to ensure that latent errors are prevented. Both Leape and Reason, in turn, argue that error reduction can be achieved by, among other things, reducing reliance on human memory and improving information access. Unfortunately there are few studies that characterize the types of information, the timeliness of their access, or the methods of delivery that are critical to prevent latent errors.

Information access may take many forms ranging from looking up information on a computer or in a textbook, to formal subspecialty consults, to the informal dialogs between health care professionals. The latter constitute the majority of the healthcare professionals information requests[7] and time[8]. While the relationships between communication and medical errors remain poorly defined, retrospective reviews indicate that they contribute to a large percentage of adverse events.[9]

Coiera argues that information and communication needs are related and represent a continuum of activities, some of which are served best by communication dialogs and others that can be served by computable methods.[10] He introduces the concept of "common ground" as the information that is shared by both participants and is relevant to the communication task. Common ground may be used to identify situations where computable information may be useful or where more effective communication channels are needed. Therefore, understanding the characteristic information types and communication patterns among health care professionals is necessary to effectively support system processes with informatics interventions. Appreciation of these concepts is par-

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ticularly important if the intention is to have impact on latent errors.

In this light, we have proposed analysis of the impact of an informatics intervention on information need satisfaction, communication, collaboration, and selected quality indicators. As a preliminary study we sought to describe and compare the perceived information needs and communication difficulties among inpatient physicians and nurses at the Presbyterian Hospital (PH) campus of the New York Presbyterian Hospital. In order to triangulate the results, three qualitative methodologies were used: surveys, focus groups and observational studies. This paper reports on the survey and focus group findings. Observational studies are reported in a separate paper.[11]

Methods

Surveys

As a first step, we designed a semi-structured survey to gather information about the perceptions of information needs and communication difficulties at PH. The survey asked participants to list instances of information needs or communication difficulties and the surrounding circumstances including why the event occurred and the frequency of similar events. The survey questions were developed based upon the Krikelas model of supplemental information seeking behavior and revised based upon feedback from the members of the research team.[12] General computer experience, functions used in the current clinical information system (WebCIS[13]), and discipline role were also recorded. Surveys were identical for the physician and nurse respondents except for discipline-specific role information and the method of completing the questionnaire. For the physician group, we developed a Web page for the survey, and e-mails were sent to all 125 medical interns and residents at PH, notifying them of the existence of the Web site and encouraging them to respond. We distributed 70 surveys in paper format to the nursing staff at PH through representatives of the Nursing Information Systems Committee.

Focus Groups

To flesh out information obtained in the surveys, we conducted three focus group meetings with physicians (interns, residents, and hospitalist physicians respectively) and two focus group meetings with nurses (nurse managers and staff nurses respectively) at PH. Studies were performed according to standard focus group principles as described by Kitzinger[14] and Kruger.[15] All groups consisted of 4-6 participants in addition to the facilitators with exception of the staff nurse group where two participants attended. Sessions were audio taped and transcribed. Common themes were identified and summarized from the transcriptions. Questions in the focus group session attempted to explore barriers to obtaining information or effective communication, to elicit examples of cases where such systematic processes lead to poor outcomes, and to suggest improvements.

Results

Survey Data

Twenty-six physicians and 17 nurses responded to the survey (response rates of 21% and 24% respectively).

Data related to general computer experience and WebCIS experience indicated a general level of computer literacy among both groups and greater use of WebCIS functions by physicians. All respondents to the survey reported having access to the Internet. All except one nurse reported having had experience with MS Windows. E-mail and Web browsing were the most frequently reported uses. WebCIS was used by all physician responders and by 76% of nurses. The most frequently used WebCIS function was laboratory results reporting by both nurses and physicians. While nearly all physicians (92%) reported using specialty reports (Endoscopy and Cardiac imaging), only 35% of nurses reported using these functions. Relatively fewer physicians reported using the diagnosis system (42%), alert system (23%) or infobuttons (15%). Only one nurse reported using these systems.

Sixty-four statements about information needs and 46 statements regarding communications difficulties were recorded. A summary of the survey themes is provided in the Table 1.

Physician responses to the survey questions of information and communication needs focused on gaps in system function and often included recommendations on how they would want the gaps addressed. For example, one physician stated an information need of "Medication list for my signout" (a function that does not currently exist) with the comment "Integrate with pharmacy." In contrast nursing responses tended to focus on problems in using existing applications. For example, a typical information need was listed as "Blood bank protocol" with the comment "manual not up to date."

Table 1 ■

Perceived Information Needs and Communication Difficulties (Survey Data)

	Physicians	Nurses
Information Needs		
Patient Specific	• A list of current medications and time administered • Problem lists • Outpatient notes (especially sub-specialty consultations. • A central list of current providers for the patient (consultants, nurses) • Laboratory and other test results	• Patient diagnoses • Laboratory and other test results
Institution Specific	• Current providers that are on-call and how to contact them.	• Policies and protocols (IV access device care policy, blood bank protocol) • Census reports
Domain Specific	• Disease management information • Prescribing information • Medical formulas linked to patient data	• Drug information (dosage and side effects of specific drugs, patient/caregiver teaching information) • Diagnostic definitions • Educational materials (e.g. colostomy care educational materials)
Communication Difficulties	• Identifying and contacting other health care providers (especially consult services)	• Identifying and contacting other health care providers

Physicians cited a majority of information needs related to patient specific data. Many comments about the need for improved availability of inpatient and outpatient consultation reports, needing patient problem and medication lists, improved drug-drug interaction alerts, and better recording of order status were mentioned. Domain-specific information, such as online textbooks guidelines and decision aids, formulas (linked to patient specific data), medication (and cost) prescribing information, and laboratory significance information were also mentioned by physicians but less frequently than by nurses.

Responses to questions about information sources fell into 3 categories: source characteristics (i.e., peer reviewed, up-to-date), source format (i.e., on-line, palm-device, paper), and specific content (i.e., NEJM, *Harrison's*). Physicians often commented about source characteristics in generalities; for example, to include peer review and validation. In contrast, nurse's comments tended to focus more on the source type (i.e., care plan, policy, protocols) but included a wider audience (i.e., patient teaching materials and continuing education). Physicians often made comments indicating that sources should be on-line or on a handheld device, whereas nurses often expressed concern over Web-based materials because some health care workers might not be able to access these materials.

Both groups stated a variety of difficulties in obtaining information including: 1) difficulty in finding information, 2) finding inaccurate or outdated information, and 3) limited time. Additionally, nurses reported that there was a lack of knowledge about how to get into the system.

Both physicians and nurses commented extensively on the difficulty in identifying and contacting other health care providers. Often these frustrations resulted from an inefficient paging system. Both physicians and nurses suggested information technology-based solutions for the rapid identification of people and common access to frequently referenced, but changing information. For example, one nurse asked for a Web page list of clean beds, a prerequisite for admitting patients and starting therapeutic regimens in a timely fashion. Physician respondents stated a very strong preference (93%) for e-mail as their primary method of communication despite currently using the telephone and paging system far more frequently. This may have been a result of selection bias since responding physicians answered using the Web-based survey, however 50% of responding nurses also stated that their preferred communication method was the Web or e-mail.

Thirty-six additional general comments about wishes for improvements to WebCIS functionality were

made. These comments mirrored other comments about information and communication needs discussed above.

Focus Groups

Focus group discussions were lively and emotionally charged. Many themes from the survey data were reviewed and expanded upon.

Regarding information needs, both nurses and physicians emphasized that the time to look up information was limited, and that quick, relevant information sources were most useful. Interns in particular liked *MD Consult* for its "One-Stop-Shopping" approach with the ability to look up information at many levels of detail and then choose the appropriate source for their particular situation. Hospitalists preferred *Up-to-Date* because it was more focused and relevant than *MD Consult*.

Nurses commented that, when they have information needs, they often turn to someone with expertise in that area as a first source. Physicians did not mention this.

All groups felt that *Medline* searches were useful in limited situations, but generally were not useful for day-to-day clinical activities. Most of the physician participants used palm-based organizers and commented on their practicality, particularly for looking up drug information.

In contrast to physicians, nurses identified the need for patient education materials. Current patient education materials were felt to be difficult to access, and often inappropriate for the literacy level of patients. They also expressed the need for materials in foreign languages, particularly Spanish.

Communication difficulties identified by physicians focused around four main problems: 1) a slow and inefficient paging system, 2) inconsistent communication at transfer of patient care, 3) the need for feedback on order status, and 4) the need for face-to-face communication where mistrust or disagreement in care plans existed.

Several cases where the lack of communication led to medical errors or near misses were identified. Patient transfers were particularly problematic. One physician reported:

> [just] last night there was a patient who left the CCU . . . in the morning—was assigned to me at 11 PM—and the patient was on heparin . . . and was on the floor for 12 hours without a physician aware or covering this patient.

Others in the group agreed that similar problems were not infrequent. Multiple cases were described where physicians were unaware of medicines being given to the patient because they were omitted from medicine lists in sign out sheets.

Communication between consult services was also highlighted as a problem area. As one intern describes:

> We had a patient who . . . had a lot of [consult teams] and all . . . of them were remarkably opinionated and all disagreed with each other. And so they used me for the last two weeks as a mode of communication. I was the conduit. . . . But I think it did affect the patient's care.

The nurses also identified quality of care issues related to ineffective or delayed communication. For example, one nurse in talking about how communication affected patient satisfaction with care stated:

> It's really a dissatisfier when a patient is in pain and you can't find the right person to give you an updated order. . . . you're flipping the kardex and you're calling 11 people, and it just [gives] the image that . . . the nurse-patient relationship is now fractured because you can't even get the right doctor. . . . It implies that you don't even know what you're doing. That message is given very strongly . . . like you know, "can't you find me a doctor?" It's not that you don't want to, it's just that you don't have the right information easily accessible to you.

Another nurse pointed out how this relates to adverse outcomes.

> It does specifically affect our patients who we know could code at any time. And we are trying to be able to get in touch with an intern.

A significant tension between nurses and physicians was identified when analyzing the focus group data. For example, some nurses felt that telephone and verbal orders should be eliminated, and that physicians were flagging all orders as "stat" inappropriately. Physicians on the other hand felt that telephone orders were essential in order to get work done in a timely fashion, and felt the need to seek nurses out face to face or mark orders as stat in order to ensure that orders were actually carried out. Regarding finding the physician for a patient, one nurse pointed out:

> I've never been able to figure out why that's so complicated. The nurses have an assignment—whether it's written on paper or computer-generated or what ever

> — we have an assignment. At any given moment you can just look at it and see what nurse is assigned to what patient. But it's much more complicated with the doctors. You have to go through hoops to find out.

In contrast, a physician trying to find a nurse for a patient stated:

> I think the nurses should have their pictures on the floors, saying 'this is my face', 'this is who I am', 'I'm taking care of these rooms'. [Instead] they tell me— 'S____ is taking care of this patient.' Like, who is S____? Until I figure that out, basically I have to ask nurse to nurse until some nurse can say 'I'm taking care of this patient.'

All groups felt that the current paging system needed to be changed, and that a common "whiteboard" area with patient problems, responsibilities, and tasks with check off to identify completion was considered to be a potential solution to less urgent communication issues regarding patients.

Discussion

The survey data suggest that providers are having significant difficulty in obtaining certain types of information. Implied in the comments is the notion that information is available, however due to time constraints it is too difficult to obtain. The Information needs listed (ie. knowledge sources, provider lists, medication lists, etc.) appear predictable and have much common ground between providers, therefore computable information sources would be appropriate.

In contrast, comments in the focus group sessions highlight frustration with the interruptive nature of their work environment that is inevitable in clinical medicine. At the same time they illustrate personal goals to improve efficiency without consideration of systemic efficiency. Some of these processes may need to be addressed though non-informatics means, however others such as the feedback of task status may be targets for interventions such as improved asynchronous channels such as a virtual whiteboard.

There is significant work to be done to implement successful technologies, however. In analyzing the data collected from these studies, we identified several ambiguities in the problem terminology. For example, in response to the question "name a communication difficulty you have had" one respondent identified the source as "Pharmacy", the difficulty as "I couldn't remember what meds the patient was on", and commented, "Need medication section like the demographics section [of WebCIS]." We had difficulty classifying this as an information need or communication problem. Future studies will benefit from an ontology for this domain[16].

Conclusions

Although quite limited by design, the focus group and survey data outlined here confirm that health care professionals perceive significant gaps between information needs and timely access, and that communication difficulties are commonly linked to poor outcomes. While physicians and nurses have different needs, methods and goals, they share common problems in obtaining information and communicating effectively.

We believe that successful tools can be developed. Both groups had favorable responses to the idea of a common "virtual whiteboard" that would facilitate communication of low-priority tasks without interruption but with confirmation of task completion. Physicians in particular were receptive to the idea of a wireless handheld device for this. Our data indicate that exploring the use of such technology has potential for favorably impacting the process of care.

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