Improving Clinical Communication and Patient Safety: Clinician-Recommended Solutions

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Abstract

Background: Teamwork and good communication are essential to providing high-quality care. **Methods:** We examined clinician perspectives on clinician-to-clinician communication in the context of pediatric patient safety using 90-minute focus groups comprising representatives from varied clinician groups (physicians, nurses, pharmacists) in the five Chicago area hospitals of the Pediatric Patient Safety Consortium. Using a standardized protocol, we asked participants to address effective and problematic communication related to patient safety risk and any recommended solutions to address these risks. Verbatim transcripts of the focus groups were analyzed to identify major themes. In this article, we focus specifically on the potential patient safety solutions clinicians recommended. **Results:** Sixty-five clinician focus groups were conducted. The key solution-oriented themes included: (1) technology, health information technology (HIT), and electronic medical record (EMR) elements and organization; (2) coordination of care and communication around care plans; (3) communication in transitions; (4) knowledge and experience gaps; (5) team-oriented solutions; (6) orders and consultations; (7) organizational responsibility and communication about errors. **Conclusion:** Improving the understanding of clinician-recommended solutions to address risk related to clinician communication will direct targets for communication-related patient safety improvement.

Background

The burden of harm from patient safety events pervades the health care system and is directly and indirectly experienced by many health care consumers. A conservative estimate suggests that 70,000 children annually experience adverse events sufficient to extend a hospital stay or cause disability at discharge, and that 60 percent of these are preventable.[1] This is equivalent to 1 in every 100 admissions. Despite significant improvements in adult medical care related to better understanding of patient safety problems and new interventions to mitigate safety risks, there has been only limited understanding and improvement in these areas related to the care of children.

Communication among clinicians in providing health care is a highly complex but important function in the delivery of health care. In fact, clinician communication is consistently the most frequent contributor to sentinel events reported to the Joint Commission.[2] Sentinel events are the most serious and harmful of patient safety events and are a high priority for intervention and

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improvement. Problematic processes and systems for clinician communication have been shown to lead to patient safety risk for children as well as for adults.[3, 4, 5, 6]

Given that teamwork and good communication between and among clinicians is central to the provision of high-quality health care for all patients, the processes and systems designed to enhance such communication remain understudied. This multisite study was designed to explore the contexts, processes, and systems of communication among pediatric clinicians and to elicit clinicians' recommendations for effective solutions to improve communication and enhance patient safety. The results of this investigation should provide information that directly translates to the development of interventions for improving the processes and systems of clinician communication in a wide range of contexts and across a wide range of pediatric health care organizations (e.g., community hospitals, academic institutions), ultimately reducing the risk of serious patient safety events in pediatric health care.

Methods

The Chicago Pediatric Patient Safety Consortium

The Chicago Pediatric Patient Safety Consortium (Peds Consortium) was established to conduct research concerning pediatric patient safety. The Peds Consortium consists of a group of five Chicago area hospitals, including Advocate Hope Children's Hospital, Advocate Lutheran General Children's Hospital, Children's Memorial Hospital, John H. Stroger Jr. Hospital of Cook County, and Mount Sinai Children's Hospital. Such a consortium is necessary in order to have a sufficiently large and varied population of pediatric patients for research findings to be generalizable, to provide information about different pediatric health care settings (e.g., teaching hospital, community hospital, freestanding children's hospital, general hospital), and to provide sufficient confidentiality protection to the participating institutions. In total, Peds Consortium member institutions admit over 46,000 pediatric patients each year.

Data Collection

To examine clinician experience related to pediatric patient safety, a series of focus groups was conducted at each site. Focus groups have been shown to be an effective method for identification of systemic patient safety risks.[7] Data collection for this study consisted of focus groups that comprised hospital-based attending physicians, residents, nurses, and pharmacists; transport teams; and respiratory therapists currently involved in the delivery of pediatric patient care in one of the five Peds Consortium hospitals. Clinicians in each of the participating institutions were invited to participate in a focus group regarding effective and problematic communication in providing patient care.

We convened focus groups within each discipline (e.g., neurology, neurosurgery, surgery, intensive care unit [ICU], emergency medicine, etc.) by profession and professional level (nurse managers, staff nurses, attending physicians, fellow/resident physicians, advanced practice nurses, and nurse administrative coordinators). This group composition was intended to enhance the participants' comfort level and willingness to speak freely about communication with staff from other disciplines. Clinicians were selected based on their service, profession, and

professional level (e.g., a group of neurology attending physicians, a group of neurology residents and fellows, and nurses from the pediatric ICU).

Trained facilitators conducted the 90-minute focus groups using a standardized protocol that directed the group's discussions toward the processes of communication (i.e., in person, telephone, medical chart) and the contexts that resulted in either effective or problematic clinician-to-clinician communication leading to patient safety risk. Clinicians frequently offered solutions to the problematic communication contexts, processes, and systems they described. The focus groups were audiotaped then transcribed. The number of focus groups was determined by "saturation," the point at which additional data collection no longer generated new understanding.

Participants in the focus groups were recruited from the above targeted services and professions. Recruitment included a presentation of the project in departmental and unit meetings and a letter sent to selected clinicians. The letter and presentation provided an overview of the study and informed the individuals that someone would be contacting them in order to schedule their participation in a focus group. Focus group participation was voluntary, and the focus group discussions were confidential. No participant names were recorded; participants identified themselves by using a colored card to indicate when they were speaking (e.g., Dr. Pink, Nurse Blue, etc.) The audiotaped discussions were transcribed in such a way that no identifiable information regarding patients, clinicians, or institutions was included.

The Institutional Review Boards for each of the participating institutions and for Northwestern University approved this study.

Analysis and Interpretation of Data

The focus group transcripts were reviewed by two investigators to inductively develop codes for effective and problematic communication using the Constant Comparative method[8] and included the following iterative steps:

1. Overall review of the transcripts.

2. Detailed review of a few text reports to formulate meaning.

3. Review of additional reports to develop preliminary categories.

4. Coding of data by category and determination of the need for new categories and grouping of related categories to develop overarching categories (any discrepancies in coding were resolved through consensus based on the transcript language).

5. Sorting of data by category, and review of the performance of preliminary analysis of each category.

6. Deductive review for parallelism and clarity of categories.

7. Classification of all data into the developed categories.

These were refined through review by the remaining Peds Consortium investigators (Steps 4–6). The focus group transcripts and the classification taxonomy of patient safety-related effective and problematic communication were entered into the analytic software *ATLAS.ti* (ATLAS.ti

Scientific Software Development, Berlin, Germany; www.atlasti.com/index.html) for the final classification (Step 7) and to conduct the analysis. The reliability of the categories was assessed through a process that involved independent coding of the textual data by at least two independent reviewers. When discrepancies occurred in the coding, reconciliation of these discrepancies was finalized through consensus according to the transcript language and code definitions. An additional (third) cross-institutional reviewer also reviewed four to five transcripts to further ensure consistency of the code application across the Peds Consortium.

The analysis identified patient safety-related effective and problematic communication scenarios. Clinicians linked solutions to the problematic scenarios, and these were associated with codes related to the problematic communication code(s) they were intended to address or to code(s) for effective communication, for which an additional application to reduce risk was described. The recommended solutions were then aggregated according to the patient safety-related problems for which they were proposed.

Hierarchy of Interventions

To further assess the clinician-recommended patient safety solutions, the transcript sections of recommended solutions were reviewed and classified by the theoretically derived hierarchy of safety interventions developed by Vaida in 1999.[9]

Results

Focus Groups

Sixty-three focus groups were conducted, which included 274 participating clinicians across all of the focus groups. Focus groups included 2 to 11 participating clinicians, with a mean of 4.4 and a median of 4.0 participants. A 90-minute standardized focus group protocol was used for all the focus groups in each of the five Chicago area Peds Consortium hospitals. Table 1 shows the distribution of clinicians by profession and level.

Coding of focus group transcripts resulted in the identification of 252 clinician-recommended solutions to address the patient safety-related communication problems described in the provision of health care. A review of the transcript of recommended solutions revealed three transcript exerpts that were workarounds, done to cope rather than address the safety problem. This resulted in 249 clinician-recommended solutions for analysis.

Table 1. Number of focus group participants by clinician type

Clinician type	Number of focus group participants
Attendings	66
Residents/fellows	70
Nurses	107
Nurse managers	12
Other (e.g., respiratory therapists, transport team, pharmacy, imaging technicians)	19
Total	274

Recommended Types of Safety Solutions

Table 2 shows the types of interventions recommended to address specific patient safety-related communication problems and the number of times, across all of the focus groups, that these solutions were recommended. Recommendations fell into four primary domains of solutions, and these applied to many different types of patient safety-related communication problems. The primary domains of solutions included: technology-oriented, team-oriented, educational, and clinical or organization-related. The most frequently suggested technology-oriented solutions involved defining effective elements and organization of the electronic medical record (EMR) system, followed by the use of cell phones and text pagers for accessing clinicians and prioritizing calls. The most frequent team-oriented solution applied to rounds, suggesting that for rounds to be maximally effective and to reduce the opportunity for miscommunications, rounds should be scheduled, structured, of a set duration, and should most importantly involve all key team members. A recurrent recommendation was that nurses be notified of new orders or a change in the management plan, whether in person or through the use of technology. The recommendation to add advanced practice nurses or hospitalists to the clinical team to provide pediatric-specific medical knowledge and coordination was also common.

Table 2. Clinician-recommended solutions for patient safety-related communication problems

Communication problem	Solutions		Number of times suggested
	Types of solutions	Description of solution	
Fragmented medical record information	Technology, EMR elements, & organization	Consolidated clinical information in the EMR including medications, labs, imaging, orders – "one source of truth"	25
		Computerizing the ED "white board"	2
Coordination of care & communication around care plans	Technology	Cell phones and text pagers; computerized clinical information – EMR	22
		Computerized, current, accurate on-call lists with phone numbers in the computer	4
		Voice recognition software for documentation, to improve documentation	4
		Automatic faxing of notes for a patient's hospitalization to their community pediatrician	2
		GPS for transport	1
		Remote technology enabled care conferences	1
	Team-oriented	Rounds: Structured, scheduled, interdisciplinary rounds at the patient's bedside with all key team members present (e.g., attendings, nursing, pharmacy, RT)	26
		Conduct rounds in a quiet space	1
		Role clarity in general and particularly in emergencies	5

Table 2.   Clinician-recommended solutions for patient safety-related communication problems (continued)

Communication problem	Types of solutions	Description of solution	Number of times suggested
		Solutions	
Coordination of care & communication around care plans *(continued)*	Team-oriented *(continued)*	Care conferences	3
		Verification of problems and completed orders	3
		Cross-departmental meeting of clinicians and staff	3
		Someone taking charge in a conflict	2
		Coordination regarding medical equipment needed for surgical procedures	1
		Observing the processes of other services/units	2
Communication in transitions	Technology	Accurate clinician contact information in the computer	2
		Standardized sign-out	3
		Accessible clinicians with needed knowledge on nights & weekends	3
		Standardized sign-out which includes "why this plan"	1
		Protocol for determining admitting service in transfers from the ED and PICU	2
	Team-oriented	Attending-to-attending communication for inter-facility transport	2
		Relationships across services	2
		Proactive notification of a problem with test or sample	2
		Update on delays	1
		Staggering shift changes	1
		APN to coordinate discharge	1
		Role model respectful communication	1
Orders	Technology-oriented	CPOE	11
		Decision support	5
		Automatic notification of an order made and completed	5
		Automatic weight-based dose calculation and checking	2
		Automated order tracking	2
		Order lists in one place in EMR	2
		Accurate, accessible on-call lists	2

Table 2.   Clinician-recommended solutions for patient safety-related communication problems (continued)

Communication problem	Solutions		Number of times suggested
	Types of solutions	**Description of solution**	
Orders *(continued)*	Team-oriented *(continued)*	Provide and make information about the specific prep needed for specific tests easily accessible in computer	1
		Notifying nurse of an order or change in plans	19
		Indication included on orders	7
		Double-checking orders	5
		Attending-to-attending communication to resolve patient management conflicts	4
		Establishing a central line service	1
		Change imaging order form to standardize the communication to include needed information	1
		Consult service to write orders, managing service to sign	1
Consultation	Technology-oriented	Consultations typed in EMR for accessibility and legibility	3
	Team-oriented	Acknowledge consult and provide feedback	4
		Standardized and clarified pre-anesthesia assessment	4
Knowledge experience gaps	Technology-oriented	Palm Pilots® with PDR for surgical residents	2
	Team-oriented	APNs, hospitalists, pediatric liaison	17
		Going up to the next level in the clinical hierarchy	5
		Attending to attending communication	5
		Clear roles	2
		Standardized sign-outs	2
		Tiered consultation intensity	2
	Education	Orientation for surgical residents	5
		Attending availability on nights weekends and holidays	3
		Screening resident read imaging results before releasing	1
		Motivate residents by giving tests	1
		Comanagement of surgical patients in the PICU for educational requirements	1

Table 2. **Clinician-recommended solutions for patient safety-related communication problems (continued)**

Communication problem	Solutions		Number of times suggested
	Types of solutions	Description of solution	
Clinician availability	Technology-oriented	Cell phones and text pagers	7
	Team-oriented	APNs as physician extenders	2
		The night operator knows who to call	1
		Attending physicians on call making it clear they want to be called	1
Organizational responsibility for safety	Clinical organization	Standardizing processes	4
		Effective computer systems to facilitate clinical thinking	2
		Role clarity	2
		Availability of knowledgeable staff at night and on weekends	2
		Policy for resolving a conflicts regarding admitting service	1
	Learning from errors	Multidisciplinary discussions of errors and solutions	3
		Thank people for reporting	2

EMR = electronic medical record; ED = emergency department; GPS = global positioning system; RT = respiratory therpaist; PICU = pediatric intensive care unit; APN = advanced practice nurse; CPOE = computerized physician order entry; PDR = physician's desk reference

Some unique yet interesting recommendations could prove useful. For example, the use of a global positioning system (GPS) to locate and track patients in intra- and interfacility transport; having clinicians from one unit or service observe the operations in another unit or service to better understand the processes, perspective, and priorities of the other; the suggestion of a specialized central line service; and facilitating patient care conferences involving multiple services by conducting them remotely. Table 2 provides a template of ideas for safety improvement investigation.

There were many contexts of problematic communication for which no solutions were recommended. Of 180 possible classifications for problematic or effective communication, 133 were linked to a solution or referred to as a solution. A few examples of codes for which no solution was offered include the following:

- Lack of notification of responsible clinicians: "Clinician has difficulty, cannot, or fails to identify or notify other responsible clinicians about patient care issue."

- Acuity assessment: "Lack of recognition of signs and symptoms of acute clinical status."

- Orders not understood: "Insufficient communication to the responsible clinician or insufficient knowledge base of clinician responsible for carrying out the order to understand order."

- Consultations for surgical patients: "Insufficient pediatric knowledge base of surgical clinicians caring for surgical patients with medical conditions, leading to missed indications for consultation or lack of understanding or misunderstanding the recommendations."

- Lack of participation in discharge planning: "Failure to prepare and/or communicate adequate and relevant discharge information for the patient's discharge."

Hierarchy of Intervention Effectiveness

The hierarchy of safety interventions developed by Vaida[9] was slightly modified through the analysis of these data in order to appropriately classify solutions not addressed by the existing hierarchy of interventions. Additions included staff organization, risk assessment, learning from errors, and personal initiative. The frequent identification of the addition of advanced practice nurses (APNs), hospitalists, and occasionally, pharmacists as a method to improve communication suggested the need for this addition. There were also recurrent suggestions of utilizing individual initiative or individual vigilance. While recommending individual initiative be applied to improve the safety of a particular system is not a highly effective systemic intervention, it bears reporting that this was a recurrent recommendation from clinicians to improve communication. The resulting hierarchy of interventions is as follows:

1. Forcing functions.

2. Automation, computerization, and technology.

3. Standardization and protocols.

4. Staffing organization.

5. Policies, rules, and expectations.

6. Checklists and double-checks.

7. Risk assessment and learning from errors.

8. Education and information.

9. Personal initiative – vigilance.

As presented in Table 3, automation, computerization, and technology were the most frequent levels of intervention recommended by clinicians to improve communication effectiveness related to patient safety. These were followed by standardization and protocol implementation, which combined, represented more than half of the suggestions. Twenty-one percent of clinician's recommendations were related to personal initiative. Forcing functions were infrequently recommended or described.

Table 3.   Hierarchy of interventions

Hierarchy of interventions	Frequency (%) intervention suggested	Type	Examples of interventions
1. Forcing functions	3 (1%)	Auto-faxing medical information	"When we sign off, the report can be auto-faxed to the referring physician."
		CPOE	"Computer ordering systems… you do not have to do a lot of calculating, you are confirming right there that the dosage is correct. It has limits that won't let you order too large a dose. I think that is a huge issue."
2. Automation, computerization, & technology	69 (28%)	Computerized EMR	"…The institution that I trained at had a much more advanced system. So the resident at night at 2 in the morning admitting a patient had every clinic note, every discharge summary on the computer, every radiologic procedure, medication list, discharge from every prior hospitalization….."
		Automated access to information for sign-out	"There should be a way I could say to my computer, this is my subset of patients, and the computer has all the names, and have it generate a list for me, name, current vitals, or abnormal vitals for the last 24 hours, current medications, location of patient, and a big black box for me to write my to-do stuff. That would save an enormous amount of time for all the residents, because we spend a lot of time doing data entry."
		Technology – voice recognition software	"That's not here. The Wednesday before last, I was the operating surgeon at that hospital, and every note I dictated in the operating room was on the system in the recovery room when I left with the child (*inaudible*), so there are ways to do this, and I've been to other hospitals, and they are using them now."
3. Standardization & protocols	61 (24%)	Protocol	"So setting up some sort of a protocol for transferring patients from the ED to the floor or from out of the PICU."
		Standardized communication	"When they sign on (*inaudible*) each other, I think we need to have a standardized form, the nurses, so they can transmit information the same day; every nurse signing off to the next nurse will have the same form just as the physicians have, and they are getting the same information, rather than some signing off elaborately and some signing off very brief, and then information getting missed; and that happens when we shift, when one nurse transfers it to the other nurse, information does get missed."

Table 3. Hierarchy of interventions (continued)

Hierarchy of interventions	Frequency (%) intervention suggested	Type	Examples of interventions
4. Staffing organization	21 (8%)	Advance practice nurses	"I have been a big proponent of a lot of hospital having more nurse practitioners, because I think nurse practitioners have a lot of things to offer, that this is their base, they are staying here forever, communication can be much better. For example, if residents were in the ER for 2 hours, they could know that their floor was being taken care of, which that is not always the way it is right now, because I may be in clinic, I may have gone home already. So I think the hospital, in general, particularly our service, could benefit from having more nurse practitioners.
		Hospitalist	"He made a decision, a bad decision in terms of communication. Whereas, if you have a hospitalist, a physician, and if they know what the protocols are, they probably have a less chance of making a mistake, in terms of who to call, who not to call, what to do, what not to do."
5. Policies, rules, & expectations	26 (10%)	Policy for the determination of the inpatient admitting service	"There is the issue of which service they are getting admitted…if we call a service because we think a patient should be admitted…and they said that that is not an appropriate admission for their service, it is then their responsibility to find another service for the patient to go to. I think it is good, because it gets us out of trying to go back and forth and be mediating something that needs to be worked out amongst the individuals involved."
		Expectations: Nurses and nursing input included in rounds	"I'm thinking to improve this situation, it's important that during rounds, between us, that a nurse clinician, a nurse manager, or a charge nurse would make rounds with us, so if there's a problem with a patient the nurse knew about it, she related it to the charge nurse, and if the charge nurse makes rounds together with us right then and there, she can tell us what is the patient's problem."
6. Checklists & double-checks	18 (7%)	Checklist	"Or even if they sent their orders down from the floor and put 'child needs sedation, child NPO'd, or child has an ID.' Put it in the check-in, on the check-in document…They actually should have to check-off that these things have been accomplished.…even if they put on there, you know, the patient is intubated, the patient has an IV – give us the information that we need to complete the study."

Table 3.   Hierarchy of interventions (continued)

Hierarchy of interventions	Frequency (%) intervention suggested	Type	Examples of interventions
6. Checklists & double-checks *(continued)*	18 (7%) *(continued)*	Double-check to make sure nurse is aware of the order	"The problem right now in our hospital is that now everything is on the computer, so if you do write it down, and you do want an order executed, I know the nurses check it every hour, 45 minutes, hour and a half, something like that; but it still depends on when they check it…but that is when I think the verbal system is even more important to tell them, 'Hey, I put in this order.'"
7. Risk Assessment & communication errors	6 (2%)	Discussing errors	"We addressed system issues every month as a medical practice review of cases discussed. Where did treatment fall down? What are the system issues that are responsible? And it is really just not doctors miscommunicating that is the issue. It is really what systems are in place that we have for our patients' treatment."
		Acknowledge reports	"Somebody noticed and some action was taken – even with a note, 'Thank you for letting us know about that,' would be fine."
8. Education & information	25 (10%)	Education	"We had a couple of issues with anesthesia communication. We have to go back to the OR with certain cases for the heart patients, and they had actually, for specific instance, they were getting new circuits for their ventilator, and the specialty gas we needed to bring back our attachments did not fit onto their ventilator circuit. So that was just a big… they did not tell us. We were back there ready to go, and this child has got an open heart, and we are not following through with anything, we cannot do anything. So we did do an education piece that they needed to be informed… We needed to be informed of things."
		Information	"Especially when you are calling to find out about some obscure test and what kind of tubes do they need it to go into. Sometimes, that is a much more laborious process than I think it should be…I requested something, but I never heard anything…. go into the lab portal; there could be a place where you can type in the test that you want, and then they can give you the test color…before you draw; it does not have to be fancy."

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Table 3.   Hierarchy of interventions (continued)

Hierarchy of interventions	Frequency (%) intervention suggested	Type	Examples of interventions
9. Personal initiative	21 (8%)	Personality	"…and then again it depends on the bedside nurse's personality. Some of the more difficult subspecialties, I do not take them personally, and I go up to them, and I have no trouble talking to them, even if they are in a bad mood."
		Individual initiative	"Different things that should have been done were not done for the baby, and that you have to take initiative, especially if you are following a baby to look, to see what was done…and therefore, I had to come to the conclusion that I have to go by my own mind…"
Total	249		

Discussion

Technology Solutions

Health information technology (HIT) and suggestions for the organization of the EMR information were the most frequent safety solutions recommended by clinicians to address problems in clinician-to-clinician communication. HIT and EMR solutons were recommended to address many disparate types of communication problems. Entire fields have grown up around the best methods for development and implementation of HIT and the EMR. This literature generally recommends substantial involvement of frontline clinicians in EMR development and organization of HIT and EMR applications to enable the effective expansion of electronic tools that would support the work flow of medical practice and facilitate clinical thinking. Clinicians describe multiple communication problems and patient safety risks that would be addressed specifically by organizing medical information in such a manner to systematically provide easily accessible summary lists of all orders, labs, and consults (with contact information for the consults). Likewise, clinicians frequently recommended compiling a complete list of a patient's medications in one place, with the capability to check and reconcile these. Clinicians discussed the potential for the EMR to become the desired "one source of truth"[8] for medications and other medical information. This notion of a "one source of truth" did not apply just to patients' medical information, but also to accurate on-call lists and clinician contact information.

HIT solutions thought to address patient safety risks also included the use of automated functions and decision support within the EMR to remind and support memory, check calculations, limit dosages, and bring forward information (e.g., an allergy or a potential drug-drug interaction). Automation was also recommended as a tool to support communication between residents and nurses (e.g., to provide alerts of new orders or to support cross-departmental communication with the lab regarding problems with a specimen for a lab order, blood samples, or verification of results from completed lab work).

Voice recognition software was advanced as a tool to facilitate one's own and other clinicians' documentation of needed clinical management information. GPS systems were described as promising for locating and tracking patients for both intra- and interfacility transport.

Cell phones and text pagers were described by clinicians as tools to locate clinicians and to provide a vehicle for needed communication. These tools can enable the receiver of the communication to prioritize a particular communication and to indicate the need for emergent or routine response as appropriate. Cell phones and text pagers were described as having the additional advantage of providing verification of the receipt of information, developing expectations for the initiator of the response, and in the case of cell phone, providing the ability to ask on-the-spot questions, clarify issues, and develop a plan. Cell phones were suggested as a potential tool to establish a clinical case conference by enabling several clinicians to be brought together over the phone for remote case conferences, which would facilitate communication among the clinicians caring for patients who have multiple services involved in their care.

The potential of HIT to assist the processes of communication and decisionmaking and to overcome many of the problems with hard-to-read, inaccessible, and fragmented medical records is great. However, there were significant drawbacks in the current organization of the systems

that were currently deployed that led to new risks and challenged clinicians' ability to deliver safe care.

Team-Oriented Solutions

Rounds. In addition to technologic solutions, clinicians thought many team-oriented solutions might hold promise for improving clinician communication and patient safety systems. Rounds—a time-honored method of clinical communication—were described as effective because this method of clinical communication brings together the group of clinicians caring for a patient and enables discussion of the patient's status and the care plan for that day. In addition, when rounds take place at the patient's bedside, senior clinicians could easily verify the information presented. However, the effectiveness of rounds would quickly diminish if all key team members were not present or included, and when appropriate preparation is not made. Furthermore, clinicians described additional advantages to rounds that occur at regularly scheduled times, take place in a structured format, and include all key team members.

Including information, knowledge, and the pespective of all team members represents an important safety challenge that was commonly expressed as potentially a significant safety solution. Scheduling of rounds was described as helping to minimize the need, particularly by surgical clinicians, to leave before all patients have been discussed. Having structured rounds would enable an easy-to-follow flow of information and encourage preparation. Defining and including key clinical team members is an important aspect of team communication.

Both physicians and nurses acknowledged the importance of the clinical information and perspective on the patient that nurses can provide to the development of the patient's care plan during rounds. Several methods were recommended to include nurses or nursing input—e.g., residents getting reports from nurses prior to rounds, scheduling rounds so that nurses could participate for their patients, and having the charge nurse participate in rounds.

Clinicians suggested the inclusion of pharmacists and nutritionists into interdisciplinary rounds to address particular patient safety risks in pediatrics. Respiratory therapists were thought to provide needed clinical information and perspective for their patients. It was suggested that there be more than one service round for patients when multiple services were actively involved in the patient's care.

Communication in transitions. Clinicians had comparatively few suggestions for addressing the problem of communication across transitions of care. Most transitions are very complex and actually involve multiple transitions. A change in unit (the place where the patient is being cared for) also involves a change in the managing service (the specific medical specialty caring for the patient), and a change in the specific nurse, specific resident physician, and specific attending physician in charge of managing the patient's care. Clinician shift changes involve at least one clinician but frequently can involve transitions of several clinicians at the same time. At the time of a nurse shift change there also may be a change in the resident and attending physicians. Standardization and protocols were the most freqently recommended solutions for sign-out as well as determining the admitting service from the ED, but other team-oriented suggestions, such as the availability of senior clinicians, good contact information, relationships across services, and respect were also considered to be of assistance.

Gaps in Knowledge and Experience

Most inpatient care for children is provided in general hospitals with a small pediatric service. These institutions may have no pediatric physicians on staff, and indeed, they may lack basic pediatric equipment and skills.[10] Furthermore, resident physicians must receive training in pediatric health care, but these resident physicians have had minimal or no previous pediatric training. During this "rotation," residents provide care to pediatric patients and are supervised by trained pediatric attending physicians. Pediatric care involves caring for children of varying ages and stages with varying normal ranges of clinical values and test results and care processes and priorities. This variability of signs and symptoms for different age groups of children provides a challenge. In addition, the medical requirements of children with special health care needs (e.g., feeding tubes, oxygen, shunts) that increase complexity and need for expertise further intensify these challenges in institutions with nonpediatric-trained clinicians, including nonpediatric-trained residents and nurses.[11]

Knowledge and experience gaps are a challenge of particular importance in pediatrics. Communication in the context of inexperience and lack of contextual knowledge is complicated and can easily lead to misommunications and misunderstandings. Of the many solutions to communication problems related to lacking requisite knowledge and experience in the health care of pediatric patients, most frequently suggested were supplementing the team with additional types of clinical postitions to provide supportive knowledge assistance, such as APNs, hospitalists, or pediatric surgical liaisons. The substantial pediatric knowledge base and experience of these clinicians provides an additional teaching function and an important safeguard for the recognition of "when a clinician doesn't know what they don't know." It was also recommended that nurses "jump over" the traditional hierarchy of communication in medicine and speak directly to attending physicians if they believe a resident does not understand the pediatric clinical picture. Direct attending-physician-to-attending-physician communication was also suggested as a vehicle to address these knowledge and experience gaps.

These proposed additions to the clinical team—APNs, hospitalists, and pediatric surgical liaisons—have also been identified as resources for filling the needed role among clinicians involved in the care of pediatric patients, particularly pediatric surgical patients, for coordinating care by different levels of physicians across services.

Recommended Organizational Responsibility for Safety

Clinicians recognized the broader role of the overall organization and organizational leadership to effect improvement, and they attributed the responsibility for many specific solutions to the institution. Examples include the responsibility for standardizing processes; the effectiveness of computer technologies, such as the EMR; role clarity, including the establishment and enforcement of the "chain of responsibility," and how and when to circumvent this for the safe care of pediatric patients.

Ultimate accountability for clinician availabilty and for methods and systems for avoiding and resolving conflicts in care management was considered an organizational leadership responsibility. Finally, clinicians ascribed the responsibility for institutional learning from errors to leadership and suggested that cross-departmental, multidisciplinary contexts for learning about

errors as a potentially meaningful approach. Furthermore, they suggested that positively acknowledging the reports of problems is important and should be embraced.

Levels of Intervention

It is encouraging, in the current sociohistorical context of medicine, to find that clinicians frequently recommended use of standardization and protocols. After decades of resistance to standardization and protocols, these findings suggest that the safety value of standardization of systems and processes and proscribed protocols may be rising in clinicians' awareness, with the recognition that medicine is no longer "an individual sport but a team sport."

Conclusion

Involvement of frontline clinicians in the development and deployment of patient safety interventions is essential to understanding the contextual environment in which the risks exist and the impact of change on that environment. Clinicians have important contributions to make to inform interventions for patient safety improvement and the redesign of safer health care. Furthermore, according to the heirarchy of interventions, the clinician's safety recommendations in this study were largely at the more effective end of the hierarchy.

Improved understanding of the role of clinician-to-clinician communication in patient safety and clinicians recommendations' for solutions is a first step to effectively implementing interventions to improve communication between pediatric clinicians and thereby improve the safety of care delivered to pediatric patients. These findings provide a roadmap to direct the next round of efforts to improve the safety and reliability of systems and processes for clinician communicaiton in pediatric health care.

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