Qualitative Analysis of Team Communication with a Clinical Texting System at a Midwestern Academic Hospital

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Abstract

Background Hospitals are increasingly replacing pagers with clinical texting systems that allow users to use smartphones to send messages while maintaining compliance for privacy and security. As more institutions adopt such systems, the need to understand the impact of such transitions on team communication becomes ever more significant.

Methods We conducted focus groups with hospitalists and individual interviews with nurses at one academic medical center in the Midwest. All interviews and focus groups were audiorecorded, transcribed, and deidentified for analysis. All transcripts and notes were independently read by two members of the research team and coded for themes.

Results Twenty-one hospitalists and eight nurses participated in the study. Although study participants spoke favorably of texting, they identified more dissatisfactions with texting than benefits. There were disagreements regarding appropriate texting practices both within and between the hospitalists and nurses.

Conclusion Despite the benefits of texting, there is room for improving team communication and understanding in the realm of clinical texting. A lack of shared understanding regarding when and how to use texting may require long-term solutions that address teamwork and appropriateness.

Keywords
- messaging
- qualitative research
- care teams
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Background and Significance

Pager use is declining by 11% each year in U.S. hospitals. Pagers are increasingly being replaced by smartphones with functionalities for team communication via clinical text messages while maintaining compliance with policies and requirements for privacy and security.[1–3] With this change comes shifting norms regarding communication about clinical care, because phones and pagers require different processes and considerations for sending and receiving messages. Many clinical texting platforms also include more functions than traditional pagers, such as the ability to include pictures. Despite the increased prevalence of these clinical texting systems (CTS), professional guidelines and etiquette for team communication by CTS are still evolving.

Communication is an integral part of the workflow of inpatient teams. Effective communication practices and teamwork are positively associated with markers of care, including fewer communication errors, a positive safety culture, shorter lengths of stay, and lower mortality rates.[4–8] Changes to communication practices have the potential to alter the quality of care delivered. Yet, little attention has been paid to the effects of the implementation of CTS on team communication. A recent review by Martin et al, for example, found a lack of high-quality evidence about associations between mobile technology and team-based relationships and work.[9]

As more institutions adopt text-based team communication,[10–12] the need to understand the impact of such transitions becomes ever more significant. The nuanced, detailed experiences of clinical teams are especially important for understanding how to replicate best practices, address problems, and deliver high-quality care to patients. In this study, we aim to address this and describe the experience of hospital medicine clinicians ("hospitalists") and nurses with text-based communication. We use the Donabedian framework to consider the use of CTS by hospitalists and nurses.[13,14] The Donabedian model considers health care quality through three domains: structure, process, and outcomes; and posits a causal linkage between the domains. ►Table 1 illustrates the three domains as applied to the current study. We focus our analysis on the outcome of hospitalist–nurse communication, with considerations of the structural and procedural factors that affect the communication.

Table 1 Donabedian model of care quality, as applied to CTS

Structure	Process	Outcome
• **CTS platform** • **Institutional policies**	Paging, clinical texting, calling, or having in-person conversations	• Hospitalist–nursing communication • Satisfaction • Clinical outcomes (patients)

Abbreviation: CTS, clinical texting systems.

Methods

Setting

Our study was conducted at a large, Midwestern academic medical center. Diagnotes is a CTS that includes a smartphone app and a desktop software application. Clinical texting was introduced to hospitalists at the institution in July 2018, and to the nursing staff nearly a year later, in June 2019. Their different scope of work accounted for the different implementation timelines. We conducted our study in autumn of 2019. At the time of data collection, the former paging system was also still in place, with a plan to be phased out in the near future. This meant that care team members could still call operators to send short text pages to clinicians —text pages that the hospitalists received on their phone via the CTS. Beyond the nurses and the hospitalists in our study, adoption of clinical texting varied among other specialties and service lines within the hospital.

Participants

Participants were registered nurses of one inpatient unit, and hospitalists (physicians and advanced practice providers) of the academic medical center. These two groups were chosen for their frequent interactions with each other, and presumed ability to reflect meaningfully on their experiences in hospitalist–nurse communication before and after CTS implementation. We used a maximum variation strategy to sample participants across a range of age groups, race, and experience on the unit. Maximum variation sampling is used to elicit a broad range of perspectives and allows for wide applicability of findings.[15]

Recruitment and Sample Size

The nurses were recruited as a part of a related study in which their communication workflow was observed. They were recruited by a team member (A.K.) in person during morning huddles. Hospitalists were recruited by email to participate in focus groups about their experiences with the CTS. Recruitment and data collection for both the interviews and focus groups occurred until each method reached saturation—a point when the study team heard similar responses from the respondents, and no new themes or codes were uncovered.[16]

Interviews

We conducted semistructured, one-on-one interviews with the nursing staff of the pulmonary care unit. Each interview was about 30 minutes long and focused on how the participants communicated with hospitalists, their perspectives on different modes of clinical communication available (e.g., paging, texting, or in-person conversations), as well as their understanding and experiences with clinical texting.

Focus Groups

We held two focus groups for hospitalists, each an hour long and facilitated by one member of the research team while two others served as note takers. There were 14 participants in the first focus group, which was held for day-shift

hospitalists, and 7 in the second group, for night-shift hospitalists. The focus groups were semistructured, with the facilitator using a discussion guide to begin each session. The guide focused on user rationales for texting and paging, experiences with texting, as well as barriers and facilitators to team communication with texting. The moderator invited contributions from all participants about their experiences. The semistructured guides (see ►Supplementary Appendix A, available in the online version) for nurses and hospitalists differed because focus groups and interviews require different considerations and approaches; additionally, the workflow demands and experiences with CTS of the two groups also differed.

Data Analysis

All interviews and focus groups were audiorecorded, transcribed, and deidentified for analysis. All transcripts and notes were independently read by two members of the research team and coded for themes. The transcripts were coded using an immersion and crystallization approach to thematic analysis.[15] Through this iterative process, analysts organized the data in the transcripts into meaningful units, inductively developing categories for use in representing a coherent account of participants' experiences and perspectives with CTS.[17–19] Each analyst first noted their overall impression of the interview and focus group session, then identified and coded each meaning unit; the units were then organized into groups as themes emerged. The interview guide was compared with the notes and transcript to support and refine the analysis. The pair then combined their notes and organized findings into major themes. Procedures to ensure rigor and validity included practicing reflexivity (e.g., questioning interpretations, becoming aware of one's own expectations), depth of description (i.e., seeking out rich, particular details of participants' experiences), and actively seeking alternative interpretations of the data that might challenge study findings.[17–19]

Results

A total of 21 hospitalists, a group that included physicians, nurse practitioners, and physician assistants, participated in the focus groups. Eight nurses participated in interviews. Although we collected data after the texting platform was introduced to clinicians (for 14 months) and nurses (for 3 months), we observed that both groups were still adjusting to communicating by text. While participants found texting to be useful, their experiences with, and knowledge of, the CTS platform varied. A list of key benefits and dissatisfactions with CTS identified by the participants is summarized in ►Table 2.

Perceived Benefits of CTS

Overall, nurses and hospitalists had positive impressions of texting, describing it as "easier" than the paging system and noting several key benefits. A hospitalist noted that "the people that you need to communicate with are more easily accessible [by texts than by pager]." In addition to easy access, being able to take pictures and send them securely by text was cited as "a huge life saver" by hospitalists. This was especially true for their communication with dermatologists. Prior to the availability of texting, hospitalists would sometimes have to wait days to receive a dermatology consult. "Dermatology is very unavailable because they're only here Mondays and Tuesdays," one participant explained. "Calling on a Wednesday usually means you'll wait five days." But by texting photos, hospitalists could receive feedback from the consultants and meet the patients' needs sooner.

Another noted benefit of texting was having a record of communication between team members, either by text or photo, that was previously unavailable. Some nurses believed that this simplified communication. "It's easier for people to understand me when I text, when I write it down," said one nurse who spoke with an accent [Nurse respondent 8]. Another nurse said having a written record helped preserve information, saying, "For documenting the note later, right now if I communicate with the doctor I have to write it down" [Nurse respondent 6]. But with texting, the nurse reasoned, there would be a record of the communication to refer to for documenting in the chart later.

Table 2 Key benefits and dissatisfactions with CTS, as reported by participants

Theme	Exemplary quote
Benefits of CTS	
Ease of access	"The people that you need to communicate with are more easily accessible"
Ability to send pictures	Being able to take and send pictures for dermatology consults has been ""a huge life saver"
Ability to have record of conversation	"It's easier for people to understand me when I text, when I write it down"
Dissatisfaction with CTS	
Implementation challenges	"I have no idea how to [use this]. We've gotten no in-service on it"
High volume of texts	"It's not that the quantity is annoying. It's that we have too many things during a night [shift]—too many critical patients that we're dealing with. I don't safely have the time to respond to this many"
Lack of shared understanding about texting	"[Emojis are] just so unnecessary. Why should we have emojis?" versus "The emoji allows there to be another layer of personal interaction"

Abbreviation: CTS, clinical texting systems.

Dissatisfaction with CTS

Despite the benefits of texting the participants described, we also observed great dissatisfaction with clinical texting.

Notably, focus group participants spent much more time discussing their negative perceptions of texting than positives. Some of the frustrations were specific to the uneven implementation and a lack of education about texting from the hospital. Although we did not explicitly ask participants about CTS implementation, issues related to implementation emerged as a theme in the discussions. Nurses and hospitalists had questions and commented on how little they knew of various aspects of the texting rollout, policy, and platform. One nurse attributed her hesitation to adopt texting with not knowing how to use the platform, explaining, "I have no idea how to [use this]. We've gotten no in-service on it" [Nurse respondent 6]. During the focus groups, discussion was disrupted several times when participants paused to teach each other about different features and shortcuts.

Another source of frustration had to do with disagreements with how texting is perceived and used by different users. Specifically, nurses described decision rules they used for determining whether and when to text the hospitalists. Many described a deliberate decision-making process. "I pick and choose when and what I bother the physician with at that moment because I know that person," one nurse said, "Each one operates differently" [Nurse respondent 7]. Another spoke of being cognizant of not contacting hospitalists too often. "I try to be judicious about when I page and when I don't page," the nurse said. "I don't want to bomb the doctor with pages [and texts]" [Nurse respondent 6].

Although the nurses in the sample spoke of not wanting to send too many texts to the hospitalists, hospitalists nevertheless spoke of texting interactions with the nursing staff with frustration.

"[Texting] is great for communicating with other providers," one clinician said in the focus group, but "I don't think it's useful [for] communicating with nursing staff." "The big problem [is] getting more messages from nurses," another hospitalist said. "They're just sending FYI messages because it's easy."

Another hospitalist expressed that receiving too many messages from nurses affected patient safety and their ability to deliver care, saying, "it's not that the quantity is annoying. It's that we have too many things during a night [shift]—too many critical patients that we're dealing with. I don't safely have the time to respond to this many."

While these sentiments were common, they were not universal. One hospitalist challenged the notion of receiving too many messages. "I think that's our projection. I haven't personally seen that I've had too many nurses paging me yet." She qualified that the volume of messages was an existing issue, and may be related to nursing experience. "[It's] experienced nurses versus non-experienced nurses. The new nurses are like, 'there's a slight issue I need to call the team no matter what.'"

In addition to the volume of messages, hospitalists also stated that nurses were not texting appropriately and that messages from nurses often lacked key pieces of information. One questioned what training about texting the nursing staff had received and noted that messages from nurses "should include the patient name, [medical record number] or call back number and that's it." Another repeated the need for training later, saying, "no matter what tool we use, nurses have to be instructed on the right use." These instructions would include necessary information to include in a message, like "make sure I know the patient… and a callback number at minimum. Maybe toss the urgency in there."

Lack of Shared Understanding about Appropriateness

The study participants had differing perspectives about the types of interactions that were appropriate over texting. While there was consensus among the participants that texts were replacing traditional pagers, there was a lack of consensus whether it was appropriate to use texting for information that most would not have chosen to transmit via pagers previously. One example of this disagreement centered around the use of text messages to convey nonurgent updates.

One nurse expressed finding the option a helpful alternative to interrupting clinicians, and said texting was useful for conveying information that the hospitalists "probably already know because it's been a recurring issue or something that's pretty easy fix," they said. "They can come to [the messages] at a specific time when they're not in the middle of something" [Nurse respondent 4].

Some hospitalists agreed with the utility of nonurgent notification texts. One cited an example of when such notifications are helpful, saying "If [a patient has] blood sugar that's out of range or a critical result, I've had [nurses text me] and tell me what they've done about it."

Some hospitalists even send such notification messages themselves. "Where I really find [secure texting] helpful is when there can be that communication replaces the [unsecure] text messaging that I would otherwise do rather than wait for someone to call me back for." Rather than expecting a response back, they explained, those texts simply serve to notify specialists. "I'm just letting the specialist know that I need them to see the patient before they go."

Yet, many hospitalists were wary of receiving nonurgent notifications from nurses, who found notifications to be disruptive and unnecessary. "[Notifications] aren't necessary and don't require a response back," one hospitalist said of them, "There's just a lot more interruptions during the day."

The discussion around notifications was just one of several examples where some focus group participants deemed a particular practice "unnecessary" and expressed annoyance with how nurses texted, while other hospitalists defended the practice. Other disagreements included the function and appropriateness of "polite chatter" and "thank you texts," and whether and how text messages should be used to convey urgent patient issues like chest pains. Another example centered around the use of emojis.

> "I have had nurses messaging me, they're sending me OK thanks emojis [in response to my messages]," one hospitalist commented. "It's so unnecessary. Why should we have emojis?"

In response, another hospitalist defended the use of emojis, noting their use as an efficient way of conveying

acknowledgment and context. "The emoji allows there to be another layer of personal interaction and I find it much faster to write a thumbs up when traffic gives me a message. Then I know that they know I've received that. [Instead of typing] 'yes, I have received your message, send.'"

These disagreements illustrate the lack of shared understanding between users of clinical texting. While hospitalists and nurses alike shared consensus on some aspects of texting: that it should be professional, focused on important issues, and replace traditional pagers, there were many interpretations of how that was to be operationalized. Frustrations arose when senders and recipients disagreed. While most of the hospitalists' frustrations were directed at the nurses, the diversity of opinions and experiences with texting that arose in the focus group discussions suggested that there were nuances of clinical texting for which there was a lack of consensus on appropriateness even among hospitalists.

Discussion

This study is one of the first in-depth, qualitative analyses of team communication after the implementation of a CTS platform in a hospital. Although the study participants spoke favorably of texting, they identified more dissatisfactions with texting than benefits, and spent more time discussing the negatives. The perceived benefits of texting appeared to be limited by shortcomings of the implementation process as well as a lack of shared understanding among the health care team. There were disagreements regarding appropriate texting practices both within and between the hospitalists and nurses. These findings suggest that despite the benefits of texting, there is room for improving team communication and understanding in the realm of clinical texting.

The challenges of health care team communication, particularly between physicians and nurses, are well documented. Physicians and nurses have been found to have differing perceptions of communication with one another, with physicians reporting higher levels of interdisciplinary open communication than nurses,[20] and more physicians reporting that communication with nurses is well coordinated.[21] Physician responsiveness to communication from nurses depends on clinical and nonclinical factors, including message medium (e.g., by text or not), clarity, and urgency, as well as interpersonal relationships and personal preferences.[22] Our study contributes to this literature by noting the experiences and approaches of hospitalists and nurses communicating via clinical texting; we uncovered the ways clinical texting exposed or exacerbated existing communication challenges. Different expectations about when and how text messages should be sent led to frustrations for many in our study. In particular, hospitalists described some nurses as sending too many texts and not knowing how to use texting, although the nurses in our sample described a deliberate judiciousness in their sending of these messages. Our findings are in line with the limited and emerging research to date on the effects of texting implementation in clinical settings, as well as the greater body of work on face-to-face communication between physicians and nurses.[9,11,23,24] The benefits we reported also support the findings of Patel et al that secure texting was less disruptive to workflow compared with one-way text paging by both nursing and physician survey respondents.[24] Yet, we also uncovered tension and dissatisfaction. Similarly, in a 2012 study, Lo et al interviewed nurses and physicians about the use of smartphones in team communication, and observed that while smartphone use could facilitate team communication, it could also lead to conflicts. Both the nurses and physicians in the study identified a lack of clarity and discrepancies on the level of perceived urgency and the appropriate medium of communication.[25] In the absence of clear guidelines, stated preferences, and shared understanding, nurses and physicians are left to navigate the discrepancies on the individual level. Given the importance of effective communication and teamwork in maintaining patient safety and preventing medical errors, such an absence could have negative consequences for team performance and patient outcomes.

In our study, only hospitalists, not nurses, spoke negatively of the volume of messages they received via text. In some ways, the experience of receiving a disproportionate number of team messages echoes physician experiences with electronic health record (EHR) systems. Much has been written about the negative impacts of "alert fatigue" and of the high burden of EHR documentation.[26] The toll for both is often heaviest for physicians. A recent survey found that 50% of physicians reported frequent EHR use on workday evenings compared with 41% of nurses. The probability of physicians' reporting frequent EHR use on days off was 20 percentage points higher than nurses (average marginal effect $= 0.20$, $p < 0.001$).[27] In 2015, recognizing the serious consequences associated with documentation burden and alert fatigue for clinicians, the Joint Commission released a sentinel event calling for health care organizations to pay close attention to information technology (IT) as a safety issue. The Commission noted the importance of paying careful attention to safe IT implementation, and recommended engaging leadership to provide oversight of health IT planning, implementation, and evaluation.[28]

The findings of this study have important implications for health care administrators and health care team members, as well as researchers. We offer a checklist of planning considerations pre- and post-CTS implementation based on our findings in ►Table 3. Although we did not report on implementation challenges in depth, that they were raised by participants without prompting suggests the need for thoughtful education and implementation. While the circumstances of each institution may be different, implementation challenges related to new health IT are not unique and demonstrates the need for frequent and continuous attention by administrators.[12,24] Our study focused on the different shared experiences and understandings of texting by users, and the frustrations that arose when senders and recipients were not aligned in experiences and understanding. These findings contribute to the literature by highlighting user frustrations with CTS related to interprofessional

Table 3 Checklist of CTS implementation considerations

Consideration	Activities
Maximizing the benefits of CTS	Remind users of 1. their dual role as sender and recipient of messages, and 2. that a benefit for one party (e.g., ease of use), may be associated with dissatisfaction with another
Minimizing dissatisfaction with CTS	Given that CTS will be used differently by users of different clinical roles: • Recruit diverse stakeholders are needed in the implementation so not one group will be favored or inconvenienced • Conduct education sessions in different formats and for different audiences
Building shared understanding about CTS appropriateness	Conduct group discussions about CTS with specific cases contributed by users to generate team buy-in and develop user consensus about different aspects of appropriateness

Abbreviation: CTS, clinical texting systems.

communication and workflow issues that may have predated CTS implementation.

Several implications can be drawn from these results. First, our findings point to the need for health care leaders—including institutions, administrators, and even professional societies—to provide explicit guidance and shared expectations on how and when clinical texting should be used to overcome mismatched expectations and understanding. Second, for health team members, the experiences described in our study suggest that establishing a common understanding needs to happen on both institutional and individual levels. Team members may need periodic, brief trainings on how to establish a shared understanding in communication preferences. Lastly, for researchers, our findings point to the need for more understanding about improving team dynamics as well as different aspects of clinical texting (e.g., the use of texting for specific clinical processes) as the practice becomes more prevalent in health care. This includes understanding the relationship between successful team texting and quality of care outcomes.

Limitations

This study focused on the experiences of one clinician specialty group (hospitalist) and the nurses from one unit in one academic medical center. Because institutional settings and policies may greatly affect user perceptions of texting as well as their patterns of use, our findings might not be generalizable to other settings. We were constrained by the availability of the participants, and so had to use two different data collection methods—focus groups for hospitalists, and interviews for nurses. However, we were able to draw from a range of experiences of both groups, and reach thematic saturation. Another limitation of this study was that not all the nurses who participated in the interviews had used the texting platform. Because of this, our data may have been limited in understanding the depth of texting experiences for nurses. However, the inclusion of nurses who do not use texting contributed to our understanding of implementation challenges related to texting.

Conclusion

This study is one of the first to describe the experiences of hospitalists and nurses with clinical texting, and to consider the effect of texting on inpatient team communication. There is a dearth of literature considering the long-term effects of clinical texting. And while some studies have evaluated the impact of CTS on clinical processes (e.g., time-to-procedure, number of interruptions), few have examined their effects on clinical outcomes, such as patient safety or readmission rates.[9,23,24] The issue of how to communicate effectively over text is an evolving one that affects many institutions, and clinical texting is likely to only increase in the U.S. health care landscape in the coming years as more institutions decommission their pager systems. A lack of shared understanding regarding when and how to use texting may require long-term solutions that address teamwork and appropriateness. Future research should address current gaps in the literature by considering the effects of team texting on patient safety as well as long-term user satisfaction.

Clinical Relevance Statement

As more and more institutions decommission their pager systems, the issue of how to communicate effectively over text will be increasingly important. This study found a lack of shared understanding among the team regarding when and how to use. Long-term solutions will need to address teamwork and appropriateness to improve teamwork via clinical texting.

Multiple Choice Questions

1. How has clinical texting system adoption trended in the U.S. in the last decade?
   a. Increased among hospitals.
   b. Decreased among hospitals.
   c. About the same among hospitals.
   d. Increased among hospitals then decreased then increased again.

Correct Answer: The correct answer is option a. The use of clinical texting systems has increased in the U.S.

2. What clinical system is the clinical texting systems replacing?
   a. Electronic health records
   b. Pagers
   c. Sega Genesis
   d. Telephones

   Correct Answer: The correct answer is option b. Clinical texting systems are meant to replace pagers.

Protection of Human and Animal Subjects

The study was performed in compliance with the World Medical Association Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects, and was reviewed by the Indiana University Institutional Review Board.

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Conflict of Interest

None declared.

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