

Secure Text Messaging in Healthcare: Latent Threats and Opportunities to Improve Patient Safety

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UNINTENDED CONSEQUENCES

Over the past two decades, physicians and nurses practicing in hospital settings have faced an onslaught of challenges in communication, an area frequently cited as critical to providing safe and effective care to patients.¹⁻³ Communication needs have increased significantly as hospitalized patients have become more acute, complex, and technology-dependent, requiring larger healthcare teams comprising subspecialists across multiple disciplines spread across increasingly larger inpatient facilities.⁴ During this same period, the evolution of mobile phones has led to dramatic shifts in personal communication patterns, with asynchronous text messaging replacing verbal communication.⁵⁻⁷

In response to both the changing communication needs of clinicians and shifting cultural conventions, healthcare systems and providers alike have viewed text messaging as a solution to these growing communication problems. In fact, an entire industry has developed around "secure" and "Health Insurance Portability and Accountability Act (HIPAA)-compliant" text messaging platforms, which we will refer to below as secure text messaging systems (STMS). These systems offer benefits over carrier-based text messaging given their focus on the healthcare environment and HIPAA compliance. However, hospitals' rapid adoption of these systems has outpaced our abilities to surveil, recognize, and understand the unintended consequences of transitioning to STMS communication in the hospital setting where failures in communication can be catastrophic. Below, we highlight three critical areas of concern encountered at our institutions and offer five potential mitigating strategies (Table).

CRITICAL AREAS OF CONCERN

Text Messaging is a Form of Alarm Fatigue

Text messaging renders clinicians vulnerable to a unique

form of alarm fatigue. The burden of alarm fatigue has been well described in the literature and applies to interruptions to workflow in the electronic medical record and sensory alerts in clinical settings.^{8,9} Text messaging serves as yet another interruption for healthcare providers. Without a framework to triage urgent versus nonurgent messages, a clinician can become inundated with information and miss critical messages. This can lead to delayed or incorrect responses and impede patient care. System design and implementation can also contribute to this phenomenon. For example, a text message analysis at one center identified how system and workflow design resulted in all messages to an intensive care unit team being routed to a single physician's phone.¹⁰ This design left the singular physician at risk of information and task overload and at the mercy of endless interruptive alerts. Although this can occur with any communication system, it has been well demonstrated that adopting STMS correlates with an increased frequency of messaging, leading to an increase in interruptive alerts, which may have implications for patient safety.¹¹ This type of systems failure is silent unless proactively identified or revealed through a retrospective review of a resulting safety event.

Text Messaging Inappropriately Replaces Critical Communications that Should Happen in Person or by Phone

Text messaging has de-emphasized interpersonal communication skills and behaviors critical for quality and safety in hospital-based care. This concern emerges alongside evidence suggesting that new generations of physician trainees have profoundly different communication habits, preferences, and skillsets based on their experience in a text-heavy, asynchronous world of communication.¹² There is reason to worry that reliance on text messaging in healthcare leads to similar alterations in relationships and collaboration as it has in our broader cultural context.¹³ Academic medical centers in particular should attempt to mitigate the loss of profound and formative learning that occurs during face-to-face encounters between providers of different disciplines, experience levels, and specialties.

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TABLE. Real-World Examples of Each Area of Concern Described in Our Manuscript

| Risk | Example |
|--|---|
| Text messaging is a form of alarm fatigue | A resident on an inpatient team carries a generic team phone, serving as the single point of communication for a busy inpatient team. The flood of messages throughout the day leads to difficulty triaging requests and missed connections, leading to delays in care. |
| Text messaging inappropriately replaces critical communications that should happen in person or by phone | A medical student texts back and forth with a floor nurse about a patient's new and concerning examination finding. STMS allow the illusion of a provider's presence, leading the nurse to feel falsely reassured and the medical student to remain in the workroom. Both miss key learning opportunities that would have accompanied a conversation in the patient's room. Presence of new and concerning findings is not escalated within the medical team. |
| Text messaging increases the risk of communication error | A nurse texts the medical team with repeated updates about a patient's vital signs, attempting to signal concern about the patient's disease progression. The busy medical team member dismisses the updates as informational rather than a legitimate patient concern from an appropriately worried nurse. Patient evaluation is delayed and eventually a code is called. |

Abbreviation: STMS, secure text messaging systems.

Text Messaging Increases the Risk of Communication Error

Finally, text messaging appears to be highly vulnerable to communication errors in the healthcare setting. Prior work emphasizes the importance of nonverbal communication in face-to-face and even voice-to-voice interactions, highlighting the loss of fidelity when using text-only methods to communicate.¹ Furthermore, the asynchronous nature of text messaging grants little room for clarification of minor misunderstandings that often arise in text-only communication through minor alterations in punctuation or automatic spelling corrections, a frequent occurrence when using medical terminology. Although a seasoned physician may be able to piece together the issues that deserve further clarification, young residents may be more hesitant to ask clarifying questions and determine the right course of action due to clinical inexperience.

PROPOSED SOLUTIONS

Deliberate Design and Implementation

A recent systematic review identified a lack of high-quality evidence evaluating the impact of mobile technologies on communication and teamwork in hospital settings.¹⁴ This paucity of understanding renders communication via STMS in the healthcare setting uniquely vulnerable to latent safety threats unless the design and implementation of these systems are purposeful and proactive.

These concerns led us to postulate that deliberate and proactive implementation of these systems, rather than passive adoption, is needed in the healthcare environment. We propose a number of approaches and interventions that may guide institutions as they seek to implement STMS or redesign communication in the inpatient setting. At the core of these proposals lies an important tension: can implementation of STMS occur in isolation or should the arrival of these systems prompt an overhaul of an institution's clinical communication system and culture?¹⁵

Proactive Surveillance

Surveillance is one proactive method for healthcare systems to understand where and how the implementation of STMS

might lead to safety threats. From a quantitative standpoint, understanding the burden of messaging for each user across the system can reveal the clinical roles in the system that are particularly vulnerable to alert fatigue or information overload. Quality assurance monitoring of critical roles in the hospital (ie, airway emergency team, rapid response teams) could be conducted to ensure accurate directory listings at all times. Associating conversations with events, from serious safety events to near misses, could help leaders understand when and how text messaging contributes to safety events and create actionable learnings for safety learning systems.

Standardized Communication

A standardized language eliminates the burden of individuals to parse and translate each individual text message. A standardized algorithm for language, urgency, and expectations (ie, response before escalation) would help define the interaction in the clinical setting.¹⁶ Moving toward standardized, meaningful "quick messages," one of our centers has implemented a campaign to "stick to the FACS," where the following four standard quick messages are available for users: (1) "FYI no response needed," (2) "ACTION needed within X min," (3) "CONCERN can we talk or meet," and (4) "STAT immediate response required." These quick messages, developed with frontline stakeholders, represent the majority of requests exchanged by providers, and help standardize expectations and task prioritization.

Targeted Training

Targeted training and culture change efforts might help institutions counteract the broader impact of asynchronous messaging on communication skills and behaviors. Highlighting the contrast between clinical and casual communication with an emphasis on examples, scenarios, or role-playing has the potential to emphasize why and how clinical communication with STMS requires a careful, deliberate approach. For instance, safety culture training at one of our institutions features a scenario that illustrates the potential for miscommunication and missed connection between a nurse and a physician on the wards. The scenario gives way to discussion between partic-

ipants about the shortcomings of text messaging and allows the facilitator to segue into the “dos and don’ts” of text messaging and when a phone call might be more appropriate.

Innovate

Finally, creatively harnessing the technology and data underlying these STMS may uncover methods to identify and mitigate communication errors in real time. For instance, using trigger methods to create a “ripple in the pond,” whereby a floor nurse reaching out with an urgent text automatically loops in the charge nurse of the unit. Building a chatbot or a virtual assistant functionality by leveraging user behavior patterns and natural language processing to provide text-based guidance to users might help busy clinicians connect to the key decision-makers on their team. For example, in response to an unanswered text, a virtual assistant might reach out to the waiting provider as follows: “you texted the resident 20 minutes ago and they haven’t replied, would you like to call the fellow instead?” The data-rich nature of these systems implies that they are ripe for automated solutions that can respond to behavioral- or text-based patterns to augment the existing operation and safety infrastructure.

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CONCLUSION

The transition of healthcare communication systems toward STMS is already well underway. These systems, despite their flaws, are undoubtedly an improvement over legacy paging systems and, if properly implemented, offer several benefits to large healthcare systems. However, the communication needs in the healthcare setting are vastly different from the personal communication needs in everyday text messaging. As clinicians at the forefront of these transitions, we have the opportunity to critically assess the unique communication requirements in our hospital settings and help shape the way STMS are implemented in our hospitals. Pausing to deliberate about the limitations and the vulnerabilities of the current messaging systems for our acute clinical needs, including how they impact training and education, will allow us to proactively design and implement better communication systems that improve patient safety.

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