



Design and Integration of a Texting Tool to Keep Patients' Family Members Updated During Hospitalization: Clinicians' Perspectives

Journal of Patient Experience
Volume 10: 1-9
© The Author(s) 2023
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/23743735231160423
journals.sagepub.com/home/jpx


Courtenay R Bruce, JD, MA¹ , Ashleigh Kamencik-Wright, MBA¹,
Natalie Zuniga-Georgy, MS¹, Thomas M Vinh, RN, BSN²,
Hema Shah, MSN, BSN, RN, BS², Jamie Shallcross, BS³,
Charlie Giammattei, BS³, Colleen O'Rourke, BS³,
Mariana Smith, MHA⁴, Lindsey Bruchhaus, MSN, RN⁴,
Yashica Bowens, BSN, MBA, MHCM⁵, Kimberley Goode, MHA⁵,
Lee Ann Arabie, BS⁶, Katherine Saucedo, BA⁴,
Majeedah Pacha, MPH⁴, Sandra Martinez, MBA⁷,
James Chisum, MBA⁸, R Benjamin Saldaña, DO, FACEP⁹,
S Nicholas Desai, MD¹⁰, Melina Awar, MD, FACP, FHM¹¹,
and Thomas R Vernon, RN, BSN, EdM¹

Abstract

An important gap in the literature is how clinicians feel about patient-centered technologies and how clinicians experience patient-centered technologies in their workflows. Our goal was to identify clinician users' perspectives on facilitators (pros) and barriers (cons) to using 1 digital texting innovation to promote family centered care during patients' hospitalizations. This qualitative study was conducted at a tertiary care center in Houston, consisting of 7 hospitals (1 academic hospital and 6 community hospitals), involving analysis of 3 focus groups of 18 physicians, 5 advanced practice providers, and 10 nurse directors and managers, as well as a content analysis of 156 real-time alerts signaling family dissatisfaction on the nursing unit/floor. Thematic analysis methods were used. We selected these participants by attending their regularly scheduled service-line meetings. Clinician feedback from focus groups resulted in 3 themes as **facilitators**: (a) texting platforms must be integrated within the electronic medical record; (b) texting reduces outgoing phone calls; (c) texting reduces incoming family phone calls. Clinician feedback resulted in 3 themes as **barriers**: (a) best practice alerts can be disruptive; (b) real-time alerts

¹ System Patient Experience, Houston Methodist Hospital System, Houston, TX, USA

² Information Technology Division, Houston Methodist Hospital System, Houston, TX, USA

³ CareSense, MedTrak, Inc., Conshohocken, PA, USA

⁴ Service Quality and Guest Relations; Houston Methodist Sugar Land Hospital, Sugar Land, TX, USA

⁵ Service Quality and Guest Relations; Houston Methodist Hospital, Houston, TX, USA

⁶ Service Quality and Guest Relations, Houston Methodist Clear Lake Hospital, Nassau Bay, TX, USA

⁷ Service Quality and Guest Relations, Houston Methodist Willowbrook Hospital, Houston, TX, USA

⁸ Service Quality and Guest Relations, Houston Methodist Baytown Hospital, Baytown, TX, USA

⁹ Department of Emergency Medicine, Houston Methodist Hospital, Houston, TX, USA

¹⁰ Department of Surgery, Houston Methodist Sugar Land Hospital, Sugar Land, TX, USA

¹¹ Department of Medicine, Houston Methodist Hospital, Houston, TX, USA

Corresponding Author:

Courtenay R Bruce, JD, MA, System Patient Experience, Houston Methodist System, Institute of Academic Medicine, Texas A&M Health Science Center, College of Medicine, 6565 Fannin Street, Mail Code B164 A/B, Houston, TX 77030, USA.

Email: crbruce@houstonmethodist.org



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 License (<https://creativecommons.org/licenses/by-nc/4.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access page (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

can create hopelessness; and (c) scale-up is challenging. The analysis of facilitators (pros) and barriers (cons) pertains only to the clinician's feedback. We also analyzed real-time alerts signaling family dissatisfaction (defined as "service recovery escalation" throughout this manuscript). The most common selection for the source of family dissatisfaction, as reflected through the real-time alerts was, "I haven't heard from physicians enough," appearing in 52 out of 156 alerts (33%). The second most common selection for the source of dissatisfaction was "perceived inconsistent or incomplete information provided by team members," which was selected in 48 cases (31%). Our findings indicate that clinicians value inpatient texting, not only for its ability to quickly relay updates to multiple family members with 1 click, but also because, when used intentionally and meaningfully, texting decreases family phone calls.

Keywords

MHealth technology, mHealth interventions, family decision making, family centered care, patient-centered care, patient experience, patient engagement, patient activation, effectiveness, quality improvement, patient safety

Introduction

It is well-known that electronic health records (EHRs) can add to clinician practice inefficiencies (1–3). Clerical burdens can increase workload and exacerbate professional dissatisfaction that is compounded over time, leading to burnout (4–6). Less is known about the clinical impacts of other digital innovations that are integrated within the EHR (7,8).

One important gap in the literature is how patient-centered technologies designed to enhance communication can impact clinicians' workflow and responsibilities. To respect patient and family centered care, clinicians are expected to maintain a therapeutic alliance with the patients and families by keeping them informed and maintaining strong communication (9). There is a robust body of literature demonstrating a strong correlation or association between clinicians' communication scores and patient satisfaction scores (10–14). Thus, the quality of physician–patient communication influences patient satisfaction with healthcare delivery.

And while there is a less robust body of literature on physician–family communication and the role it plays in patient satisfaction, there is consensus that families should be updated to maintain family centered care. The extent to which clinicians can cultivate strong communication with families is impacted by competing clinical obligations and their limited time. Perhaps technologies could help keep families informed while also not significantly increasing clinical burdens, most especially if technologies could offset other administrative or clerical responsibilities (15).

The purpose of this paper is to identify clinician users' perspectives on facilitators and barriers to using 1 digital texting innovation to promote family centered care during patients' hospitalizations. The essential components of the texting tool consisted of several closed-ended options within the EHR as an additional tab where the clinician could indicate the patient's health status (improved, status quo, and indications of decline), recommendations and plans of care moving forward (family meeting, additional specialty consultations or assessments, and preparing for discharge), and current level of treatment (less treatment required, more treatment

required, and same treatment level required). In addition to these closed-ended field options, a free-text field allowed clinicians to enter additional descriptions on the plan of care. The closed-ended and free-text fields were transmitted via text to the family.

We thought a unidirectional texting platform could meet families' needs while respecting clinicians' schedules by preventing unfettered access to clinicians. To our knowledge, this is the first qualitative study on clinicians' experiences with such a digital texting innovation. This study is one of only a few empirical studies on clinicians' use of patient-centered technologies and the first to study barriers and facilitators to inpatient texting from clinician perspectives.

The Texting Platform: Preimplementation Work

This study was waived by the hospital's institutional review board. Our data-gathering and implementation processes are described in the companion article on family members' perspectives. Below, we recap salient points where the descriptions are critical to understanding the results and discussion of this article.

Best Practices Alerts (BPAs) Inside of Epic. To remind physicians and advanced practice providers (hereinafter referred to as "providers") to write a daily text message, we programmed an automatic BPA or clinical decision support alert to prompt providers when the total time a patient is in observation and/or inpatient exceeds 24 h and no documentation occurred that day or the previous evening (Figure 1).

The primary goal was to have the providers give this update, and have nursing serve as a backup to providers. Nursing had a similar alert but a different decision logic (Figure 2).

Service Recovery Escalation. Text messages were primarily unidirectional in that clinicians sent text messages on the patient's health status to their family members without the ability of families to write clinicians back.

We had 1 bidirectional component: every 3 days of the patient's admission, we asked family members to reflect on whether they were satisfied with the communication and care on the floors. If dissatisfied, an automated response

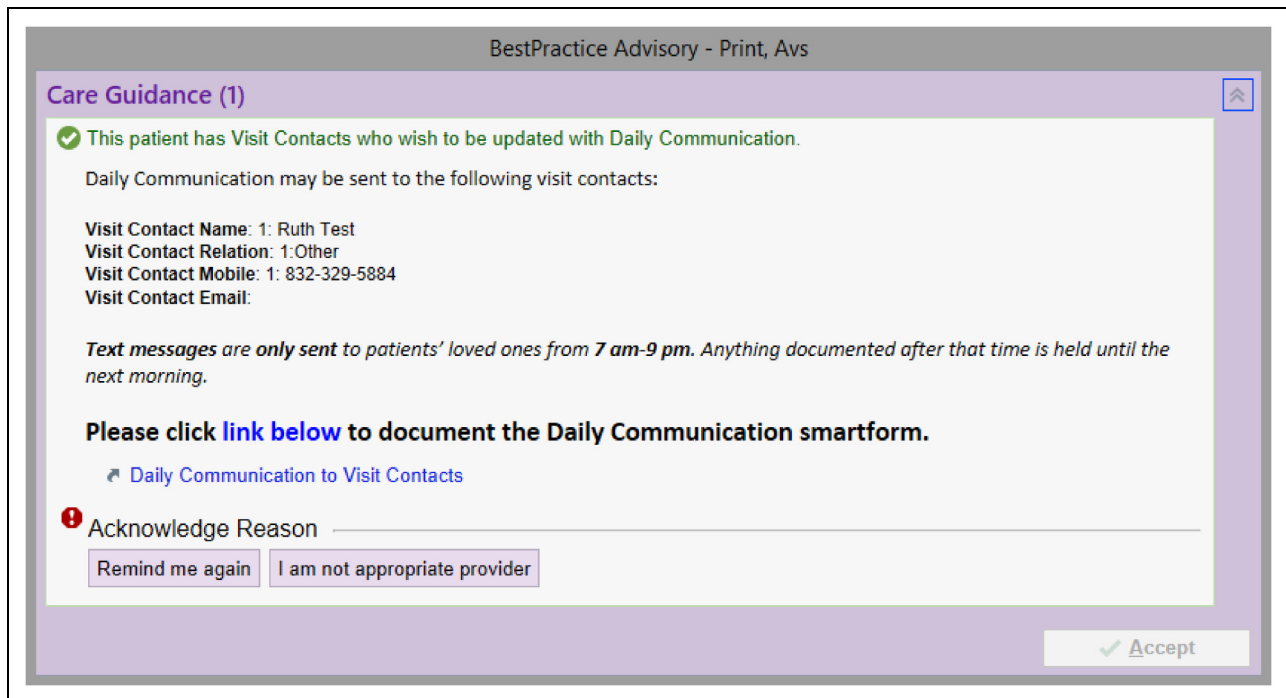


Figure 1. Best practices alerts (BPAs) inside of the EHR for providers.

asked them to select the nature of their dissatisfaction. We provided 4 options: (a) the medical care was not adequate; (b) the medical team was providing conflicting, inconsistent, or incomplete verbal or written communication; (c) the family members did not hear from physicians enough; (d) the family members did not like receiving text updates; or (e) another option. If another option was selected, the families were prompted to provide a free-text explanation (Figure 3).

In situations where families responded to a bidirectional message indicating dissatisfaction, an alert was automatically generated and emailed to unit leadership. The staff would then proactively engage in service recovery.

Methods

Focus Groups

Post-implementation, we met with providers and nurse leaders to solicit feedback, using focus group methodology to identify how to make enhancements to the build (16,17). We selected these participants by attending their regularly scheduled service-line meetings. We met with 3 focus groups over the course of several months, consisting of a total of 18 physicians (hospitalists or internal medicine physicians), 5 advanced practice providers with a specialty in internal medicine, cardiology, and/or geriatrics, and 10 nurse managers and directors on medical floors with a focus on heart failure, sepsis, and respiratory illnesses (COVID and pneumonia). A semi-structured moderator

guide was used. A moderator facilitated the sessions, and an observer took notes.

We performed a thematic analysis of the focus group discussions and a subanalysis focusing on digital texting. The thematic analysis involves identifying key themes that emerge as the theory is formed—information needs and decision-making preferences—based on recurring statements (17). Coding involves giving conceptual labels to data, each generating new emergent codes, and later comparing until there is consensus (17).

To ensure data integrity, we used a codebook to assist us in identifying themes. We reached a consensus by achieving theoretical saturation—the point in data collection when no additional insights emerge. Emergent patterns and themes were stored electronically (18) to provide analytical depth.

The analysis followed an inductive approach, allowing themes from open-ended questions to emerge with minimal a priori assumptions on content. Questions centered on facilitators and barriers, and analysts were instructed to code in keeping with the SEIPS model (person, task, environment, organization, and/or technology and tools). This framework facilitates actionable findings in healthcare (19).

The Texting Platform: Postimplementation Work

Based on the feedback garnered from clinicians during the focus group sessions, we performed a round of revisions postimplementation in April 2022. The revisions consisted of:

Daily communication to the visit contact(s) has not been documented by the Provider.

- Click on the hyperlink below and update daily communications flowsheet to send text or email updates to ALL patient loved ones/family.
- If your unit does not permit nursing to write daily text messages to update pt. family/loved ones, then click on "notify provider daily update" instead
- You do not have to document on every flowsheet row to send out a text message update.
- We encourage using free-text to families to personalize messages.

Text messages are only sent to patients' loved ones from 7 am-9 pm. Anything documented after that time is held until the next morning.

[Update Daily Communication](#)

Acknowledge Reason

Notify provider to provide daily update Will update daily communication form I am not bedside nurse for pt.

✓ Accept

Figure 2. Best practices alerts (BPAs) inside of epic for nurses.

The figure shows three sequential screenshots of an iPhone text message conversation. The contact is identified as +1 (832) 621-3279.

Screenshot 1 (4:52): A text message from the provider: "Good day from Houston Methodist. We noticed that you just clicked on the update message and want to check in on the quality of our communication. Are you finding the verbal and written communication with healthcare doctors, nurses, and staff easy to understand and is our communication meeting your expectations? Reply: 1 for Yes 2 for No". A green bubble with the number "2" is visible below the message.

Screenshot 2 (4:53): A text message from the provider: "OK. We're sorry to hear that our communication has not been adequate. Can you tell us a little more on what you would like to be improved? Reply: 1 for The care team is not providing adequate medical care. 2 for I don't like text/email updates. 3 for I don't get to talk with the doctors enough. 4 for The messages the healthcare team is providing me is conflicting or not consistent. 5 for None of the above". A green bubble with the number "5" is visible below the message.

Screenshot 3 (4:53): A text message from the provider: "healthcare team is providing me is conflicting or not consistent. 5 for None of the above". A green bubble with the number "5" is visible below the message. A second text message from the provider: "Would you please let us know what could be improved?". A green bubble with the number "2" is visible below the message. A green bubble with the text "They use too many medical abbreviations that I don't understand" is visible above the second message. A third text message from the provider: "We'll let the team know about your dissatisfaction. Would you like for us to stop sending updates? Reply: 1 for Yes 2 for No". A green bubble with the number "2" is visible below the message.

Figure 3. Bidirectional text soliciting family feedback on dissatisfaction.

Exp Disch Date	Chem Orders	Isolati	Med List Status	Daily Updat for Visit Conta	EDI
🕒	No Tx Plan	—	—	●	12
🕒	No Tx Plan	—	—	●	N/A
🕒	No Tx Plan	—	—	●	N/A
🕒	No Tx Plan	—	—	●	14
🕒	No Tx Plan	—	—	●	15
🕒	No Tx Plan	—	—	●	18
🕒	No Tx Plan	—	—	●	17
🕒	No Tx Plan	—	—	●	18
🕒	No Tx Plan	—	—	●	16

Figure 4. Provider view of column indicating a text had been written or not in the last 24 h.

1. Adding an automatic message to ride off the EHR bed transfer feed. This automatic message operated in real-time by sending out a text message to the families, providing the new room location and the unit and patient’s bed/room phone numbers.
2. Adding a discharge message that would ride off the EHR discharge order feed. This automatic message operated in real-time by sending out a text message, telling families they could expect discharge in the next 2 to 4 h.

Table I. Summary Table of Themes and Prevalence.

Facilitators	Subthemes	Description
	Texting platforms must be integrated within the EHR	Clinicians like having the addition of columns so that texting can be performed after rounding on all patients.
	Texting reduces outgoing phone calls	Nursing indicated they had to make 30% to 35% fewer phone calls.
	Texting reduces incoming family phone calls.	At least 6 physicians estimated that they believed they receive at least 30% fewer phone calls, with 1 estimating he thought he received 50% fewer phone calls.
Barriers	BPAs can be disruptive.	The BPAs could only be fired upon opening the chart, which is before clinicians examined and met with the patient, which does not integrate well within their clinical workflows.
	Real-time alerts can create hopelessness	Sometimes the issue identified could not be addressed by those receiving alerts.
	Scale-up is challenging	We also could not easily communicate benefit-added features, which were integral to clinicians’ adoption.

3. Turning off notifications after 9 p.m. for any clinician-entered documentation and releasing at 7 a.m.
4. Adding security features. Families would be required to enter the patient’s birth year to minimize the possibility of unintended recipients having access to healthcare updates.
5. Adding a “daily update” EHR column to be available to hospitalists via their EHR patient list and available to nursing via their EHR unit manager list. This allowed clinicians to click directly on the patient’s name to get to the texting feature with 1 click.
6. Adding the texting physician’s name automatically to the message so that families would know who wrote the text message.

Figure 4 shows the provider column. A red dot on the column indicated that no text had been written in the last 24 h, and yet the patient agreed to text and there was family contact information in the chart. A green dot indicated that a text had been written. A grey dot indicated that the patient declined to text.

We also performed enhanced education for clinicians in late April 2022. To increase inpatient physician texting utilization, some hospitals made provider texting a key educational topic in their education series, in which providers received continuing medical education credits by attending. These in-person education sessions consisted of 2, in-person 1-h didactics, which covered how to use the tool, tips to ensure success, and exploring perceived barriers.

Finally, post-implementation we built real-time reports to aid us in scale-up and sustainment efforts. All reports were stripped of protected health information and made publicly accessible to anyone with epic access, creating a sense of transparency through the organization of our implementation efforts.

Results

Service Recovery Escalation

Over the study period of February–June 2022, there were 156 alerts triggered indicating family dissatisfaction on 57 different units (out of 113 total units participating), averaging 1 or 2 alerts per day. Of the 57 units, 15 of them had 1 alert over the 4-month period. Twenty-nine units had 2 to 5 alerts during the same period. The remaining 13 units had 5 alerts or more. These 13 units were all similarly sized medical/surgical units with an average of 25 beds. The alerts primarily came from medical patients.

Of the 13 units with 5 alerts or more, 4 of them were within the top 10 frequent texting units. Of the top 20 frequent texting units, 2 of them were intensive care units (ICUs) and the remaining were medical/surgical floors.

The most common selection for the source of dissatisfaction was “I haven’t heard from physicians enough,” appearing in 52 out of 156 alerts (33%). The second most common selection for the source of dissatisfaction was “perceived inconsistent or incomplete information provided by team members,” which was selected in 48 cases (31%). Inadequate medical care was cited as the source of dissatisfaction in 25 cases (16%). “None of the above” was selected in 21 cases (13%). “I don’t like receiving text updates” was selected in 10 cases (6%).

For the “none” option, free-text responses typically indicated the text messages were not providing meaningful information. A few times, respondents indicated that the nurse or provider used too many medical abbreviations.

Focus Groups

Our sample of clinicians approximated the demographic trends of clinicians in the Houston area. Specifically, internal data reveals 43.61% of our employed physicians are female and 85.36% of nurses are female, whereas 56.39% of employed physicians are male and 14.64% of nurses are male. The mean age in years of our physicians is 47 years, and the mean age of our nurses is 40 years. Additionally,

physician ethnic subgroups consist of the following demographics: 43.90% White, 38.13% Asian, 9.08% Hispanic or Latino, 7.00% Black, and 1.89% identified as other. Nursing ethnic subgroups consist of 35.26% Asian, 29.86% White, 16.80% Black, 15.9% Hispanic or Latino, and 2.15% identified as other.

In what follows, we arrange clinicians’ thematic perspectives on facilitators and barriers to digital texting innovation.

Text Messaging Facilitators

The data analysis resulted in 3 emerging themes as facilitators, which are summarized in Table 1. The most prominent theme—that texting platforms must be integrated within the EHR—relates to the interface and usability from a clinician’s perspective. Two other less prominent themes focused less on the interface, accessibility, and usability of texting and instead focused more on the perceived benefits to other aspects of clinical workflow practices by offsetting clinical time.

Theme 1: Texting platforms must be integrated within the EHR.

The most prominent theme is that clinicians—specifically hospitalists and nurses—liked that texting existed within the EHR environments, as reflected by this hospitalist: “If I have to move to another system to look something up or send something, forget it. It has to be inside of the chart.” They referenced that they liked the enhanced feature we made during revisions that allowed them to click on the patient name through an added column: “I hated it before [when I had to click inside the navigator.] It forced us to write a message after seeing each patient, which interrupted me. But when you added the column, I could text after rounds.” Nursing felt similarly about the columns.

Theme 2: Texting reduces outgoing phone calls. Clinicians felt that texting reduced the need to update family via phone calls, as articulated by this hospitalist physician: “I can get to all at once, so I don’t need to call multiple [families].” Another hospitalist echoed a similar sentiment: “I tell the family I will keep the patient updated [during rounds] and send a text [to family].” Nursing indicated they had to make 30% to 35% fewer phone calls on “standardized information that we call about,” like when to come to the bedside for discharge or when to be ready for pick-up.

Theme 3: Texting reduces incoming family phone calls. At least 6 physicians estimated that they believed they receive at least 30% fewer phone calls, with 1 estimating he thought he received 50% fewer phone calls, “Before, I would talk to the wife, and then I’d get a call from the sister and third cousin. This stopped that.” Another hospitalist said she was “convinced” that it would “just increase” calls: “The family is going to ask me more questions [to clarify what I wrote]. But that happens rarely.”

Nurse leaders said they used “phone calls as a selling point” to their nurses to encourage texts: “My nurses write texts about stuff they get calls about. To head it off.” Nurse leaders estimated that they received fewer phone calls, although there was variability in how much decrease, with some reporting 20% fewer calls, and others reporting as high as 50% fewer calls. They were, however, consistent in reporting a decline.

Text Messaging Barriers

Clinician feedback resulted in 3 emerging themes as barriers, the first 2 of which focused on interface and usability from a clinician perspective—what made it less user-friendly from their perspective? A less prominent theme focused on how operational implementation practices can negatively impact clinical workflow.

Theme 1: Bpas can be disruptive. As discussed in our methods, we sent alerts upon admission and every 24 h thereafter to remind clinicians to write a text message. The BPAs could only be fired upon opening the chart, which is before clinicians examined and met with the patient, which does not integrate well within their clinical workflows. Sending BPAs upon closing the chart was not technically possible, and alternatives were not considered feasible by providers: “You could send when we order something, but what does the order have to do with a text?”

A compromise approach was to delay the BPAs until after 9 a.m. For all practical purposes, however, most clinicians ignored the BPAs and wrote texts using the patient list column. We suspect we will drop the BPAs once an adoption is organizationally saturated.

Theme 2: Real-time alerts can create hopelessness. When families triggered a dissatisfaction alert, we routed the alert via email to unit leadership and patient liaisons to allow them to conduct service recovery. The challenge, however, is that sometimes the issue identified could not be addressed by those receiving alerts, as reflected by this nurse manager: “Are the doctors on these alerts? Because this issue is one they created.”

Sometimes, team members expressed futility: “Nothing we say is going to make this family happy. They want more information than we can write or say.” Ignorance can sometimes be bliss as 1 clinician expressed, “The alerts tell us there’s a problem. Maybe the ostrich has a point with his sand thing.”

Theme 3: Scale-up is challenging. Because we iteratively made revisions, it was challenging for clinicians to know current processes during the implementation phase: “Everything you do makes it better [as clinicians] and patients. But I can’t remember...what we’re currently sending automatically.” We also could not easily communicate benefit-added

features, which were integral to clinicians’ adoption. We used a combination of on-the-ground support where EHR specialists could teach nurses and physicians. However, there were few on-the-ground support teams available, making it challenging to provide the level of support clinicians needed.

Discussion

Service Recovery Escalation

One of the most significant findings is that the units with the highest number of real-time alerts were among the lowest performers in overall HCAHPS scores (20) prior to implementation. This finding suggests that real-time alerts serve as a strong proxy and pulse check of intrateam communication and dysfunction that are often associated with substandard HCAHPS scores. Equally significant, for families that triggered a real-time alert, if the team satisfactorily addressed the issue in real-time before discharge, patients and families often reflected appreciation. This lends credence to the notion that real-time service recovery before discharge can allow clinicians and patient experience specialists to proactively address issues.

Of note, we are unable to make causal assertions from a qualitative study (16,21,22). We therefore cannot discern how real-time alerts lead to HCAHPS scores. Future studies should: (a) extrapolate whether patients whose families triggered real-time alerts scored physician and nursing communication favorably in HCAHPS scores when/if patient liaisons or unit leaders were able to successfully perform service recovery during hospitalization; (b) extrapolate whether or how texting causally creates better HCAHPS outcomes, which can only be discerned through a randomized clinical trial, which may not be feasible operationally.

Another major finding in our paper is that the real-time alerts came from medicine/surgical floors, even though ICUs were among the highest texting units; furthermore, units with the most real-time alerts were primarily medical, not surgical units. This finding—that medical patients and families are the most dissatisfied when compared to surgical units or ICUs—is consistent with other internal data, showing that patients who come through the emergency department are less satisfied than those who enter our hospitals electively.

It is challenging to speculate why surgical patients are more satisfied with care compared to medical patients, but other authors have suggested that there is a different psychology and level of preparedness for both groups (23–28). Surgical patients can plan for it. They were likely educated and had time to psychologically adjust and anticipate hospitalization and postrecovery, and preoperative education and therapeutic alliance are associated with higher patient satisfaction scores (26). Medical patients, on the other hand, are not hospitalized electively, and they may have chronic conditions that can be tiring and life-altering (27). Medical patients

may have had repeat hospitalizations, contributing to a heightened sense of overwhelmingness and dissatisfaction with healthcare (27,28).

Focus Groups: Text Messaging Facilitators and Barriers

Clinician engagement and seamless integration into preexisting clinical workflows are essential to the high adoption and uptake of digital texting innovations. The findings indicate that clinicians value inpatient texting, not only for its ability to relay updates to multiple family members at 1 click, but also because, when used intentionally and meaningfully, texting can decrease other administrative and clerical responsibilities and offset their time. However, offsetting clinical time may not be sufficient. Our usability findings illustrate the importance of having a user-friendly, minimally disruptive system that is fully integrated within the EHR regardless of whether the technology positively impacts other workflow practices.

These study findings should bring reassurance to clinicians, hospital administrators, and others who might be considering a digital texting innovation in that clinicians view it as benefit-added and generally nondisruptive. It was not the case that the units with the highest volume of texts also received the most alerts, creating more work for high performers in having to service recover on alerts. Second, clinicians reported a decrease in outgoing and incoming phone calls, and families reported being less inclined to call clinicians (a finding which is discussed in the companion piece). We could not empirically discern a decrease in phone calls, because phone logs were not accurately maintained. Thus, we had to rely on clinicians' and unit secretaries' assessments of phone calls, but there was consistency across all stakeholders in decreasing calls. Technology and innovations are successful only insofar as they create less work for adopters (29–32).

There are limitations to this study. First, coders' interpretations were necessary when reviewing free-text fields. Finally, it could be argued that thematic analysis could have coding errors in that 2 people may interpret the same quote differently by identifying different themes (16).

Conclusions and Future Research

This study advances the understanding of digital technologies by providing an empirical foundation on how clinicians experience patient-centered or family centered digital technologies (32,33). Technologies can be integrated into the clinical workflow without being viewed as overly burdensome or disruptive to the clinicians, but careful attention should be placed on scale-up implementation practices and the interface usability of the technology.

Future research should further explore causal connections between technology impacts on patient satisfaction. Historical, time series pre- and post-comparisons evaluating whether a digital texting innovation is associated with

better HCAHPS outcomes after implementation is tempting due to its convenience but would not be scientifically sound. However, pre- and post-implementation studies cannot tease out whether other interventions or circumstantial factors impact outcomes (17,28). For instance, COVID, short staffing, turnover, emergency department-boarding/hospital throughput or efficiency, and clinical burnout/fatigue are factors that impact patient experience intervention outcomes. Without removing these and other variables, investigators cannot determine whether texting or another intervention is responsible for an outcome.

Instead, 1 approach that is both scientifically reasonable and administratively convenient is to perform a control cohort versus intervention cohort analysis. Here, investigators would compare patients whose families received text messages (an intervention cohort) versus patients whose families did not receive text messages (a control cohort). If both cohorts were analyzed during the same time, then external factors, such as COVID or short staffing, would be the same in both cohorts and therefore controlled (21). Indeed, we performed such an analysis, and we will report on those findings in a subsequent paper.

Authors Statement

All procedures in this study were conducted in accordance with the Institutional Review Board protocol that was waived. ID: 21300. Informed consent was not obtained because the study was waived. All data were aggregated and anonymized.

Author Contributions

All authors were involved in implementing the project. For writing, CRB took primary responsibility for writing the manuscript, but all authors contributed to revising, reviewing, and approving.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.


Ethical Approval

This study was waived by the Institutional Review Board of Houston Methodist Hospital in Houston, Texas.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Courtenay R Bruce  <https://orcid.org/0000-0002-9503-9834>

References

1. Baumann LA, Baker J, Elshaug AG. The impact of electronic health record systems on clinical documentation times: a systematic review. *Health Policy*. 2018;122(8):827-36. doi:10.1016/j.healthpol.2018.05.014

2. Erickson SM, Rockwern B, Koltov M, McLean RM. Putting patients first by reducing administrative tasks in health care: a position paper of the American College of Physicians. *Ann Intern Med.* 2017;166(9):659-61. doi:10.7326/m16-2697
3. Tajirian T, Stergiopoulos V, Strudwick G, et al. The influence of electronic health record use on physician burnout: cross-sectional survey. *J Med Intern Res.* 2020;22(7):e19274. doi:10.2196/19274
4. Shanafelt TD, West CP, Sinsky C, et al. Changes in burnout and satisfaction with work-life integration in physicians and the general us working population between 2011 and 2017. *Mayo Clin Proc.* 2019;94(9):1681-94. doi:10.1016/j.mayocp.2018.10.023
5. Shanafelt TD, Mungo M, Schmitgen J, et al. Longitudinal study evaluating the association between physician burnout and changes in professional work effort. *Mayo Clin Proc.* 2016;91(4):422-31. doi:10.1016/j.mayocp.2016.02.001
6. Ellison EM. Beyond the economics of burnout. *Ann Intern Med.* 2019;170(11):807. doi:10.7326/m19-1191
7. Gonçalves-Bradley DC, J Maria AR, Ricci-Cabello I, et al. Mobile technologies to support healthcare provider to healthcare provider communication and management of care. *Cochrane Database Syst Rev.* 2020;2020(8):CD012927. doi:10.1002/14651858.cd012927.pub2
8. Moayedi Y, Ross HJ. Seizing opportunities in mobile health technologies and heart failure: empowering patients and informing clinicians. *Can J Cardiol.* 2021;37(8):1163-4. doi:10.1016/j.cjca.2021.03.005
9. Beauchamp TL, Childress JF. Principles of biomedical ethics. Oxford University Press; 2019.
10. Boissy A, Windover AK, Bokar D, et al. Communication skills training for physicians improves patient satisfaction. *J Gen Intern Med.* 2016;31(7):755-61.
11. DiMatteo MR, Taranta A, Friedman HS, Prince LM. Predicting patient satisfaction from physicians' nonverbal communication skills. *Med Care.* 1980;18(4):376-87.
12. Świątoniowska-Lonc N, Polański J, Tański W, Jankowska-Polańska B. Impact of satisfaction with physician-patient communication on self-care and adherence in patients with hypertension: cross-sectional study. *BMC Health Serv Res.* 2020;20(1):1046.
13. Mann RK, Siddiqui Z, Kurbanova N, Qayyum R. Effect of HCAHPS reporting on patient satisfaction with physician communication. *J Hosp Med.* 2016;11(2):105-10. doi: 10.1002/jhm.2490
14. Davidson KW, Shaffer J, Ye S, et al. Interventions to improve hospital patient satisfaction with healthcare providers and systems: a systematic review. *BMJ Qual Saf.* 2017;26(7):596-606. doi: 10.1136/bmjqs-2015-004758
15. Bruce CR, Miller SM, Zimmerman JL. A qualitative study exploring moral distress in the ICU team. *Crit Care Med.* 2015;43(4):823-31. doi:10.1097/ccm.0000000000000822
16. Cohen DJ, Crabtree BF. Evaluative criteria for qualitative research in health care: controversies and recommendations. *Ann Fam Med.* 2008;6(4):331-9. doi:10.1370/afm.818
17. Strauss AL, Corbin J. Basics of qualitative research. Thousand Oaks, CA: SAGE Publications; 2007.
18. ATLAS.ti 7. Atlas.ti Scientific Software Development Company, GmbH, Berlin, Germany.
19. Holden RJ, Carayon P, Gurses AP, et al. SEIPS 2.0: a human factors framework for studying and improving the work of healthcare professionals and patients. *Ergonomics.* 2013;56(11):1669-86.
20. HCAHPS: Patients' perspectives of care survey. <https://www.cms.gov/medicare/quality-initiatives-patient-assessment-instruments/hospitalqualityinits/hospitalhcahps> (accessed August 12, 2022).
21. Brod M, Tesler LE, Christensen TL. Qualitative research and content validity: developing best practices based on science and experience. *Qual Life Res.* 2009;18(9):1263-78. doi:10.1007/s11136-009-9540-9
22. Mays N. Qualitative research in health care: assessing quality in qualitative research. *Br Med J.* 2000;320(7226):50-2. doi:10.1136/bmj.320.7226.50
23. Lee Hargraves J, Wilson IB, Zaslavsky A, et al. Adjusting for patient characteristics when analyzing reports from patients about hospital care. *Med Care.* 2001;39(6):635-41. doi:10.1097/00005650-200106000-00011
24. Baumann C, Rat AC, Osnowycz G, Mainard D, Cuny C, Guillemin F. Satisfaction with care after total hip or knee replacement predicts self-perceived health status after surgery. *BMC Musculoskelet Disord.* 2009;10(1). doi:10.1186/1471-2474-10-150
25. Kupfer JM, Bond EU. Patient satisfaction and patient-centered care: necessary but not equal. *JAMA.* 2012;308(2):139-40. doi:10.1001/jama.2012.7381
26. Schmocker RK, Cherney Stafford LM, Siy AB, Levenson GE, Winslow ER. Understanding the determinants of patient satisfaction with surgical care using the consumer assessment of healthcare providers and systems surgical care survey (S-CAHPS). *Surgery.* 2015;158(6):1724-33. doi:10.1016/j.surg.2015.06.018
27. Mapelli M, Salvioni E, Bonomi A, et al. How patients with heart failure perform daily life activities: an innate energy-saving strategy. *Circ Heart Fail.* 2020;13(11):e007503. doi:10.1161/circheartfailure.120.007503
28. Nguyen Thi PL, Briçon S, Empereur F, Guillemin F. Factors determining inpatient satisfaction with care. *Soc Sci Med.* 2002;54(4):493-504. doi:10.1016/s0277-9536(01)00045-4
29. Nielsen J. Usability engineering. San Francisco, CA: Morgan Kaufmann; 1994.
30. Rogers EM. Diffusion of innovations. 4th ed. New York: Free Press; 1995.
31. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process.* 1991;50(2):179-211. doi:10.1016/0749-5978(91)90020-t
32. Bagozzi R. The legacy of the technology acceptance model and a proposal for a paradigm shift. *J Assoc Inf Syst.* 2007;8(4):244-54. doi:10.17705/1jais.00122
33. Bruce CR, Minard CG, Wilhelms LA, et al. Caregivers of patients with left ventricular assist devices. *Circ Cardiovasc Qual Outcomes.* 2017;10(1):e002879. doi:10.1161/circoutcomes.116.002879