System Factors Influencing the Use of a Family-Centered Rounds Checklist

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Abstract

Introduction: Checklists are used to operationalize care processes and enhance patient safety; however, checklist implementation is difficult within complex health systems. A family-centered rounds (FCR) checklist increased physician performance of key rounding activities, which were associated with improved parent engagement, safety perceptions, and behaviors. To inform FCR checklist implementation and dissemination, we assessed physician compliance with this checklist and factors influencing its use. Methods: Guided by a recognized human factors and systems engineering approach, rounding observations and ad hoc resident and attending physician interviews were conducted at a tertiary children’s hospital. Rounding observers documented 8-item checklist completion (nurse presence, family preference, introductions, assessment/plan, discharge goals, care team questions, family questions, and read back orders) and then interviewed physicians to elicit their perceptions of challenges and facilitators to FCR checklist use. We performed a directed content analysis of interview notes, iteratively categorizing data into known hospital work system components. Results: Of 88 individual patient rounds observed after checklist implementation, 90% included the nurse, and 77% occurred at the bedside. In an average patient rounding session, staff performed 82% of checklist items. Factors influencing checklist use were related to all hospital work system components, eg, physician familiarity with checklist content (people), visibility of the checklist (environment), providing schedules for rounding participants (organization), and availability of a mobile computer during rounds (technology). Conclusions: Multiple factors within hospital systems may influence FCR checklist use. Strategies, such as providing rounding schedules and mobile computers, may promote optimal engagement of families during rounds and promote pediatric patient safety. (Pediatr Qual Saf 2019;4:e196; doi: 10.1097/pq9.000000000000196; Published online July 30, 2019.)

INTRODUCTION

Checklists are increasingly used as tools to operationalize healthcare processes to support communication, shared understanding, and patient safety.1–4 Although deceptively simple, checklists can be difficult to implement within complex healthcare systems, which has hindered their broad adoption.5–10 Thus, the use of human factors and systems engineering approaches are recommended to identify challenges and facilitators embedded within the context of hospital work systems that may affect checklist performance.10,11 This information can then be used to redesign checklists and/or modify factors influencing their implementation to support their sustained use and positive impact on healthcare outcomes.
Family-centered rounds (FCR), in which families of hospitalized children ‘share in the control of the management plan and in the evaluation of the process itself,’ are endorsed as standard practice and a way to improve care quality and patient safety. We previously created an FCR checklist as a tool to support family engagement in rounds and provide guidance and a rounding structure for their healthcare team (HCT). Developed based on family and HCT feedback, this bundled intervention consists of an 8-item checklist of key activities to be completed during daily rounds with families and training curriculum and informational materials for their HCT. Implementation of this FCR checklist bundle was shown to improve HCT performance of these activities that were, in turn, associated with improved parent engagement during rounds, safety perceptions, and behaviors.

While the FCR checklist intervention succeeded, factors influencing HCT adherence to this checklist were not well understood. Guided by a recognized human factors and systems engineering approach, the objective of this study was to describe HCT compliance with this checklist and identify and characterize challenges and facilitators that may influence its use. These data can be used to inform the optimal implementation and dissemination of the FCR checklist bundle to support the care of hospitalized children and their families and the work of the HCT.

METHODS
Setting, Participants, and Study Design
We conducted this study with English-speaking patients admitted to a pediatric hospitalist teaching service at a 61-bed tertiary children’s hospital from October 2012 to May 2013 after the implementation of the FCR checklist bundle. This service included children hospitalized with acute and complex medical conditions. To evaluate checklist compliance, researchers conducted observations of morning hospital rounds and documented checklist item completion by HCT members. To elicit challenges and suggestions to facilitate checklist use, researchers conducted interviews with available senior resident and attending physicians immediately after rounds.

FCR Checklist Bundle
We developed and implemented the FCR checklist bundle at this institution before this study in 2012. This FCR checklist bundle includes an 8-item checklist that prompts completion of key FCR activities during rounds (Table 1) and associated implementation materials for HCT members, including a 90-minute training curriculum informational materials. The goal of the checklist is to promote the performance of optimal activities for engaging families in FCR, and setting expectations and providing structure for the HCT. The expectation is that FCR are conducted daily with the patient and/or family (if their preference) and the HCT (consisting of at least one physician and one nurse). Typically multiple students, intern and resident physicians, and other staff (ie, pharmacists) are also present. Any HCT member may complete checklist items; however, the senior resident and attending physician are ultimately responsible for completion. The HCT is to complete all items during every patient rounding session. If patients/families are not present or prefer not to participate, the HCT is still expected to complete relevant items (ie, all items except “introductions” and “ask family for questions”). Checklist training was conducted in September 2012 and yearly with all senior resident and attending physicians. More detail and guidance about the FCR checklist implementation process is provided in this free, online toolkit: https://www.hipxchange.org/familyrounds.

Study Procedures
To evaluate checklist compliance, 2 trained human factors engineering researchers (AX and YL) familiar with rounds conducted rounding observations according to their availability, capturing a sampling of rounds from all weekdays. On each observation day, a researcher shadowed the HCT throughout the entire rounding process.

Table 1. FCR Checklist Item Definitions

| Checklist Item | Item Definition |
|----------------|-----------------|
| Ensure nurse is present | HCT member communicates with the nurse and/or representative to let him/her know when the team is ready to start rounds. |
| Check family preference for rounds | HCT member asks if and how the patient/family would like to participate on rounds before the team enters the room. |
| Ask if the family knows everyone on team. If not, introduce unfamiliar team members and roles | HCT member asks the patient/family whether they know everyone. If they do not or are newly admitted, HCT member introduces unfamiliar members by name and role. |
| Discuss assessment and plan with family | HCT member communicates with the patient/family the patient’s status and/or what will be done that day. |
| Review and update goals for discharge | HCT member discusses discharge goals with patient/family. If goals unchanged, he/she explicitly says so. |
| Ask family for questions | HCT member asks the patient/family what questions they have. This does not include if patient/family raises questions spontaneously. |
| Ask team for questions | HCT member asks the team what questions/concerns they have. This does not include if HCT member raises questions spontaneously. |
| Read back orders | HCT member reads back new and changed orders (ie, medications and tests) that he/she has entered into the computer. If there are no new or changed orders, he/she must explicitly say so. |
for that day. Although the HCT was aware that the observer was collecting data, they were unaware of what data were being collected. The unit of observation was a rounding session for a single patient. The session’s beginning was indicated by the HCT’s arrival at the patient’s room, while the end was indicated by the HCT physically moving to the next patient. An observation form was used to collect (1) observation day, (2) number and roles of HCT members, (3) patient and/or family presence, (4) rounding location (eg, bedside or hallway), (5) rounding beginning and ending time, and (6) performance of each checklist item (yes/no). To capture the full scope of checklist compliance, we intentionally included in our data rounding observations with and without patients and/or families.

To evaluate barriers and facilitators to checklist use, observers also conducted brief, semistructured, one-on-one interviews with a convenience sample of 7 of the 10 eligible senior resident and attending physician participants. We interviewed 4 senior residents and 3 attending physicians immediately after rounds on each observation day during the study period. We interviewed each physician once for approximately 15 minutes and documented their responses. These physicians were asked about their perceptions of challenges/barriers to checklist use (ie, what are the challenges of using the FCR checklist?) and suggestions/facilitators to improve its use (ie, what suggestions do you have to improve the FCR checklist or its use?). Observers followed an observation training manual, interview guide, and protocol provided in the FCR checklist toolkit. This toolkit is available at https://www.hipxchange.org/familyrounds. The University of Wisconsin Institutional Review Board considered this study as quality improvement and not human subjects research; therefore, they did not require review and approval.

Data Analysis

We entered data from observations and interviews into an Excel spreadsheet. Descriptive statistics characterized observed rounds and the completion of checklist items during rounds.

Researchers conducted a directed content analysis of qualitative interview note data guided by a recognized human factors and systems engineering model, the Systems Engineering Initiative for Patient Safety (SEIPS) framework (Fig. 1). SEIPS is a model that considers how each of a multitude of factors within complex health-care work systems (eg, hospital) impacts the successful implementation of an intervention (eg, FCR checklist) and the impact of these interventions on patient safety. According to the SEIPS model, the sociotechnical system (ie, work system) can be conceptualized as being composed of people (eg, physicians) performing a range of tasks (eg, discussing care plan with family during rounds) using various tools and technologies (eg, checklist, computer). These activities occur within a physical environment (eg, bedside) and an organizational context (eg, care

Fig. 1. The Systems Engineering Initiative for Patient Safety (SEIPS) framework from Carayon et al.
team). Using this approach, we can improve interventions, like the FCR checklist, and their implementation to most effectively support the entire work system (eg, HCT work) and improve outcomes (eg, family engagement and patient safety). Our objective was to conceptually “fill in” the SEIPS framework by capturing physician perspectives regarding factors influencing checklist use. SEIPS is an appropriate model for examining these data because we began from a framework of recognized hospital work systems and processes and not from a naive perspective.

To corroborate data during analysis and minimize disciplinary biases, 4 researchers contributed to the analysis (AX, YL, PC, and MK). Two researchers (AX and YL) first independently identified factors related to challenges/barriers and facilitators to checklist use from interview notes data. They then came together with 2 other researchers (PC and MK) to reach consensus and resolve any discrepancies, always referring back to the data. These factors were then independently categorized by 2 researchers into known components of hospital work systems within the SEIPS framework. All researchers then met again to reach consensus.

RESULTS
Rounding Characteristics
We observed a total of 88 individual rounding sessions on a pediatric hospitalist service during the study period. The characteristics of observed rounds are shown in Table 2. A majority of rounds occurred with the patient and/or family present (88%). The duration of rounds with the patient/family was an average of 12.9 and 16.6 minutes without their presence. Due to the small number of rounds that occurred without patients/families, it is not possible to report whether there was a significant difference in rounding duration with and without patients/families.

Table 2. Characteristics of Observed Rounds (N = 88)

| Rounding Characteristic               | Mean (SD) | [min–max] |
|---------------------------------------|-----------|-----------|
| Rounding sessions observed per day (rounds) | 5.2 (3.2) | [1–12]    |
| Duration of individual rounding session (minutes) | 13.3 (6.2) | [3–32]    |
| No. healthcare team members present per rounding session (people) | 8.1 (1.6) | [4–13]    |
| Roles of people present on rounds | No. rounds (% of rounds) | Mean number of people (SD) |
| Patient and/or family | 77 (88) | 2.3 (0.9) |
| Attending | 67 (76) | 1.0 (0.0) |
| Senior resident | 83 (94) | 1.0 (0.2) |
| Intern | 88 (100) | 1.9 (0.5) |
| Medical student | 87 (99) | 2.6 (0.6) |
| Nurse | 79 (90) | 1.0 (0.0) |
| Pharmacist | 9 (10) | 1.0 (0.0) |
| Other staff* | 43 (49) | 1.9 (1.3) |
| Rounding location | 58 (77) | 19 (22) |
| Conference room | 1 (1) |  |

*For example: Social worker, nutritionist, case manager, nurse practitioner, and nursing student.

HCT Compliance with the FCR Checklist
In all rounds observed, the HCT competed 82% of checklist items in an average patient rounding session. An HCT member was observed asking a nurse or nursing representative (eg, charge nurse) to join rounds 97% of the time, and a nurse was subsequently present in 90% of rounds. Checklist items performed by the HCT included family preference in 98% of observed rounds, introductions in 84%, assessment/plan in 100%, and review of discharge goals in 70%. The HCT asked families if they had questions in 84% of observations. The patient or family asked the HCT questions in 64% of rounds, and orders were entered and read back in 60% of observations.

Application of the SEIPS Framework to Identify Challenges and Facilitators to Checklist Use
All challenges and facilitators to checklist item completion mentioned during checklist user interviews are shown and categorized into recognized components of the work system within the SEIPS model11 (P-people, T-tasks, T/T-tools/technologies, E-environment, and O-organization) in Table 3. Illustrative examples for each checklist item are described below:

- **Ensure nurse is present.** Facilitators for ensuring nurse presence included availability of the unit clerk to page the nurse (O, T), visibility of the nurse by the rounding team (E), and nursing knowledge of the order of patients to be rounded on before rounds, ie, when it was their turn to round with the team (O). To facilitate nurse presence, some interviewed physicians would delay rounds or come back to the patient later if the nurse was unavailable (P). Competing patient care activities that also occurred during rounds (ie, administering medications to other patients, transporting patients to radiology, and concurrent teams rounding) were noted by participants as barriers to checklist use (T).
- **Check family preference for rounds.** An absent, sleeping, or late-arriving patient/family member or visitor was perceived as a barrier (T) to checking whether patients/families preferred to participate in rounds (P) by physician participants.
- **Ask if the family knows everyone on the team; if not, introduce unfamiliar team members and roles.** The team’s familiarity with patients with chronic illnesses or prolonged hospital stays acted as a barrier to daily introductions, even if there were new members on the HCT that the family had not previously met (P). Late arrival of the patient/family to rounds also acted as a barrier to completing introductions (O).
- **Review and update goals for discharge.** Prolonged hospitalizations (P) and the team not yet knowing goals for discharge (P) acted as barriers to discussing discharge criteria.
- **Ask the family for questions.** Physician interviewees believed that the family voluntarily asking questions...
earlier in the rounding session acted as a barrier to the HCT explicitly asking for additional questions (P).
• **Ask the team for questions.** Discussing the patient's care before or after rounds without the patient/family (eg, pre-rounding, discharge, or care conferences) served as a barrier (O) to asking the HCT explicitly for questions during FCR.
• **Read back orders.** Having an available mobile computer (T/T) and a specific HCT member responsible for entering orders (P) acted as facilitators to reading back orders. Time pressure (T) was also noted as a barrier specific to the completion of this item, which was last on the checklist. Some checklist users considered this task to be complete or repetitive if the daily plan had been discussed or was unchanged from prior days (P).

**DISCUSSION**

This study identified multiple human and systems factors that could influence the use of an FCR checklist by the HCT to support family engagement during FCR effectively. Physicians made suggestions for improvement of checklist use and implementation, specifically for items that were less frequently performed (eg, goals for discharge, read back orders). Examples include sharing the order of patients to be rounded on with the nurse beforehand and providing accessible mobile computers across units for use during rounds. These recommendations could be used to streamline FCR further and inform future checklist implementation, sustainability, and dissemination efforts.

Our results advance scientific knowledge regarding the challenges and facilitators influencing the implementation of FCR and the use of checklists in hospital care more broadly. Our results highlight and extend previously described challenges to effectively conducting daily rounds with families in the inpatient setting.²³⁻²⁵ Participants cited that time constraints and issues organizing the team together at the bedside impaired their ability to perform key activities during daily rounds. Our findings also corroborate and expand upon known challenges to using checklists to improve processes in health care.¹¹,²⁶,²⁷ Participants reported that they did not always explicitly perform all items because they did not understand their purpose or felt that an item seemed repetitive. For example, some HCT participants reported that they did not explicitly ask families for questions if the family had already spontaneously asked questions earlier in the rounding session. Although this item may seem repetitive, our previous study found that specifically asking families for their questions during rounds was associated with significantly better parent perceptions of staff communication openness, handoff, and transition safety.¹⁸ Incorporating these results and feedback from families into the HCT training curriculum may reinforce the benefits that each item on the FCR checklist provides.

The results of this study also offer potential practical strategies to support the use of an FCR checklist to engage families and improve patient safety in pediatric hospitals optimally. FCR checklist use may be facilitated by restructuring HCT member tasks and the organizational structure within which FCR are implemented. This could...
include instituting a daily HCT “huddle” before FCR to clarify HCT roles (e.g., who will get the nurses, place, and read back orders), identify, and prioritize other activities that need to be accomplished for the day, and communicate the anticipated order of patients to be rounded on to nurses. Consideration may also be given to sharing such a rounding schedule with families and other HCT participants so that they could anticipate and plan for their involvement in advance. Furthermore, to participate effectively in rounds, the necessary tools and technology need to be available. Specifically, to enter orders and read them back aloud to families during rounds, HCTs need accessible mobile computers. These computers could be located on every unit or with the functionality to move with the team between floors easily. Operationalizing these tools and technologies are necessary given that rounds are often a venue for families to discuss medication questions.\(^ \text{28} \) We have demonstrated that reading back orders leads to significantly increased family engagement in information sharing and decision making and perceptions of safety.\(^ \text{18} \)

There are several limitations to consider. Data may not be generalizable to all settings because they represent a convenience sample of rounds with English-speaking patients/families and their available physicians at a single, academic children’s hospital. However, similar barriers to conducting FCR were found in published studies from both another single institution\(^ \text{21} \) and a sampling of pediatric hospitals nationally.\(^ \text{22} \) Data do not quantify checklist “use” using a more literal definition, i.e., holding, looking at, or referring to the checklist.

Further, HCTs being observed during rounds may have been influenced by the presence of observers and performed checklist items at a higher rate. This limitation of obtaining data on activities that only occur during rounds has been noted in other studies.\(^ \text{30,31} \) Data on challenges and facilitators are from interviews of available physician rounding participants. Some physicians were not available due to unknown reasons. Additional interviews conducted systematically with a broader range of HCT members, and patients/families could potentially identify additional barriers and facilitators. Our data do not quantify the prevalence of or prioritize factors that may influence checklist use. Future studies could focus on each FCR bundle item to elicit specific barriers and further improve compliance with individual items. Also, this and our prior study did not assess the impact of checklist use on patient/family satisfaction or inpatient experience, which is a potential direction for future research. Lastly, there may be fluctuations in checklist adherence or changes in barriers or facilitators over time, data which we did not capture in this study.

Prior published work indicates that the FCR checklist intervention bundle is an effective tool to operationalize key FCR activities that influence family engagement and patient safety behaviors.\(^ \text{19} \) In this study, a recognized human factors and systems engineering approach was used to identify practical strategies across hospital work systems and processes that could be used to continue to facilitate FCR checklist use, e.g., having rounding schedules and available mobile computers on rounds. These strategies may be used to proactively target future checklist redesign, implementation, and dissemination efforts to support the care of hospitalized children.

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**DISCLOSURE**

The authors have no financial interest to declare in relation to the content of this article.

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