Chapter 19
The Effects of Structuring Clinical Rounds on Communication and Efficiency

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Introduction

Clinical rounds are a critical time for determining a patient's daily and long-term goals, for communicating these goals to a patients' healthcare team and to family, and for teaching medical students and other clinicians. However, these discussions are highly variable ranging from highly structured monologues at some sites to free form dialogues in other units [1–7]. Best practices and standards for round discussions are still emerging. As discussed in Lane et al.'s [8] review of the literature, known barriers to round quality include interruptions, long rounding times, and poor information retrieval. Given rounds' importance for team communication [9–11] and patient care, significant effort is being put forth to improve round quality. For example, tools such as scripts and checklists are proven to hasten the rounds process and increase the rounding teams' satisfaction [1, 3, 5, 7, 12–14].

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Our team studied a much larger tool for improving round quality—the use of a team theater. This theater is a room that sequesters the rounding team from the rest of the unit. Many hospital sites have implemented conference rooms [15–17] for rounding purposes, however, these rooms are often separate from the patients and the hospital unit itself. Our team theater, on the other hand, is situated within the unit and allows line of sight to patients and staff through its glass walls. It is intended to mitigate interruptions from passersby and reduce fatigue, as the rounding team sits instead of stands. Based on studies from the field of aviation, where decisions are made from sterile cockpits [18, 19], we investigated if the rounding in the team theater would be effective in helping to reduce barriers to round quality introduced by the clinical environment [20, 21]. We hypothesize that sequestering the rounding team could be the key to establishing and maintaining structure during rounds by reducing the variation in length of discussion and content.

Method

Setting

Our study was conducted in a cardiothoracic intensive care unit (CT-ICU) in a large, urban, academic hospital. During the course of observation, a new CT-ICU was built and staffed by our clinical team. In this natural experiment, we were able to capture rounds of the same CT-ICU team in two configurations, one with, and one without a team theater. For ease of discussion, we will refer to the initial configuration, of the unit as Unit A and the new configuration will be referred to as Unit B (team theater). Following the same participants through a physical change of space, we observe the impact of sequestering a team during round discussions.

The team theater (depicted below in Fig. 19.1) is centrally located in Unit B. Its glass walls allow occupants to remain aware of hallway activity while blocking minor interruptions. The rounding team is able to sit for the duration of rounds at desks that can be arranged into a circular formation.

Rounding Procedure

For both units, rounds would commence when the intensivist arrived and the affiliate providers (i.e., nurse practitioners and/or physician assistants), and/or residents concurred that they were ready to begin. Prior to the move to the team theater, rounds in Unit A occurred in the hallway outside of the patients' rooms and peripheral to the large, centralized nursing station. Rounds in Unit B utilized the theater space.

Following a semi-structured format, the teams would gather and one affiliate would commandeer a computer, load the patients' medical record and deliver their

Fig. 19.1 The team theater, depicted above, has changed rounding behaviors

updates on each patient. Periodically, the patient's nurse would interject to add additional information on the patient. The composition of the team during discussion varied, ranging from 2 to 6 participants. The intensivist and affiliates were sometimes joined by the patient's nurse, a pharmacist, respiratory therapist, fellow or medical student and the occasional dietician. Family members were also were included in Unit A discussions. After reviewing each patient's current status, the affiliate would state his or her daily and long-term plans. Finally, the intensivist would share his/her thoughts and then open the case for discussion with the rest of the team.

Participants

Five affiliate providers and 5 intensivists form the core of the rounding team. Additional clinical team members such as pharmacists, nurses and therapists were included when present. Families and alert patients were taken aside to make sure they understood the purpose of the research and its risks.[1] Verbal consent was obtained from all participants in this institutional review board approved study.

[1] All participants were made aware that they could withdraw their participation at any time. No participants chose to withdraw, and the little concern from potential participants (save the ten intensivists) that did arise about the research was allayed.

Data Collection

Data was collected during 10 days of rounds in each unit (n = 5 Unit A, n = 5 Unit B) during the spring of 2012. An anthropologist with a PhD, who did not speak or engage with the participants during rounds, observed and recorded activities during typical rounding procedures. The clinical team was observed throughout round discussions and multiple forms of data recording were used. An iPad based tool called UObserve [22] was used to record the duration of activities, handwritten notes captured group composition, and selected audio recordings were used to gather the content of rounding conversation.

Following an initial period of observation, a list of canonical activities for the clinical team was developed. Hundreds of activities including "looking at x-rays" to "socializing" were compiled and used to develop the UObserve tool for observation. During rounds, participants' activities were recorded for the duration of each task. Codes were tapped to start/stop timing and this created a representation of time utilization by task during rounds. In addition to the data recorded electronically, a handwritten record of which rounding participants were present, not including family and patient, was created for each patient with attention being given to full or part-time participation in the discussion. Group composition and contributions were pulled from this data.

In addition to the observations made by the researcher, audio recordings were captured for the group by placing microphones on the intensivist and as well as the other clinical team members presenting patients (i.e. affiliates, medical students). As the data collection agreement only allowed for encrypted recordings that were destroyed after 24 h, data transcription was limited to the longest and the shortest patient presentations. The names of people and pharmaceuticals were anonymized in the transcriptions.

Data were analyzed considering the unit in which the discussion occurred, the composition of the group at the time, and the proportion of time spent during the rounds on each patient. Additionally, we considered the nature of communication during each discussion.

Time Spent During Rounds

While rounds accomplish many goals from coordinating patient care, providing opportunities for interaction between clinical team members, and educating trainees, rounds consume a significant amount of clinical time (on average 105 min) [23]. Concerns for the maintenance of attention and consistency across patients have given rise to studies exploring the amount of time spent during high and low patient loads [24] as well as the amount of time attributed to each patient [25–27]. Here we consider the amount of time spent discussing each patient, including their position in that discussion in both units observed.

The time spent on each patient was organized according to the order in which the patients were discussed. The patients were sequentially ordered and the total time

spent per patient was computed for both ICU configurations. Next, for each session, the time spent per patient was normalized as a proportion of the total time spent during that session. For example, if the total time for a session was 2,400 s (i.e., 40 min), and the time spent for the first patient was 600 s, then the proportion of time spent for the first patient was 600/2,400 = 0.25. Similarly, the order of patients was also normalized as a proportion of the total number of patients seen during that session. Kendall's τ correlations were calculated for each session to evaluate whether there was a significant negative correlation between the order of patients seen and the proportion of time spent on each patient.

In addition to this, we also identified the number of clinical staff that was present during the rounds. Full-time members of the rounding team generally included the attending physician and the affiliate who presented the case under discussion. Part-time members of the rounding team generally included a second affiliate and a pharmacist. If they were present, fellows, medical students, other affiliates, nurses, consults, and others were generally present part-time. Changes in the composition of the group could potentially alter the length of rounds.

Content of Rounds: Qualitative Analysis

Changes to the content of rounds often include the use of tools such as checklists or standardized content [1, 7, 12–14]. The aim of these processes is to eliminate information loss and communication gaps by ensuring discussion of all relevant details. These lists often cover information at the level of capturing each body system or process (e.g. discussion of current breathing function and input/outputs overnight.) Other rich descriptions of ICU effort or round discussions such as Sung et al.'s [27] compare times spent discussing new patients, established patients, data review and staff communication. Here, we add an additional layer of description. Given our two settings of sequestered and open rounds along with the two sets of shortest and longest patient discussions, we explore what distinguishes these conversations. That is, what beyond duration changes?

We focus at the pragmatic level to consider what is the intent of each utterance is and how many of such turns are used to organize the discussion in addition to sharing patient data.

The longest and shortest patient discussion for each observed round was transcribed within 24 h of collection. Identifying information such as patient name was not included in the transcript. The written transcription of the discussion was separated into turns by speaker and further broken down by utterance. Each utterance roughly captures a thought, and multiple utterances may be contained in a single turn of conversation. 5,431 utterances were transcribed (average 400 utterances in long discussion and 143 utterances on average in short patient discussions).

Twenty patient cases are presented and each case represents a different individual with unique history and needs. While we did confirm that each patient's discussion includes some mention of all major body systems (e.g. discussion of cardiac function, state of extremities, labs, medications, renal function etc.), it is beyond the

Table 19.1 Categories of utterances spoken during rounds

Category	Description	Example
Describing	Follows the designated format and describes the patient's case	Mr. X is a 62 year-old patient
Seeking	Requests information	What is his white count?
Coordinating	Aligns members of the rounding team	We will diurese her tomorrow
Clarifying	Clears ambiguity	You said we were getting another x-ray?
Other	Covers all other communicative acts include rhetoric and social communication	Thank you; continue

scope of the current paper to determine if the length and coverage of each discussion is appropriately thorough. Here, we are not exploring if duration of conversation is influenced by the complexity, relevance of information given, or amount of training provided by case. Instead, we explore whether or not different communicative processes such as information seeking and coordinating across the group differ based on environment of conversation and length of discussion.

We used grounded theory to discover the communication themes occurring during rounds. Our dataset was coded by the lead investigator into 1 of 5 categories of speech acts. These categories include describing, seeking, coordinating, clarifying and other forms communicative practices (see Table 19.1 below). As we are focused entirely on rounds, describing as a category encompasses all forms of reporting or summarization of patient state, history or other declarative knowledge of the patient. This description is provided in a semi-structured format (e.g. regular structure and order to the presentation such as giving name, gender, patient age, recent procedures, and other details in order). Utterances were coded as information seeking if there was an explicit request for information and typically given as a question. Similarly, clarifying questions requested confirmation, clarification, or other negotiation. Coordinating statements included utterances that establish roles, plans and agreement regarding the alignment of shared activities and goals. Finally, a remaining category of other was used to capture social communication, rhetoric and non-patient related content.

Results

Time Spent on Rounds

In the team theater, i.e. ICU Unit B, there was no effect on the time spent per patient based on the order of patients seen or the number of full-time staff that were present during the rounds. But, there was significant effect on the presence of part-time staff members, with the proportion of time spent per patient increasing at a rate of 0.019

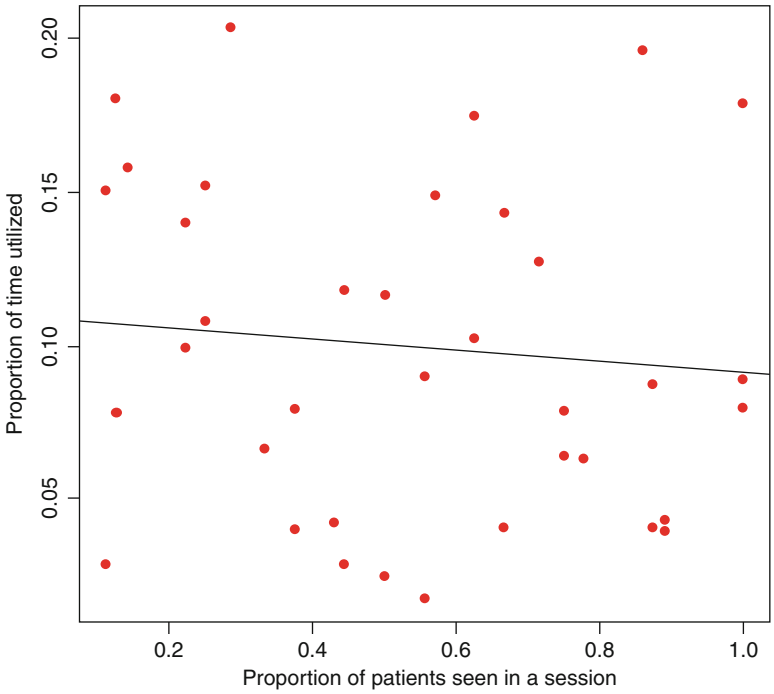

Fig. 19.2 Proportion of patient seen as a function of the proportion of time spent per patient in the team theater (Unit B). There was no significant decrease in the time spent on each additional patient

(p <0.001) with each additional patient that was discussed during the rounds. It seems that in a controlled environment, the part-time presence of staff increases the discussion time, potentially giving the patients they see a greater allotment of time. While sequestering the rounding team may reduce the effect of interruptions and other events that might lead to spending a disproportionate amount of time with each patient, the introduction of new variables, such as more staff members, may increase discrepancies.

In contrast, in Unit A, there was a marginal effect of the order of the patients seen on the proportion of time spent per patient. In other words, the proportion of time spent per patient increased at a rate of 0.04 (p=0.072) with each new patient that was discussed during the rounds. The number of full-time or part-time staff that was present did not affect this increase the per-patient rounding time. Figures 19.2 and 19.3 shows the relation between the proportion of time spent and patients seen across all sessions for the team theater and traditional rounding sessions. Additionally, the Kendall's τ correlations were not significant for any of the sessions in either unit (sequestered or not), providing further overall evidence of no significant negative correlations between the order of patients seen and the time spent for discussing each patient.

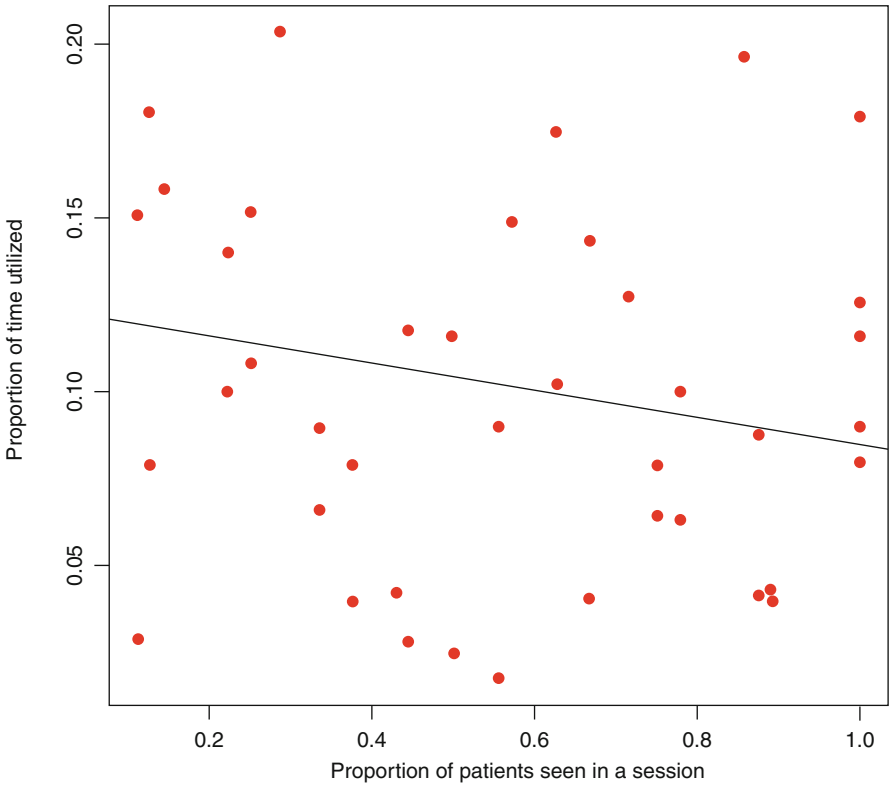

Fig. 19.3 Proportion of patients seen as a function of the proportion of time spent per patient in Unit A. There was a slight increase ($p < 0.1$) in the time spent on each additional patient

Our results are in contrast to previous findings that suggested a decrement in time spent per patient based on position in rounding discussion. We found an increase in time spent per patient in our traditional unit as well as an increase with group size in the sequestered unit. Differences in our findings and the previous may reflect variability created by contextual factors such as day of the week, acuity of patients, and group dynamics.

Comparing by Duration: Longest Versus Shortest Patient Discussions

While the above analyses considered the duration of all presentations, we continue our analysis by exploring differences between the longest and shortest discussions within a rounding session to determine if there are any meaningful differences.

One potential impact of interdisciplinary rounds may be simply more people equals more being said. Sequestering the teams is intended to prevent group attrition and limit interruptions. Our analysis indicates, however, when the longest

discussions were considered there were no differences between the two ICUs in terms of the number of utterances ($M_{21\text{-}ICU}=6.8$ ($S.D._{21\text{-}ICU}=1.09$), $M_{11\text{-}ICU}=6.0$ ($S.D._{11\text{-}ICU}=1.87$), $t(4)=0.827$, $p=0.45$), speakers ($M_{21\text{-}ICU}=443.0$ ($S.D._{21\text{-}ICU}=64.94$), $M_{11\text{-}ICU}=387$ ($S.D._{11\text{-}ICU}=113.09$), $t(4)=1.081$, $p=0.34$), or turns ($M_{21\text{-}ICU}=173.4$ ($S.D._{21\text{-}ICU}=48.74$), $M_{11\text{-}ICU}=154.6$ ($S.D._{11\text{-}ICU}=63.38$), $t(4)=0.496$, $p=0.64$). However, when we consider the shortest discussions for each session in both units, there was a significant difference in the number of utterances in the shorter sessions with the non-sequestered ICU having fewer utterances ($M_{21\text{-}ICU}=128.4$ ($S.D._{21\text{-}ICU}=33.34$), $M_{11\text{-}ICU}=169.2$ ($S.D._{11\text{-}ICU}=53.76$), $t(4)=-3.327$, $p<0.05$).

There were no differences in the number of speakers ($M_{21\text{-}ICU}=3.8$ ($S.D._{21\text{-}ICU}=1.92$), $M_{11\text{-}ICU}=4.6$ ($S.D._{11\text{-}ICU}=1.67$), $t(4)=-0.82$, $p=0.45$) or the number of turns ($M_{21\text{-}ICU}=43$ ($S.D._{21\text{-}ICU}=22.21$), $M_{11\text{-}ICU}=53.8$ ($S.D._{11\text{-}ICU}=24.12$), $t(4)=-1.92$, $p=0.12$). We then consider if the variation seen is duration only or in fact there are differences in the content of discussions.

Content of the Rounds

As you would expect given the updating and planning goal of rounds, 63.49 % of round discussions are spent in description. 4.7 % of utterances seek information while 4.4 % in general are used for clarification. A sizeable portion (21.36 %) is found to cover rhetorical statements, social conversation and other types of communication not directly functioning to support the patient case. In both configurations A and B, we observed interruptions from both outside and inside the group, relevant and irrelevant to the patient under discussion, that would often cause deviation from this semi-structured format.

With our goal of exploring length and location, we first compare the longest and shortest discussion within each unit to determine if the differences in duration are due to quantity of discussion or content conveyed. Only the coordinating category ($t(4)=2.95$, $p<0.05$) varied between the long and short rounds and only for the sequestered unit.

While the intent of sequestering to reduce interruptions and fatigue, there seems to be an impact on group attrition. The larger groups found in the sequestered units may require additional coordination which is seen in the above result as well as contributes to the lengthier duration of discussion. It is a limitation of our analysis that we did not consider the paralinguistic features of the utterances of coordination. It is ambiguous as to whether or not we have captured greater agreement in coordination (e.g. Yes, we will do X today) or request for coordination (e.g. We will do X, right?) as such differences may be conveyed only using tone of voice. Future work is needed to tease apart the kinds of coordination in different implementations.

When we consider other differences across units (looking again at location while comparing short to short and long to long), it is generally only in the shorter rounds[2] that differences are found across the configurations. Activities of describing

[2] Seeking($t(4)=4.18$, $p<0.05$) between units for long.

($t(4) = -6.92, p < 0.05$) coordinating ($t(4) = -1.21, p < 0.05$), and clarifying ($t(4) = 6.34, p < 0.05$) differed between the sequestered and non-sequestered units. This suggests that the shorter patient discussions in the non-sequestered units are both lesser in terms of time spent, content covered, and coordinating activities.

Conclusion

As efforts are made to improve the quality of rounds, it is important to consider the influence of the environment as well as the format of the round and the use of tools such as checklists. Our results suggest the potential for sequestering clinical teams in team theaters is one way of supporting round discussions. From interest in remote presence through robot-physicians on rounds to the use of team theaters, we must continue to expand the body of research investigating the impact of design (including artifacts and physical space) on performance. From rich descriptions such as Sung et al. to comparative studies of different configurations [28], future work is needed to better understand the sources of variability during rounds and their impact on patient outcomes.

Discussion Questions

(a) If the presence of more care team members increases variability in rounds, should the care team size be capped during rounds? What are the pros and cons of having more participants in interdisciplinary rounds? Is variability always a negative?
(b) Communication is complex and especially challenging to study. How did our mixed methods, both quantitative and qualitative, substantiate each other? What other methods could be used to study communication in healthcare?
(c) Bedside rounds are becoming less common and team theater-style configurations and telemedicine more common. Are we ready for rounds be conducted completely outside of the ICU? Why or why not?

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