

## Patient care

## Designing for multidisciplinary rounding practices in the critical care setting

Rounding is critical to developing integrated care plans, and there is a trend for moving daily rounds from the bedside to conference rooms. This study's aim was to document staff preferences for the location of rounding practices, and to determine the effect of available space on those preferences

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Medical rounds provide healthcare professionals with the opportunity to develop an integrated plan of care<sup>1</sup>. In this forum, the goals are to share information, address patient problems, plan and evaluate care, increase learning opportunities for team members, and ultimately enhance the quality of patient care<sup>2</sup>. It is often the only opportunity for the patient and their family members to be informed of various care issues and to have the opportunity to ask questions of their care team<sup>3</sup>. Therefore, medical rounds serve as the foundation for information exchange between parties invested in the patient, and thus effective collaboration during this process is critical to enhancing decision making and the quality of patient care<sup>4</sup>.

In the intensive care unit (ICU), rounds



Figure 1: Conference-room rounds



Figure 2: Bedside rounds

occur in various formats, including daily multi-disciplinary rounds<sup>5</sup>, where members of the disciplines represented include the attending physician, residents, medical students, nurse practitioners, bedside nurse, charge nurse, respiratory therapist, pharmacist and nutritionist. Services such as case management, social work, physical therapy, occupational therapy and the chaplaincy may also be represented<sup>6</sup>.

The demands on healthcare professionals to provide safe, effective, high-quality patient-centred care, in addition to maintaining a teaching culture and meeting the educational requirements of medical students and residents, are increasing. Given this increased emphasis on patient-centred care, it has been proposed that new models for hospital 'work rounds' need to be developed<sup>6</sup>. The rounding team must often contend with noise, repeated interruptions and, frequently, a corridor for a classroom<sup>7</sup>.

The primary aim of this study was to determine the preference of the Surgical ICU (SICU) multi-disciplinary team for either bedside or conference-room rounds. Conference-room rounds were defined as an initial exchange of patient data and education in a conference room with all members of the multi-disciplinary team being present, including the attending physician, residents, medical students, nurse practitioners, bedside nurse, charge nurse, respiratory therapist, pharmacist and nutritionist, followed by bedside rounds with the attending physician, residents, nurse practitioners, bedside nurse and the patient (with or without their family) being present (Figure 1). The conference room where rounds occurred was outside of the SICU. Bedside rounds were defined as the above occurring solely at the bedside and within the unit corridors between patient rooms (Figure 2). We hypothesised that

the team would prefer conference-room rounds. A secondary aim was to determine if physical space played a role in this preference for rounding communications. We hypothesised that physical space would play a role in this preference.

### Materials and methods

This was a prospective observational study designed to evaluate the multi-disciplinary rounding practices in the SICU at The Methodist Hospital, a tertiary care academic referral centre in Houston, Texas. The SICU is a 27-bed adult unit that serves a diverse group of patients including critically ill general, vascular, oncologic, transplant, thoracic, orthopaedic, plastic, urologic, and head and neck surgical patients.

A multi-method research design was used, including focus groups, an online survey and direct observations. Study participants included members of the SICU Team (attending physicians, a nurse practitioner, bedside nurses, charge nurses, respiratory therapists, a pharmacist, a nutritionist, a case manager, a social worker, a physical therapist and a chaplain).

Focus groups were conducted over two sessions (attending physicians were interviewed separately from the rest of the multidisciplinary team in order to limit potential bias due to any workplace hierarchy). The questions centred on the definition and process of rounds, the patient care model and the physical environment (Figure 3). The sessions were audio/video recorded for accuracy and transcribed verbatim for subsequent analysis which followed a seven-step method for the analysis of qualitative research based on phenomenological methodology<sup>8</sup>.

The survey was subsequently developed based on the focus group themes. Data surveyed included participant demographics,

a general characterisation of the SICU rounding practice, a comparison of bedside and conference room rounds and the identification of environmental factors that promote or inhibit the rounding process.

Rounding practice observations were used to confirm the aforementioned. Surgical ICU multi-disciplinary rounds were observed on two separate occasions. The observations were documented and recorded in the form of a journal. This process allowed for descriptions of experiences and events as they occurred, along with interpretations, enabling critical reflection of the rounding process within the unit's physical space. This multi-modal technique provided strength in the research design, enhancing its validity by compensating for any inadequacies of the individual methods or measures presented in the study.

Data were also collected on the SICU's architectural design, including computer-generated floor plans, which were used in a room-by-room area analysis to document the detailed functional programme with net square footage of each room and departmental gross square footage of the unit. Protocol for the area take-offs was based on the *Analysis of Departmental Area in Contemporary Hospitals: Calculation Methodologies & Design Factors in Major Patient Care Departments*<sup>9</sup>.

Descriptive statistics will be reported as mean ± standard deviation for normally distributed continuous data, medians with inter-quartile ranges for non-normally distributed continuous data, and percentages for categorical data. The study was approved by The Methodist Hospital Research Institute Institutional Review Board.

## Results

The focus groups were attended by all five attending physicians who practice in the SICU and, separately, 12 non-physician SICU multi-disciplinary team members with representation from nursing, respiratory therapy, nutrition, social work and chaplaincy. Analyses of the focus groups identified five themes (with sub-themes) for further survey. These included patient safety, communication, information technology, efficiency and inefficiency (Figure 4).

Fifty-four SICU multi-disciplinary team members completed the online survey, a 65% response rate. The mean age of

Focus Group Questions	
1)	Can you define the process of rounding from the viewpoint of your role in the ICU?
2)	How are daily rounds conducted in the surgical ICU?
	What time do they begin? How many times per day are rounds conducted? How long do they last? Who determines how rounds are conducted? How many people generally participate in this process?
3)	For those people who have been working in the surgical ICU for the past 8 years, how has the process of rounding changed over time?
4)	How is the multidisciplinary team accommodated during rounds?
5)	Is there family involvement in the rounding process?
	In what way is this an advantage? In what way is this a disadvantage?
6)	What are some factors that <i>inhibit</i> the rounding process in the physical environment?
7)	What are some factors that <i>promote</i> the rounding process in the physical environment?
8)	Do you think the existing unit allows all members to participate equally on rounds?
9)	How do you think the rounding process contributes to quality in patient care delivery?
10)	How do you think the rounding process promotes patient safety?
11)	For those people in the room who have worked in the field less than 5 years, what features of the rounding process contributes most significantly to the learning process?

Figure 3: Focus group questions

Focus Group Themes	
<b>Safety</b>	A condition that is safe from medication errors and misdiagnosis.
<b>Communication</b>	The transfer of information from one of the multidisciplinary team members to another regarding the status of a patient in relation to the formulation of a care plan.
<b>Information Technology</b>	Equipment used in the healthcare setting which electronically stores and communicates information regarding the patient's physiologic status.
<b>Efficiency</b>	The undertaking of a certain task or procedure that contributes to the timeliness in patient care delivery and a patient's transition of care.
<b>Inefficiency</b>	Any action or condition that impedes the timeliness of care or transfer of information from one multi-disciplinary team member to another regarding the patient status and care plan.

Figure 4: Focus group themes

respondents was 39.3±10.7 years and 83% were female. The majority of respondents were bedside nurses (46%) with 7.0±5.8 years of experience in the SICU. Figure 5 shows the participant breakdown by clinical speciality. In characterising the SICU rounding practices, participants indicated that 9.5±3.0 SICU multi-disciplinary team members attended daily rounds that lasted for 3.3±1.1 hours.

Fifty-seven percent (57%) of respondents felt that all SICU multi-disciplinary team members shared in the decision-making process during rounds, while 64% reported open communication during the process. Perceived barriers to effective communication included background noise

(92%), lack of physical space (90%) and the size of the SICU multidisciplinary team (95%). Twenty-eight percent of respondents indicated that upon the completion of rounds, they always understood what work needed to be accomplished to get the patient to the next level of care; similarly, 12% stated that they always had a clear understanding of the care plan/goals for each patient at the end of rounds. That being said, only 50% of SICU multidisciplinary team members were 'very satisfied' or 'satisfied' with the care-planning outcome of rounds the majority of the time, and 50% wished to change the SICU rounding process.

Regarding the physical environment of the SICU, the width of the hallway (75%),

size of patient room (48%), rooms with multiple patient beds (82%) and background noise (70%) were listed as major inhibitors to the bedside rounding process. Figure 6 outlines the architectural barriers/facilitators to bedside rounds identified by SICU multidisciplinary team members through the survey process.

Fourteen survey questions specifically compared bedside to conference room rounds. Overall, bedside rounds were preferred except in regards to providing adequate space for the entire SICU multi-disciplinary team during rounds and avoiding Health Insurance Portability and Accountability Act (HIPAA, 1996) violations where conference room rounds were preferred 88% and 77% of the time respectively (Figure 7).

## Discussion

Rounds provide healthcare professionals with an opportunity to develop an integrated plan of care and thus serve as the foundation for information exchange between parties invested in the patient, and thus effective collaboration during this process is critical to enhancing decision-making and the quality of patient care<sup>4</sup>.

In the ICU, rounds occur in various formats, including daily multi-disciplinary rounds<sup>5</sup>. The cornerstone of multi-disciplinary rounds is communication. Communication is critical to patient safety. In an analysis of 646 ICU safety incidents involving adult medical patients and 707 incidents involving adult surgical patients, problems related to communication, clinical management, and ICU management were a factor greater than 50% of the time<sup>10</sup>.

In the study, the majority of survey respondents felt that bedside rounds were

preferred over conference-room rounds with respect to encouraging communication with other physician consultants (72%), facilitating patient transfers (41%), facilitating the formulation of a diagnosis (44%), providing the most efficient patient care (49%), promoting communication with family members (82%) and improving overall patient safety (38%). Focus group comments reinforced these aspects.

Numerous studies have documented the benefits of multidisciplinary rounds. Sisterhen et al. demonstrated reductions in cost and length of hospital stay and improved provider satisfaction with communication when comparing bedside interdisciplinary rounds to physician-only rounds on general medicine units<sup>6</sup>. An increased frequency of multi-disciplinary rounds has similarly shown reduced mortality rates<sup>5</sup>. The benefits of having a pharmacist on rounds have also been documented on both general medicine units and ICUs<sup>11-14</sup>. Not surprisingly, in 2005 Vazirani et al. demonstrated that multi-disciplinary rounds in an acute care setting improved ones' satisfaction with the care delivered for physicians, nurses and patients<sup>15</sup>.

A study of critical care nurse-physician interactions demonstrated that each communicated in different spatial locations within the unit<sup>4</sup>. The effect of both space and mobility on the rounding process was noted in this analysis: nurses tended to conduct their work at the bedside, where their communication was interspersed with constant interruptions, whereas physicians carried out patient care decisions in private spaces, free from such interruptions.

Our study results are concordant with this finding. It also most probably explains the repudiation of our primary hypothesis

that SICU multi-disciplinary team members would prefer conference room rounds. In the study, the conference room where rounds were conducted sits one floor below the unit, making it near-impossible for the nursing staff to attend the conference room rounds. Furthermore, many of the bedside nurses did not feel comfortable leaving their patients' bedside. With 46% of our respondents being bedside nurses, this swayed our results.

This also explains our results surrounding the ability to hear what is being said during both rounding instances, as shown in Figure 7. We presumed that noise would be a negative factor during bedside rounds, thus leading the SICU multi-disciplinary team to prefer conference-room rounds in this instance. Interestingly, 63% of respondents felt that bedside rounds allows one to hear all that is being said during rounds, versus only 22% for conference-room rounds.

With this knowledge, it is understandable why bedside rounds have created conflicts in regard to these dynamics, as interruptions to patient-care activities affect the extent to which bedside nurses can participate in the ongoing patient care dialogue. As such, observational studies have documented a decline in bedside rounds beginning in the 1960s<sup>16,17</sup>. By the 1980s, a trend had begun to move clinical teaching away from the bedside and into the conference room.

## Design considerations

While the impact of the physical environment on teamwork among caregivers is emerging, earlier studies on the physical space in corporate offices and research laboratories have documented an association between physical design, communication and teamwork<sup>18-20</sup>. According to Rashid (2006), the layout of an ICU is arguably the most important design feature affecting all aspects of intensive care services, including staff working conditions. Layout determines the location and configuration of different spaces and/or functions within a unit, impacting how a function is performed and how internal and external functions relate<sup>21</sup>.

The current study was conducted in an ICU built in 1982, which is 'racetrack' or 'double-corridor' in design typology, implying service areas in the centre and patient beds on the perimeter with a loop corridor space in between (Figure 8). Patient rooms are single occupancy, with two open wards

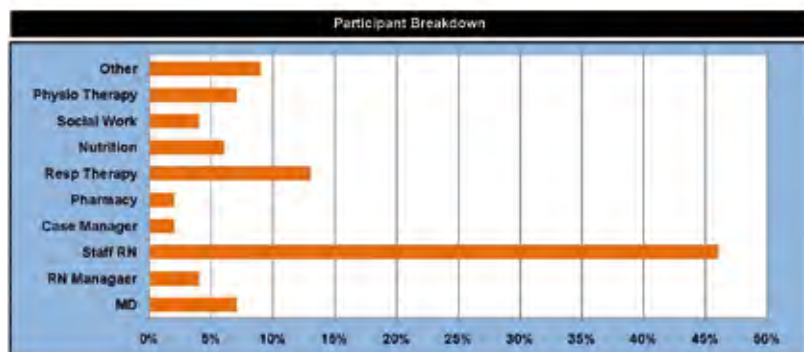


Figure 5: Participant breakdown

containing five and six beds respectively. This design results in missed opportunities for the attending physicians to interact with primary physicians and consulting physicians. This issue was expressed in both of the focus groups and the survey results.

Many newer ICUs have been designed to incorporate conference rooms within the unit itself. Examples include two recently renovated ICU projects in the US, Emory University Hospital Neurosciences ICU in Atlanta, Georgia, and Memorial Sloan-Kettering Cancer Center's ICU in New York, New York. Both units were acknowledged to be best-practice examples of critical care unit design as winners of an annual ICU design competition<sup>22</sup>.

A recent analysis of the ICU design competition winners included 12 adult ICUs built between 1990 and 2007. The study identifies trends in critical care design, one of which includes the incorporation of more administrative and meeting spaces directly within units in order to limit staff travel distance when meeting to discuss patient care<sup>23</sup>. The study notes that space allocation for administrative and educational areas within units appears to be on the rise, most notably in academic medical centres where teaching is an integral part of daily ICU activities. Conference and rounding rooms incorporating advanced technology to allow for remote patient care planning is likewise being seen more frequently<sup>23</sup>.

Staff work areas are a fundamental part of ICU design, and although the culture of ICUs has always encouraged improvements for patient care, it has not always attended to staff working conditions<sup>21</sup>. The role of user group sessions in order to identify rounding practices and preferences can be important within this complicated design context. At Emory University Hospital Neurosciences ICU, one of the attending physicians prefers a mobile rounding method featuring wireless computers on wheels (COWs), in addition to rolling stools and writing surfaces, while another uses the decentralised positions outside pairs of patient rooms, and then takes the entire multi-disciplinary team into a conference room for a thorough discussion of cases. The design of this award-winning unit allowed for spaces to accommodate both rounding styles<sup>24</sup>. The location of staff work areas in relation to patient care areas does not appear to be fully resolved in an analysis of

best-practice example ICUs<sup>21</sup>. It is perhaps not yet known which unit configurations most effectively balance patient care with staff needs, especially with the changing nature of rounding to include technology and large multi-disciplinary teams.

Although previously published ICU design guidelines<sup>25</sup> do not emphasise the practice of rounding, recent revisions (currently under peer review) call attention to work areas that accommodate multi-disciplinary staff, recognising the benefits to quality of care, in addition to a subsection describing "documentation and review", where the process of rounding as an integral activity to the daily functioning of a unit is discussed<sup>26</sup>.

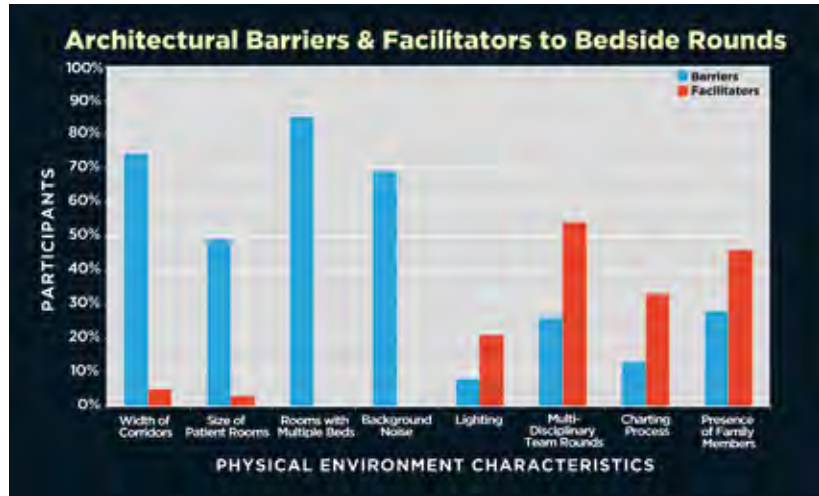


Figure 6: Architectural barriers and facilitators to bedside rounds

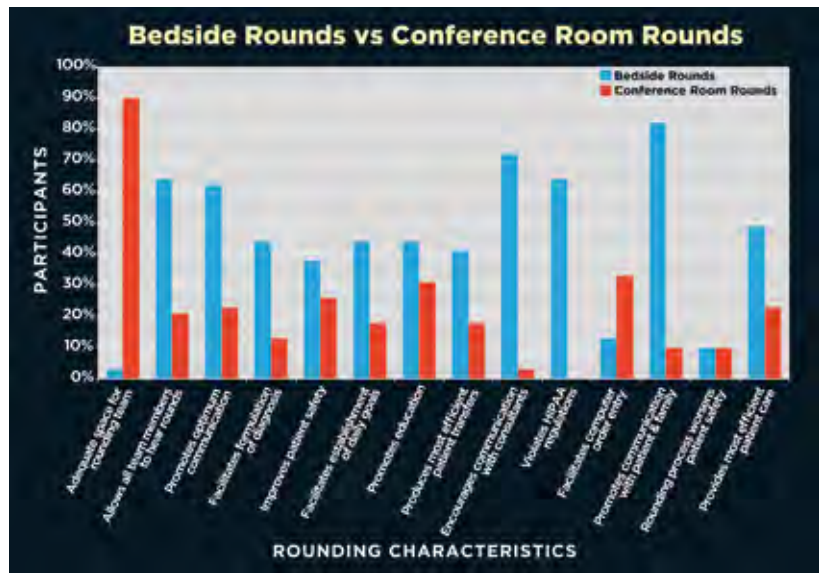


Figure 7: Bedside rounds versus conference-room rounds

### Study limitations

There were several limitations to this study. First, the SICU where the study occurred is an outdated unit in terms of its overall design and space allocation per patient. The unit does not meet current hospital design standards with respect to patient room size, according to the 2010 Facility Guidelines Institute (FGI) *Guidelines for Design and Construction of Health Care Facilities*, used by the majority of architects and planners in the US and Canada. The guidelines stipulate that each critical care patient space (whether separate rooms, cubicles, or multiple-bed space) shall have a minimum clear floor area of 200 square



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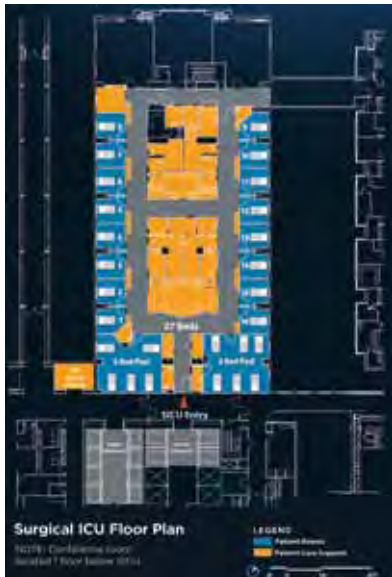


Figure 8: The floor plan for the ICU in the study

feet for all new construction, with every effort to meet these minimum standards for renovation projects<sup>27</sup>. The SICU in this study had an average single patient room size of 170 net square feet, defined as the clear, usable floor area, measured as the space within the walls of a room<sup>9</sup>. The area for beds within the two-ward rooms on the

unit averaged 150 square feet per bed, also below current standards. Corridor widths in the SICU are 8'-0" clear, which comply with the International Building Code (IBC) minimum means of egress requirements for patients in a healthcare occupancy<sup>28</sup>, but were felt by staff to be inadequate for bedside rounding practices.

Given the smaller spaces and the large size of the SICU team, rounding in open wards or within the corridor becomes a challenging exercise, which may have influenced results. An additional limitation may be the fact that nursing staff, who are unable to easily leave the bedside to attend rounds in the downstairs conference room, comprised the majority of the survey respondents: this may be one of the reasons for the unexpected results obtained for the bedside rounding preference.

## Conclusions

Multidisciplinary rounds are a patient-centred model of care, emphasising safety and efficiency, which enable all members of the team caring for patients to offer individual expertise and contribute to patient care in a combined fashion.

Flexibility in the design of the critical care unit is necessary to promote teamwork

during rounds and adaptability. The relevance of this study approach provides a greater understanding of spatial requirements in order to allow for and accommodate these flexible spaces. Given that variation in the practices of unit round delivery was found within the same unit, the notion of requiring flexibility in designed spaces is supported.

The current study demonstrates multidisciplinary staff preferences for rounding to occur at the bedside, in close proximity to the patient. Further study is needed to determine if bedside rounds may still be preferred when a conference room is located within the ICU. Further investigation specifically exploring the reasons staff did not feel satisfied with their understanding of care planning at the completion of rounds is needed. Larger samples in a number of different ICU settings may yield more information on rounding preferences.

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