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Turning Over Patient Turnover: An Ethnographic Study of Admissions, Discharges, and Transfers

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Abstract

The impact on nursing work of patient turnover (admissions, discharges, and transfers) became evident in an ethnographic study of turbulence. The patient turnover data were generated from extensive observations, 21 formal interviews, and a year of admission and discharge records on one medical and one surgical unit. Timing of turnover events on the two units differed, but on both units admissions typically interrupted workflow more than did discharges, clustered admissions were more disruptive than staggered admissions, and patient turnover during change of shift was more disruptive than during medication administration. Understanding the complexity of patient turnover will elucidate the work involved and improve the evidence base for nurse staffing, a key determinant of quality and safety of care.

Keywords

Patient turnover; interruptions; nursing workload; health care quality; quality; patient safety; ethnography

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The 1996 Institute of Medicine report on health care quality (IOM; Wunderlich, Sloan, & Davis, 1996) has sparked almost two decades of research to establish the nurse staffing level adequate to insure the delivery of quality care. Patient turnover—composed of admissions, discharges, and transfers—is not well accounted for in studies of nursing work, however. For instance, counting hours per patient day does not reflect the work associated with these patient turnover events (Spetz, Donaldson, Aydin, & Brown, 2008). Similarly, midnight census does not account for the arrivals or departures of patients over a 24-hour day and thereby underestimates nursing workload (Baernholdt, Cox, & Scully, 2010; Duffield, Diers, Aisbett, & Roche, 2009; Jacobson, Seltzer, & Dam, 1999; Norrish & Rundall, 2001; Park, Blegen, Spetz, Chapman, & DeGroot, 2012; Unruh & Fottler, 2006; Wagner, Budreau, & Everett, 2005).

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Unruh and Fottler (2006) demonstrated that patient turnover was increasing, and increased turnover increased "nursing care intensity" (p. 600), with intensity defined as the physical or mental effort related to tasks performed during the work day. Increased patient turnover also creates an increased demand for care (Norrish & Rundall, 2001; Page, 2004; Park et al., 2012), with demand reflecting patient throughput (or census variability). Unlike common measures of nurses' work that reflect volume, intensity and demand reflect the complexity of care. Greater intensity and demand contribute to greater workload, thus indicating the need for increased nurse staffing to optimize quality of care and patient safety. Among 27 factors that increased nurses' workload (beyond patient acuity), interruptions ranked first, and patient turnover ranked second (Myny et al., 2012).

Only two research reports were found in which the effect of turnover on staff and patient outcomes was examined. Using turnover as one indicator of environmental turbulence, Salyer (1995) found that nurses on units with more rapid turnover perceived a decline in communication and interpersonal relations with one another as well as patients and families. Park and colleagues (2012) found that patient turnover demands were higher on non-ICU units, and failure to rescue (FTR; e.g., a measure of preventable adverse events) was affected by the interaction of patient turnover and RN staffing. Higher patient turnover required more RN hours per patient day to decrease FTR. Park et al. concluded that care demands associated with patient turnover exceeded that shown by patient counts.

Simple counts of admissions, discharges, and transfers reflect the frequency of turnover events but tap neither their demands nor intensity nor the differences between and among admissions, discharges, and transfers. Clarke (2007) challenged researchers to explore "the essence of what nurses do for their patients" to avoid "findings generated with data stripped of their practice context" (Clarke, 2006, p. 162). Thus, our purpose in the analysis reported here was to "uncover the textured lessons that lie beneath" (Berwick, 2007, p. 1124) patient turnover as a source of workload. To offset the under-estimation of nursing work due to the lack of attention to the demands and intensity of turnover events, we turned over anew patient turnover by detailing the types, nature, and patterns of occurrence of admissions, discharges, and transfers in an acute care setting.

Methods

The analysis of patient turnover featured here was part of an ethnographic study of turbulence, defined as "nontrivial, rapid, and discontinuous" change in an organization (Cameron, Kim, & Whetten, 1987, p. 225). Among the many interactions, activities, and events deemed likely to contribute to turbulence were handoffs; medication administration; and admissions, discharges, and transfers. In the process of conducting a preliminary analysis, we began to question prevailing conceptualizations of these activities and the ways they were being studied. In a previous paper, we focused on medication administration to reveal the misconceptions about this process and the implications of these misconceptions for studying and optimizing patient safety (Jennings, Sandelowski, & Mark, 2011). In this paper, we focus on patient turnover to challenge misconceptions about the work they entail. These misconceptions are that: (a) patient turnover is similar on medical and surgical units, (b) frequency counts of turnover are sufficient to reflect the intensity and demand of the work associated with turnover, (c) admissions and discharges are equivalent events, and (d) all admissions and all discharges, respectively, are alike and can therefore be conceived also as equivalent.

The study was conducted from November 2008 to July 2009 and involved almost daily fieldwork, with additional follow-up data generated through May 2011. The hallmarks of classical ethnography are fieldwork in natural settings and acquiring local and emic

understandings of the target events under study that surface the complexities of these events (Spradley, 1979, 1980). The first author (principal investigator) spent 267 hours divided between two study units (medical and surgical), during all hours of the day, on all days of the week, including holidays. Data were generated in three ways common to classical ethnography: participant observations (recorded in field notes), formal interviews, and documents review.

Setting

The study was conducted on a 40-bed medical unit and a 36-bed surgical unit in a 581-bed community hospital in the southeastern United States. The patients on the medical unit were admitted with pulmonary or renal problems. The average age of the medical patients, 59% of whom were females, was 63.95 years (*SD* = 17.36; range 18-102 years). The patients on the surgical unit were admitted to undergo orthopedic, neurosurgical, or urologic procedures. The average age of the surgical patients, 57% of whom were females, was 62.64 years (*SD* = 16.30; range 15-100 years). The most common schedule for nurses on both units involved 12-hour shifts—7 AM to 7 PM (days) and 7 PM to 7 AM (nights). Flat-screen electronic monitors were in standard locations on both units; the monitors displayed icons that allowed all staff access to patient information according to room assignment. Pending admissions or discharges were identified using this visual alert, although the times of arrival and departure were not listed.

Sample

Although many personnel (e.g., unit clerks, patient care assistants, patient transporters, case managers, social workers, ambulance service personnel) were involved in patient turnover events, the analysis reported here focused on the licensed nurses because the work associated with patient turnover was largely their work. We drew from both interview and observation data generated from 58 licensed nurses: 51 registered nurses (RNs) and 7 licensed practical nurses (LPNs).

Most of these nurses were permanently assigned to the two units (19 from the medical unit; 15 from the surgical unit); 3 licensed nurses participated from the hospital float pool. Because admissions and discharges necessarily involved handoffs between hospital units or facilities, the licensed nurses included also 9 RNs from the post anesthesia care unit (PACU), 3 RNs from the emergency department (ED), 2 direct admissions RNs, and 7 RNs from units transferring patients to the study units. Four (7%) of these licensed nurses were men. We acquired age data for 28 of the licensed nurses (21 of whom were interviewed and 7 shadowed during the focused observations); their ages ranged from 23 to 60 years old (*Mdn* = 46; *mode* = 54). Data reflecting experience were available for 40 of the licensed nurses; their years of experience ranged from less than 1 year to 40 years (*Mdn* = 7.5 years). The experience distribution was bimodal (*mode* = <1 year and 1.5 years).

Data Generation

Protection of human subjects—Approval to conduct the study was obtained from both hospital and university institutional review boards (IRBs). Two weeks prior to the start of the study, the first author provided information sheets to health care personnel who might frequent the study units, as well as those staff assigned to the units, and posted signs at all entrances to the units to inform families, visitors, staff, and patients about the study. The IRBs waived the requirement for written consent for general observations of unit activities and focused observations of key events. For observations in which the investigator entered a patient's room, the patient was asked to provide verbal consent. Written, informed consent preceded shadowing nurses or conducting formal interviews. Questions for the formal interviews were developed after spending 6 months in the field at which time they were

approved by the IRBs. The use of existing documents was also approved. Documents containing information about patient turnover were requested after the observation and interview data suggested their importance in understanding timing and pattern.

Participant observations—Following Spradley (1980), data generation began with broad observations that allowed the first author to become familiar with the unit layouts, staff, care processes, and temporal patterns. Subsequent observations were focused on activities and events where turbulence was expected to be most prominent.

Forty-eight patient turnover events were observed from start to finish. All observations included informal interviews with the nurses about the observed events and interactions in which they took part. In addition, 13 licensed nurses were shadowed individually on 2 consecutive days, first at the beginning and then at the end of their shifts, periods the nurses had identified as times when turbulence was most likely to occur. Seven of these 13 nurses were observed doing patient turnover work. Of these seven nurses, six worked the day shift and one worked the night shift. Because the first author was present on the study units over an extended period of time, the staff became used to her as an observer; indeed, the nurses spontaneously commented that they were accustomed to her presence and that they were working in their usual ways.

Formal interviews—After 6 months in the field, the first author began conducting formal interviews, each lasting approximately 1 hour. Of the 58 nurses featured in this analysis, 21 were involved in formal interviews (18 RNs, 3 LPNs). Each nurse received a copy of the questions in advance to enhance the discussion during the interview. These questions were derived from the observations, including queries such as: “What creates the most turbulence for you during the shift? Which create more havoc—admissions or discharges—and why?” Nurses had previously explained that admissions and discharges encompassed transfers-in and transfers-out, respectively. For nurses from the ED and PACU, the questions included: “What factors contribute to moving patients around the time of shift change?” Written summaries of ideas from our observations were shared as well to elicit further discussion.

Document reviews—De-identified records from 2009 reflecting patient turnover for each unit were reviewed. Admission data were available for January through December; discharge data were available for February through December.

Data Analysis

Interview and observation data—The interviews were audiorecorded and then professionally transcribed into double-spaced documents with one-inch margins, yielding 762 pages of data. The first author transcribed the hand-written field notes within 24 hours of leaving the field, also using double-spacing and one-inch margins, resulting in 1,963 pages of notes. Because the nurses distinguished between and among admissions and discharges, and regarded transfers as either a type of admission (transfers-in) or a type of discharge (transfers-out), our analyses of the interviews and observations were structured around these two major groupings. Tabular displays (Miles & Huberman, 1994) were created to compare admissions and discharges by units, times of day, and individual nurses. Verbatim language from the nurses was preserved in quotations in the results. To optimize the validity (Maxwell, 2012) of our findings, the first two authors worked together to ensure consistency, completeness, and accuracy in coding all relevant data. In addition, 13 of the licensed nurses reviewed and commented on a synopsis of findings; their comments were then incorporated into the findings.

Admission and discharge records—Within the admission and discharge dataset for 2009, there were 3550 unique records with complete admission dates and times (1893 surgical, 1657 medical) and 3853 records with complete discharge dates and times (1948 surgical, 1905 medical). These data were examined by unit, month of the year, day of the week, and time of day.

To better understand the patterns of occurrence of patient turnover events in relation to other key events in the nurses' workday, we examined three time periods for each shift: (a) shift change (5:30 AM/PM to 9 AM/PM); (b) main medication rounds (10 AM and 10 PM with an hour on each side creating a window of 9 AM/PM to 11 AM/PM); and (c) mid-shift (11 AM/PM to 5:30 PM/AM). Shift changes—times of high turbulence—were composed of three segments: when the departing shift was getting ready to leave (e.g., final patient rounds, documentation, giving early morning medications), the handoff (e.g., shift report), and when the arriving shift was getting their work started (e.g., initial patient rounds, checking orders, retrieving medications). Main medication rounds were the times when most medications were scheduled to be given (Jennings et al., 2011). In mid-shift, work continued nonstop, yet without the level of turbulence associated with shift beginnings and endings.

In addition, we calculated the average length of stay (LOS; days/patient) and the mean turnover rate (patients/day) for each unit. This latter parameter was derived using the metric of 1/LOS as Unruh and Fottler (2006) suggested; they noted an increase in nursing care intensity with shorter lengths of stay. The closer the turnover rate is to a value of 1 or higher, the more frequent the turnover.

Results

The average LOS on the surgical unit was 2.7 days. The average LOS on the medical unit was 4.6 days (see Table 1). The turnover rate on the surgical unit was 1.6 times that on the medical unit, reflecting large differences in rates of turnover.

The Nonequivalence of Turnover Events

The admissions and discharges constituting patient turnover varied according to (a) type; (b) whether they could be anticipated (i.e., when the patient arrived at or departed from the unit); and (c) the intensity of the work they required and demand they created. All of these factors contributed to varying interruption potential. In general, discharges were viewed as more predictable, quicker (even though work associated with discharges might extend over days), and less intrusive than admissions.

Types of admissions and discharges—Nurses identified four types of admissions according to patients' point of entry to the nursing units: direct (patients admitted following an appointment with their physicians or from another hospital), emergency department (ED), post anesthesia care unit (PACU), and transfer-in admissions. The number of each type of admissions to each unit is shown in Table 2, illustrating dissimilarities between units (e.g., more than twice as many ED admissions to the medical unit than to the surgical unit).

Nurses classified discharges according to two dimensions—time involved to discharge the patient (short to long), and difficulty (simple to complex). Deaths were coded by the hospital as a type of discharge. Whether the death was anticipated or a sudden event, the most extreme and complex discharges were those when patients left in a "body bag" because of the post-mortem care given to the body and the care given to the family.

Nurses viewed transfers as variants of admissions (transfers-in) and discharges (transfers-out). A lateral transfer was one in which a patient transferred in or out, from or to, a unit at a

similar level of acuity; lateral transfers were low intensity. A vertical transfer was one in which a patient transferred in or out, from or to a unit with a higher level of acuity (e.g., a critical care unit); vertical transfers were high intensity. With vertical transfers-out, urgency surrounded the move because of a serious decline in the patient's condition. As noted by several nurses and confirmed in observations, with vertical transfers-in, patients made more requests because they were accustomed to units with fewer patients per nurse and thus more attention.

Anticipating admissions and discharges—Nurses knew that admissions would occur, but they could not anticipate when they would happen. Because admissions were so "predictably unpredictable," admissions were a stimulus to which nurses reacted, unlike discharges, for which they could plan proactively. As a result, admissions constituted a greater interruption to nurses' workflow than discharges. A combination of communication mechanisms alerted nurses that patients were arriving and leaving. For example, the unit clerks passed information to the nurses via their portable work phones, icons appeared on the electronic monitors, and handoffs took place.

Admissions: In the case of direct admissions, nurses began to anticipate a patient's arrival soon after being notified of the impending admission. In the specific case of direct admissions from the ED, hospital policy specified that patients be moved to their inpatient rooms within 30 minutes of assigning the room, but this goal was rarely achieved, leaving nurses in a state of anticipation while they continued to care for their other patients. Most commonly, delays occurred because there was no one available to transport the patient from the ED to the assigned room. Sometimes, admissions were delayed because the patient's condition became unstable, or nurses had to wait for physicians' orders to move the patient.

In the case of PACU admissions, events that occurred almost exclusively on the surgical unit, nurses could more precisely predict the new patient's arrival based on the time of surgery and the typical recovery time for that surgical procedure. In general, if patients experienced no problems, they stayed in the PACU for about an hour. Yet even these times were approximate, making it difficult for nurses to respond immediately to PACU patients' arrival because other patient care work was ongoing. In the case of transfer-in admissions, the exact time of arrival was unknown, although it was common practice for the patient to arrive shortly after the telephone handoff occurred.

Discharges: Unlike admissions, nurses usually were able to anticipate discharges several days in advance, allowing them to be more proactive in completing the work associated with discharging patients and to plan their care of their other patients. To achieve the goal of reducing readmissions, discharge planning began on the day of admission. Factors that helped nurses anticipate when discharges would occur included knowledge of the usual length of stay for a given diagnosis or surgery; on-going discussion with physicians, families, physical therapists, and case managers; the appearance of an icon on the electronic monitor at least several hours and up to a full day prior to discharge; the communication of discharge plans in shift reports; and notification from the unit clerk that a physician had written an order to discharge the patient.

Discharges from the medical unit were comparatively difficult to predict because comorbidities often altered the course of recovery of medical patients. Surgical unit discharges were more predictable; for example, patients with total hip replacements were typically discharged on the second postoperative day. Despite these differences, nurses could more readily anticipate discharges than admissions.

Intensity of admissions and discharges—The intensity of admissions and discharges (the time and effort it took to complete the tasks associated with them) depended on factors including: tasks completed prior to the patients' arrival on the unit and thus the number and nature of the tasks left for the receiving nurses to do (e.g., completing the history and physical assessment, drawing laboratory tests, starting an IV); patients' physical and mental condition; presence of an informative family member; patients' requests on arrival for such things as pain medication and food; availability of personnel required to move the patient from the transporting vehicle into the bed; and in the case of direct admissions, availability of a direct admissions nurse to complete the admission.

Direct and ED admissions were the most intense. In these cases, receiving nurses often needed to "start from scratch" because few tasks were completed prior to the patient's arrival. Lateral transfer-in admissions were considered the least burdensome, as they largely involved getting a stable patient situated, with few admission tasks for the receiving nurse. PACU admissions were between these extremes because these patients often requested medications to relieve postoperative pain and nausea, and frequent monitoring was a priority with "fresh postops."

Nurses perceived admissions to be more time-consuming and intense than discharges and, therefore, a greater disruption to workflow. Nurses likened admissions to a "code" (i.e., cardiac arrest) because they pulled nurses away from other patients for lengthy periods, potentially putting the other patients in jeopardy. Admissions also resembled codes in that they needed to be attended to immediately. Nurses had "no control" over the event; that is, they could not stop, slow down, or speed up the patient's arrival. It was also difficult to intersperse the work involved with an admission with other work. Moreover, patients were often anxious and/or uncomfortable.

In contrast, nurses had some control over discharges because the work involved with discharges was accomplished over the course of the patient's stay, and by the day of discharge, patients were typically less distressed. On the day of discharge, a nurse could weave the work of discharge into other tasks over several hours. Nurses could also "take your time discharging" to keep rooms "blocked," thereby precluding an admission.

Variation in intensity of direct admissions: Two direct admissions—one to each unit—were observed that entailed "starting from scratch." The direct admission to the medical unit took about an hour and involved one staff nurse. The patient, who arrived in a wheelchair, was alert, mobile, in minimal distress, and accompanied by one family member.

The direct admission to the surgical unit took a total of 3 hours and 14 minutes and involved two direct admissions nurses (allowing the surgical unit nurse to attend to other patients). The patient was seriously injured and admitted on a stretcher via ambulance from another hospital. Family members were present and initially anxious due to their unsatisfactory experiences at the previous hospital. Staff nurses embraced the use of direct admissions nurses, who made admissions a "nonevent" for them. Although using direct admissions nurses created the need for another handoff, the interruption created by an admission, the intensity of the work, and the time involved made the extra handoff preferable to completing an admission.

Intensity of ED admissions: Of the seven ED admissions observed, all patients had IVs started before arriving on the unit, and two arrived with the history already completed. The time required for ED admissions depended on the patient's condition and whether they had "a lot done" in the ED. The time ranged from 9 minutes of one nurse's time to almost 3 hours total of two nurses' time. In the latter case, two day shift nurses stayed beyond the end

of their shift to complete the admission while the night shift nurse cared for the other patients.

Intensity of PACU admissions: In four of the 12 PACU admissions observed, all of which occurred on the surgical unit, PACU nurses began the process of situating the patient on arrival without the assistance of a unit nurse. In these four cases, the time from the patient's arrival until a unit nurse arrived in the room ranged from 5 to 14 minutes. In the latter case, the unit nurse was starting a blood transfusion on another patient and could not interrupt that work to attend to the PACU admission. The time involved to admit a PACU patient ranged from 6 minutes, when a unit nurse was available the moment the patient arrived, to 25 minutes, in the case of the nurse who was delayed because of administering blood to another patient.

Intensity of transfer-in admissions: Seven patients were observed for the full process of transferring in. Of these, three were lateral transfers from units of similar patient acuity, and four arrived from critical care units. Nurses took from 13 to 49 minutes to complete these admissions, with at least a portion of the time involving the combined efforts of staff from the sending and receiving units. Hospital records made it difficult to reflect accurately the count of transfer-in admissions.

Intensity of discharges: Like admissions, discharges were not equivalent in terms of nursing work. Of the 20 discharges observed, 15 discharges were short and simple, lasting about 15 minutes. In short and simple discharges, patients were alert and oriented, all paperwork and prescriptions had been completed by the physician, and a family member or friend was present to hear the discharge instructions. Yet four discharges that started as short and simple became longer and more complex. In one case, a nurse believed a discharge was "done" when the patient's son arrived. Before taking his mother home, however, the son wanted to speak with the physician. This request set into motion a cascade of additional orders to complete before the patient could leave, including follow-up appointments.

Longer and complex discharges took several days to plan because more care coordination was involved. In addition to the staff nurses, case managers participated in complex discharges. Nurses stated that teaching and arranging for durable medical equipment to be used at home (e.g., oxygen, hospital bed, wheelchair) were key features of complex discharges. Staff nurses taught patients and families to perform care that would continue after discharge, such as tube feedings; some families had a hard time learning certain care techniques. The most complex discharges, according to the staff nurses, occurred when tasks had to be accomplished quickly, such as completing complex teaching and arrangements for medical equipment in one day, or rapidly transferring out unstable patients to a higher level of care. As for admissions, whether simple or complex, each of these discharges was counted as one equivalent event in hospital reports.

The Patterns and Timing of Turnover Events

Admissions—When viewed by unit, month, and week, only minimal monthly variation in admissions was evident, but more variability was seen across days of the week. For both units, the three days with the highest number of admissions, in rank order, were Mondays, Wednesdays, and Tuesdays, although there was more variability on the surgical unit. The lowest number of admissions on both units occurred on Sundays.

Discharges—Similar to admissions, only minimal monthly variation was evident in discharges, but more variability was evident across days of the week. For both units, the

three days with the most discharges, in rank order, were Fridays, Wednesdays, and Thursdays; the fewest patients were discharged on Sundays.

Total turnover workload—The combined admissions and discharges indicate the total workload from patient turnover (see Figure 1). There were 3841 events on the surgical unit, for an average of 10.52 events/day (*SD* = 4.51; *Mdn* = 11; range 1-27). There were 3562 events on the medical unit for an average of 9.95 events/day (*SD* = 4.19; *Mdn* 10, range 1-25). When viewed by unit by month, there was modest monthly variation, with slightly more variability on the surgical unit. The three days with the highest turnover workload (the greatest demand), in rank order, were Fridays, Wednesdays, and Thursdays. The lowest combined workload occurred on Sundays for both units.

Turnover timing—The majority of admissions and discharges to both the medical and surgical units occurred during the day shift (7 AM to 7 PM), when nurses had a slightly smaller patient assignment (4-6 patients) than on the night shift (5 to 7 patients).

On the medical unit, almost one-quarter (24%) of patient turnover events occurred on the night shift (7 PM to 7 AM), twice the proportion on the surgical unit (12%). By contrast, the rate of turnover on the surgical unit on the day shift was very high. A single nurse on the day shift could care for 8-12 patients over the course of the shift, by starting the shift with 4-6 patients, discharging all of them, and receiving 4-6 new admissions. Nurses on the medical unit did not talk about turning over their entire "group of patients in one shift," nor was such an occurrence observed.

Impact of turnover timing in relation to other workload

Turnover during shift change—Although few admissions or discharges occurred on either unit during the shift change from night to day (5:30 AM to 9 AM; see Table 3), considerably more admissions and somewhat more discharges occurred during the shift change from day to night (5:30 PM to 9 PM). Patient turnover events during shift change were somewhat more frequent for the medical unit (22%) than the surgical unit (14%). Nurses from both units often expressed that patient turnover during shift change was very disruptive, especially near the time of shift report handoff.

Turnover during main medication rounds—There were more admissions and discharges during the main day shift medication rounds, although turnover events did occur during the main night shift medication rounds (see Table 3). Patient turnover events during main medication rounds were slightly more common on the surgical unit (18%) than the medical unit (13%). Nurses did not mention patient turnover as disruptive to medication administration.

Turnover during mid-shift—As shown in Table 3, most admissions and discharges occurred between 11 AM and 5:30 PM, the mid-shift of the day shift. Fewer admissions or discharges occurred between 11PM and 5:30 AM, yet the medical unit received over twice as many admissions than did the surgical unit during the 11 PM to 5:30 AM period.

Clustered versus staggered timing of turnover events

Sequencing was a key aspect of the timing of patient turnover events because it had a strong influence on intensity as well as demand. When the events were staggered—that is, spread out over the shift—the workload was more manageable than when the events occurred in close succession or simultaneously. Nurses preferred 90 minutes between admissions, although they could make 60 minutes work. Because they could better control when patients were discharged, the sequencing of discharges was less of an issue.

Clustering was very apparent on the days with the highest total admissions and discharges. On the surgical unit, 27 patient turnover events (10 admissions and 17 discharges) occurred on a Friday between approximately 9:30 AM and 8:30 PM. Of these events, 22 occurred between approximately 9:30 AM and 5:00 PM. As illustrated in Figure 2, several of these 22 turnover events occurred simultaneously. The remaining 5 events all occurred during the shift change from days to nights (4 admissions, 1 discharge). In addition, 6 discharges occurred during the main day medication pass, requiring nurses to intertwine the work of discharging patients with other work, including medication administration.

The 25 patient turnover events in one day on the medical unit (9 admissions and 16 discharges) occurred on a Wednesday between approximately 4:30 AM and 7:30 PM, with 24 of the events occurring between approximately 11 AM and 7:30 PM. As illustrated in Figure 3, several of these turnover events occurred simultaneously, although there were fewer discharges occurring at the same time than on the surgical unit. One discharge occurred near the end of the main day medication rounds, and two admissions occurred during the shift change from days to nights.

Discussion

Our findings from intensive ethnographic study of two hospital units address Clarke's (2006, 2007) challenge to advance science and policy on nurse staffing by examining what nurses do with and for patients. These findings reveal the complexity associated with patient turnover events and call into question the current understanding of patient turnover. Patient turnover is not sufficiently accounted for by counting admission and discharge events and assuming all events to be equivalent. Our more inclusive accounting addressed the intensity, demand, and pattern of these events as well as the distinctiveness of the events on surgical and medical units.

Patient turnover events were observed to vary by type, predictability, intensity, demands, and timing. Admissions typically created greater interruptions in workflow than discharges. Direct and ED admissions created more interruptions in workflow than PACU and transfer-in admissions, and clustered admissions were more disruptive than staggered admissions. Nurses were better able to weave the work of discharges into other care tasks, and they could control the timing of discharges to delay admissions. Taking this nonequivalence into account is important to accurately measure workload.

Findings from prior studies are sparse regarding the time required for patient turnover events. In 1998, Upenicks showed that each patient turnover event on a surgical unit required 34 minutes. In 2005, Joyce and colleagues found that pediatric admissions took 1 to 2 hours, depending on complexity and patient acuity. In our study, the two most time-intensive admissions (a direct admission managed by direct admissions nurses and an ED admission managed by unit nurses) each involved two nurses for approximately 3 hours. The direct admission of an alert, mobile, patient in minimal distress required an hour. The work of medical and surgical adult admissions is time-consuming and intense, involving both physical and mental effort both to admit new patients and to continue to care for patients already assigned. Although the use of direct admissions nurses reduced this time commitment, the additional handoff to the staff nurse meant that gaps in quality and patient safety could occur (Cohen & Hilligoss, 2012; Dracup & Morris, 2008; Friesen, White, & Byers, 2008; Patterson & Wears, 2010). Nonetheless, nurses perceived that being away from their other patients during an admission was a greater hazard to those patients' quality of care and safety than an additional handoff.

The timing and pattern of turnover events also illustrate the intensity and demand created by patient turnover. Approximately one-third of patient turnover events in this study occurred in combination with main medication rounds or shift change. Interruptions during medication rounds may adversely affect patient safety and quality care (Biron, Loiselle, & Lavoie-Tremblay, 2009; Hopkinson & Jennings, 2013; Li, Magrabi, & Coiera , 2012; Westbrook, Woods, Rob, Dunsmuir, & Day ., 2010), but nurses in our study did not mention patient turnover as disruptive to medication administration.

Nurses were quite vocal, however, about the disruptions created by patient turnover during shift change. Admissions and discharges were more common at the shift change from days to nights (between 5:30 PM and 9 PM) than from nights to days (between 5:30 AM and 9 AM). Although no studies were found of adverse events related to patient turnover during shift change, our findings illustrate that turnover events were highly disruptive for both the nurses leaving and the nurses arriving.

Moreover, all patient turnover events entailed at least brief yet frequent interruptions, adding to the intensity and demands of the process. The intensity and demands of patient turnover help to elucidate why nurses ranked patient turnover second among 27 factors that increased their workload (Myny et al., 2012). Likewise, the intensity and demands associated with patient turnovers add to our understanding of work interruptions as factors affecting quality care and patient safety (Coiera, 2012; Grundgeiger & Sanderson, 2009; Hopkinson & Jennings, 2013; Liet al., 2012; Rivera-Rodriguez & Karsh, 2010).

Our findings illustrate how unit-specific data reveal a picture different from data aggregated at the hospital level, particularly in regard to the demand associated with turnover event patterns. Although there are few recent studies of patient turnover, both Park et al. (2012) and Unruh and Fottler (2006) reported hospital-level data, making it hard to compare our findings with existing literature. Consistent with Baernholdt and colleagues (2010) who used unit-level data, our results support the impact of unit-level differences in patient turnover on adequacy of staffing.

Moreover, our unit-specific results suggest the importance of considering the variation in demands associated with patient turnover based on day of the week, unit type, and co-occurrence with shift handoff (e.g., more patient turnover occurred during the shift handoff from days to nights than from nights to days). For example, it would be helpful to know if the failure to rescue (FTR) on non-ICU units related to patient turnover identified by Park et al. (2012) occurred during shift change, main medication rounds, or at some other point in the shift, and whether turnover-related FTR differed by shift or unit type. Our results suggest why patient turnover might increase the risk of FTR, given the intensity and demands of the work associated with these different events. Admissions in particular diverted the nurse's attention from other patients, often for lengthy periods.

These findings have important implications for staffing and hospital policies related to patient arrivals and departures. The nonequivalence of patient turnover events on medical and surgical units calls into question the use of the aggregate term "med-surg" units and staffing calculations that treat these units as equivalent. The surgical unit's turnover rate was 1.5 times that on the medical unit, particularly on the day shift, whereas the medical unit had more admissions and discharges during the night shift, intensifying the workload on the night shift. The continuation of patient turnover work into the night shift was consistent with findings reported from a medical unit for one week in 1997 (Jacobson et al., 1999). Nurses on the surgical units could turn over their entire group of assigned patients during a shift, whereas medical unit nurses never experienced such a complete turnover. Medical and

surgical units are dissimilar, underscoring the importance of adjusting staff based on the patient turnover workload distinctive to units and times of day.

Our findings suggest areas for future research. We did not observe admissions before they left their points of entry (e.g., ER, PACU) or discharges when they arrived at their respective destinations. Such perspectives would enhance understanding of how hospital units are connected and how minimizing demands in one area might increase demands in another. The tactics nurses use to keep their other patients safe while completing the work associated with a new admission would be a valuable addition to current evidence. Comparisons of admissions that can be completed by a direct admissions nurse to the number that can be completed by the unit nurse in a given shift might offer insights into how better to optimize the admission process.

In conclusion, this study of turnover events on two inpatient units with admitting diagnoses typical of medical and surgical units (Wier et al., 2011) produced findings that may be transferrable to units in other acute care settings. We showed the value of intensive study of a small number of units as a means of detailing both the metrics and qualitative nature of patient turnover demands. More such studies along with large-sample research focused on turning over patient turnover to reveal its complexity will both advance our understanding of the turbulence that characterizes nurses' work environment and of the level of nurse staffing necessary to optimize quality of care and patient safety.

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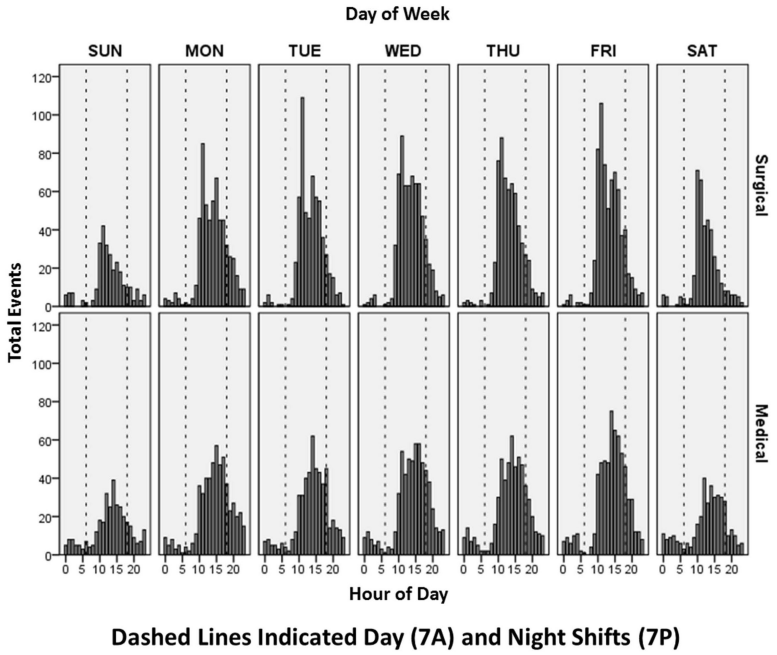

Figure 1.
Total patient turnover events (admissions and discharges) by day of the week and time of day by unit.

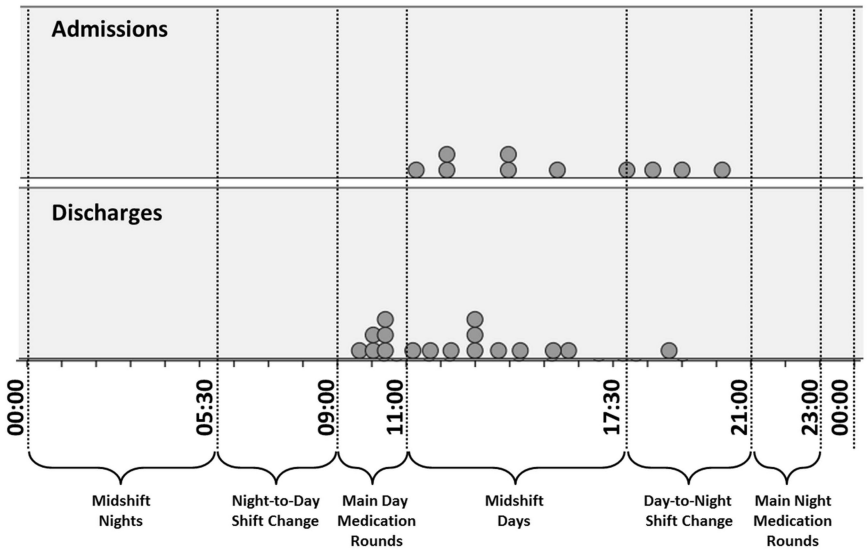

Figure 2.
A day reflecting the highest patient turnover events for the surgical unit based on their timing and pattern of occurrence.

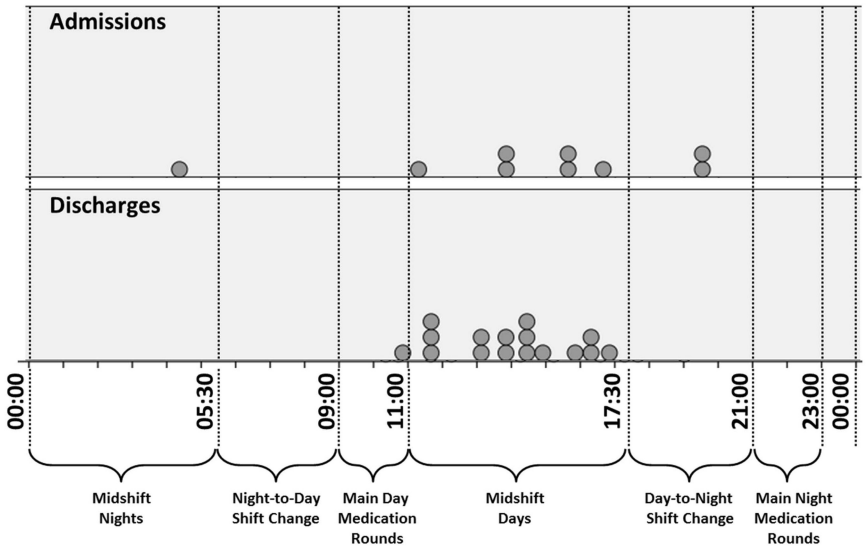

Figure 3.
A day reflecting the highest patient turnover events for the medical unit based on their timing and pattern of occurrence.

Table 1

Patient Turnover Patterns by Unit

	Surgical				Medical			
Characteristic	***n***	***M***	***SD***	**Mdn**	***n***	***M***	***SD***	***Mdn***
Length of Stay (days)		2.70	2.50	2.0		4.60	3.60	3.8
Turnover Rate		0.75	1.62	.5		0.47	1.07	.3
Admissions	1893	5.27	2.66	5.0	1657	4.68	2.21	4.0
Discharges	1948	5.46	2.83	5.0	1905	5.44	2.82	5.0

Note. Data from 2009. Turnover rate = 1/LOS. Admissions and discharges are reflected as events/day. Median turnover rate = 1/Median LOS, however, Mean turnover rate ≠ 1/Mean LOS due to the non-linear relationship between LOS and 1/LOS. Admissions include transfers-in; discharges include transfers-out.

Table 2

Admission Types by Unit

	Surgical		Medical	
Type	***n***	***%***	***n***	***%***
Direct	793	41.9%	347	20.9%
ED	519	27.4%	1261	76.1%
PACU	518	27.4%	1	0.1%
Other	63	3.3%	48	2.9%
Total	1893	100.0%	1657	100.0%

Table 3

Total Patient Turnover Events by Time of Day and Unit, 2009

	Surgical						Medical					
Time of Day	**Admissions**		**Discharges**		**Total**		**Admissions**		**Discharges**		**Total**	
Night to Day Shift Change 5:30 AM-9:00 AM	42	2%	21	1%	63	2%	76	5%	13	1%	89	2%
Main Day Medication Rounds 9:00 AM-11:00 AM	152	8%	420	22%	572	15%	68	4%	220	12%	288	8%
Midshift Days 11:00 AM-5:30 PM	1111	59%	1371	70%	2482	65%	626	38%	1363	72%	1989	56%
Day to Night Shift Change 5:30 PM-9:00 PM	362	19%	125	6%	487	13%	406	25%	272	14%	678	19%
Main Night Medication Rounds 9:00 PM-11:00 PM	91	5%	10	1%	101	3%	150	9%	20	1%	170	5%
Midshift Nights 11:00 PM-5:30 AM	135	7%	1	0%	136	4%	331	20%	17	1%	348	10%
	1893		1948		3841		1657		1905		3562	

Note. Admissions include transfers-in and discharges include transfers-out.