Rapid intervention and treatment zone: Redesigning nursing services to meet increasing emergency department demand

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The impact of emergency nursing roles in demand management systems is poorly understood. The aim of this study was to evaluate emergency nurses’ role in a specific emergency department (ED) demand management system: rapid intervention and treatment zone (RITZ). A descriptive exploratory approach was used. Data were collected from audit of 193 randomly selected patient records and 12 h of clinical practice observation. The median age of participants was 31 years, 51.8% were males and 99.5% were discharged home. Nurse qualifications or seniority had no significant effect on waiting time or length of stay (LOS). There were disparities between documented and observed nursing practice. The
designations and qualifications of RITZ nurses made little difference to waiting times and ED LOS. Specific documentation and communication systems for areas of the ED that manage large numbers of low complexity patients warrant further research.

**Key words:** emergency department, emergency nursing, health-care access, health services research.

**INTRODUCTION**

Emergency department (ED) systems have evolved over recent years to manage increasing service demands. A major focus of ED demand management has been to improve the ED journey for patients with non-urgent complaints by decreasing waiting time and ED length of stay (LOS) and increasing patient satisfaction.1,2 ED demand management systems designed to expedite care for patients with non-urgent complaints, such as ED fast track, tend to target patients with specific non-urgent problems who are likely to go home after a short ED LOS and who do not require complex nursing care.3

Current guidelines suggest that ED demand management systems are optimized by dedicated geographical areas staffed by senior medical and nursing staff.1,2,4 In addition, use of senior medical staff or nurse practitioners has also been shown to improve patient throughput outcomes (waiting time and ED LOS).5 The positive outcomes from senior staffing are based on assumptions that increased experience and knowledge are aligned with timely assessment and decision-making, improved communication, lower requirements for consultation and competence to make discharge decisions.1,2,3,6

However, despite the proliferation of demand management systems in Australian EDs, the impact of various staffing profiles is poorly understood. One study to date has examined the effect of medical/nurse practitioner staffing in an ED fast-track system,5 however there are no published studies to date about how emergency nursing roles contribute to ED demand management systems. Specifically, there are few papers about whether redesigned emergency nursing roles are advantageous for expediting care of patients with non-urgent or low complexity complaints.

The aim of this study was to evaluate the role of emergency nurses in a specific ED demand management system: rapid intervention and treatment zone (RITZ). The specific outcome measures were to (i) establish a profile of documented and observed nursing scope of practice of nurses working in RITZ and (ii) determine if the level of appointment or educational preparation of RITZ nurses affected patient throughput.

**METHODS**

**Study design**

A descriptive exploratory approach was used to evaluate the role of emergency nurses in a specific ED demand management system: RITZ. This study was approved by Human Research and Ethics Committees at Northern Health and Deakin University.

**Setting**

The study setting was a 300-bed urban district hospital in Melbourne, Australia. The ED at this hospital provided care for 63,584 patients during 2009–2010.7 Children aged < 16 years comprised 18.2% (n = 11,243) of presentations and the admission rate was 26.4% including Short Stay Unit and Medical Assessment and Planning Unit admissions.

**Intervention: RITZ system**

RITZ was implemented in July 2009 to meet increasing service demands. In a specific geographical area of the ED, the RITZ has four cubicles with trolleys, six recliner chairs and a small sub-waiting area. The existing ED fast-track area was closed and ED fast track was absorbed into the RITZ.

The RITZ operates between 0700 and 0200 and is staffed by a designated registration clerk, senior emergency nursing staff with additional skills (advanced assessment, nurse-initiated X-ray, simple wound closure and simple plaster application) and an emergency registrar, emergency physician or nurse practitioner. Nursing staff work from 0700 until 0200 with one nurse rostered to four different shifts: 0700–1506, 1000–1806, 1400–2206 and 1800–0206. Medical staffing falls across two shifts: 0700–1000 and 1300–1800 with a registrar or senior medical officer rostered to each shift. Four to 5 days per week, a nurse practitioner works in the place of the medical staff and is rostered from 1000 to 1300 or 1400 to 2200. Medical staffing falls across two shifts: 0700–1000 and 1300–1800 with a registrar or senior medical officer rostered to each shift. Four to 5 days per week, a nurse practitioner works in the place of the medical staff and is rostered from 1000 to 1300 or 1400 to 2200.

The improved physical space, capacity to provide trolley care or recline patients meant that the inclusion criteria for RITZ could be expanded and RITZ became a hybrid between an ED discharge stream and ED fast-track
model of care. Patients targeted for management in the RITZ were patients aged 5–70 years of age with specific non-urgent complaints or single system problems who were expected to be discharged from the ED, had an expected ED LOS of < 4 h and did not require complex nursing care (Table 1).

### Participants

All patients triaged to RITZ from 1 January to 31 March 2010 were eligible for the chart audit \( (n = 3124) \). A random sample of 65 patients per month was selected resulting in a final sample of 193 patients: there were two patients for whom the ED nursing chart was unavailable. Twelve hours of clinical practice observation was undertaken from 19th of March to 21st of April 2010 in 2-h blocks \( (n = 6) \) across various times of the day and evening: there were 12 nurses rostered to RITZ during these times who were observed.

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### Data collection

Data were collected by chart audit and clinical practice observation. Chart audit data were collected by a single researcher (EL) using a structured data collection tool to ascertain patient characteristics, triage category, nursing staff characteristics and nursing scope of practice. Clinical practice observation provided ‘real-time’ understanding of nursing activities and compensated for the limitations of chart audit (missing data and lack of context). There were six occasions of observation, each of 2-h duration that occurred on various days of the week and various hours of the day. During each observation period, nursing activities were recorded on a running sheet by a single researcher (EL). Once informed consent was obtained from RITZ nursing staff, the researchers informed participants that they would minimize interpersonal interaction during the observation. The purpose of this agreement was to minimize any possible Hawthorne effect on staff

### Table 1 Inclusion criteria for ED RITZ care

<table>
<thead>
<tr>
<th>Patient characteristics:</th>
<th>Presenting problems</th>
</tr>
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<tbody>
<tr>
<td>aged between 5 and 70 years</td>
<td>cellulitis (localized)</td>
</tr>
<tr>
<td>predicted ED LOS of &lt; 4 h</td>
<td>dressings/removal sutures</td>
</tr>
<tr>
<td>NOT have significant relevant comorbidity or mechanism of injury and present with one of the following complaints</td>
<td>epistaxis (asymptomatic, no anticoagulants)</td>
</tr>
<tr>
<td></td>
<td>foreign body (soft tissue, eyes, ears, nose, ingested)</td>
</tr>
<tr>
<td></td>
<td>insect bites</td>
</tr>
<tr>
<td></td>
<td>minor burns</td>
</tr>
<tr>
<td></td>
<td>minor eye complaints</td>
</tr>
<tr>
<td></td>
<td>needle stick injuries/body fluid exposures</td>
</tr>
<tr>
<td></td>
<td>pathology tests, results, certificates, referrals, vaccinations, prescriptions</td>
</tr>
<tr>
<td></td>
<td>plaster check, plaster complications</td>
</tr>
<tr>
<td></td>
<td>PV bleeding (asymptomatic in early pregnancy)</td>
</tr>
<tr>
<td></td>
<td>review—outside ED review clinic time</td>
</tr>
<tr>
<td></td>
<td>single distal limb injuries</td>
</tr>
<tr>
<td></td>
<td>superficial abscess/wounds/lacerations</td>
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<tr>
<td></td>
<td>abdominal pain (under 50 years of age)</td>
</tr>
<tr>
<td></td>
<td>loin pain/renal colic</td>
</tr>
<tr>
<td></td>
<td>migraine</td>
</tr>
<tr>
<td></td>
<td>hyper-emesis</td>
</tr>
<tr>
<td></td>
<td>urinary tract infection</td>
</tr>
<tr>
<td></td>
<td>gastroenteritis</td>
</tr>
</tbody>
</table>

ED, emergency department; LOS, length of stay; PV, per vaginal; RITZ, rapid intervention and treatment zone.
behaviour due to the researcher’s presence. To further minimize the Hawthorne effect, participants were aware of the broad aims of the study, however the exact nature of the data being collected was not disclosed to participants. During the data collection process, the observer sat at a desk located in close proximity to where participants were working where nurse–patient interactions could be easily visualized. Following each period of data collection, a detailed transcript of observational data was prepared by the observer (EL).

**Data analysis**

Descriptive statistics was used to describe patient characteristics and summarizes the study findings from the audit of ED nursing documentation. As the study data were not normally distributed, medians and interquartile ranges (IQRs) are presented and relationships between variables were examined using Mann–Whitney U-test. Statistical significance was indicated by P value of < 0.05. Study data were analyzed using SPSS, Version 17.0 (SPSS, Chicago, IL, USA).

The transcripts from the clinical practice observation were analyzed by two members of the research team (EL and JC). Analysis involved both researchers independently reading the data transcripts and then using a process of inductive analysis to identify patterns, themes and categories within the data. The two researchers then compared their findings in order to identify differences and facilitate synthesis of themes. The synthesized themes were then presented to the clinical members of the research team (RM and HC) in order to validate that the themes identified were reflective of the field notes. Themes were not presented to the research participants.

**RESULTS**

A total of 193 patients were included in the chart audit. Males comprised 51.8% of patients (n = 100), the median age was 31 years (IQR = 20–46) and only 6.7% of patients (n = 13) arrived by ambulance. The Australasian Triage Scale category distribution of RITZ patients was 1.6% in category 2 (n = 3), 15.5% in category 3 (n = 30), 76.7% in category 4 (n = 148) and 5.7% in category 5 (n = 11). Almost all patients were discharged (n = 192, 99.5%): one (0.5%) patient left the ED at their own risk. The median waiting time was 35 min (IQR = 17–64) to be seen by a nurse and 51 min (IQR = 22–84) for medical assessment. The median ED LOS was 2.2 h (IQR = 1.4–3.2) and 85.5% of patients (n = 165) had an ED LOS < 4 h.

The chart audit showed the following distribution of nursing staff: 30.6% (n = 59) registered nurses (RNs) without postgraduate emergency nursing qualifications or postgraduate emergency nursing student, 34.7% RNs with postgraduate emergency nursing qualifications (1-year university-based graduate certificate in emergency nursing) (n = 67) and 34.7% clinical nurse specialists (CNSs) (n = 67). CNSs have postgraduate emergency nursing qualifications, at least 1 year of emergency nursing experience, and meet specific requirements related to clinical skill, professional behaviour and professional development. Excluding nurse practitioner, CNS is the highest level of appointment in clinical nursing in Victoria, Australia. Waiting times, ED LOS and proportion of patients with ED LOS < 4 h were unaffected by nurse designation (CNS vs. RN) or qualifications (postgraduate emergency nursing qualifications vs. no postgraduate emergency nursing qualifications) (Table 2).

Chart audit data showed that the common investigations undertaken by nurses were diagnostic imaging (n = 20), pathology testing (n = 18), blood glucose testing (n = 7), urinalysis (n = 6), limb assessment (n = 6) and 12 lead ECGs (n = 3). Of 52 patients who had a presenting problem that might require X-ray (typically distal limb injury), nurse-initiated imaging occurred in 38.4% (20/52) of cases. Furthermore, nurses participated in intravenous cannulation (n = 15), oral analgesia (n = 9), application of wound dressings (n = 4) and initiation of rest, ice, compression and elevation (n = 2).

Twelve hours of RITZ nursing activity was observed (six occasions of 2 h of duration). During each observation period, there were two nurses rostered to the RITZ, so a total of 12 different nurses were observed: seven CNSs, three RNs without postgraduate qualifications and two RNs with postgraduate qualifications. During each 2-h period, RITZ nurses interacted with 8–16 different patients and the number of patient encounters ranged from 16 to 31. In total, RITZ nurses had contact with 60 patients on 160 occasions. RITZ nurses were frequently observed to ask questions about pain, past medical history, presenting complaint, drug allergies and usual medications. RITZ nurses were also observed to undertake patient assessments including obtaining a health history, vital sign measurement, neurovascular assessments and chest auscultation. The frequency of patient
assessments ranged from 6 to 24 assessments in the 2-h observation periods.

RITZ nurses were observed to initiate urinalysis on seven occasions, order X-rays on four occasions and initiate pathology testing on 13 occasions. Intravenous cannulation was the most common intervention observed in the RITZ and 100% of intravenous cannulations \((n = 15)\) were undertaken by nurses. The need for intravenous cannulation was determined by both doctors (33%, \(n = 5\)) and nurses (66%, \(n = 10\)). Preparation and administration of analgesia and intravenous fluid therapy were key nursing activities. During each observation period, preparation and administration of medications were observed on 5–19 occasions and preparation and administration of intravenous fluid therapy were observed on 0–7 occasions.

There were 109 episodes of RITZ nurses engaging in verbal communication with other ED staff during the 12 h of observation. Of these, 37 (34%) were nurse/nurse communications and 72 (66%) were nurse/doctor communications. During each 2-h observation period, there were 4–8 nurse/nurse communications and 6–17 nurse/doctor communications. RITZ nurses were engaged in discussions about discharge advice on 22 occasions: discharge discussions between nurses, doctors and patients occurred between one and six occasions during each observation period. During each 2-h observation period, nurses were observed to leave the RITZ area on 7–14 occasions to collect equipment, cover meal breaks for other areas of the ED, send pathology specimens or obtain medications.

### DISCUSSION

In this study, there were three major findings related to emergency nurses’ roles in a specific ED demand management system. Firstly, the RITZ was an effective demand management strategy for a specific cohort of ED patients. All but one patient went home, median waiting time for nursing care was short (23 min) and 85.5% of patients were discharged from ED within 4 h which complies with the Victorian Government Department of Health targets.10 Previous studies of fast track as an ED demand management strategy for a specific cohort of ED patients. All but one patient went home, median waiting time for nursing care was short (23 min) and 85.5% of patients were discharged from ED within 4 h which complies with the Victorian Government Department of Health targets.10

<table>
<thead>
<tr>
<th>Postgraduate emergency nursing qualifications</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Waiting times</td>
<td></td>
</tr>
<tr>
<td>Mdn</td>
<td>30</td>
</tr>
<tr>
<td>IQR</td>
<td>17–46</td>
</tr>
<tr>
<td>ED LOS</td>
<td></td>
</tr>
<tr>
<td>Mdn</td>
<td>2.2</td>
</tr>
<tr>
<td>IQR</td>
<td>1.4–3.2</td>
</tr>
<tr>
<td>ED LOS &lt; 4 h</td>
<td></td>
</tr>
<tr>
<td>(n)</td>
<td>111/134</td>
</tr>
<tr>
<td>%</td>
<td>82.8</td>
</tr>
</tbody>
</table>

* Mann–Whitney U-test. CNS, clinical nurse specialist; ED, emergency department; IQR, interquartile range; LOS, length of stay; Mdn, median; RN, registered nurse.

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It is difficult to ascertain whether decision accuracy and performance efficiency are a function of experience, knowledge or both. There is evidence that factual knowledge is more important than experience in triage decision-making, however there are few studies of the effects of knowledge and experience in other areas of emergency nursing. Further, emergency nursing guidelines have been shown to improve documentation of patient assessment but whether specific educational preparation and appropriate decision support tools can enable less experienced nurses to work effectively in RITZ warrants further investigation.

Thirdly, there were clear differences in documented vs. observed scope of nursing practice. There were 160 occasions where RITZ nurses were observed in direct patient contact equating to an average of 13 patient encounters per hour or one patient encounter every 4.6 min. During each observation period, the frequency of patient assessments ranged from 6 to 24 equating to one patient assessment as often as every 5 min. Observation data suggest that the RITZ nurses provide high levels of direct patient care even though documentation of these encounters does not always occur. As the nature of emergency care changes, care delivery systems including documentation systems need greater scrutiny. Current recommendations are that emergency nursing assessment includes documentation of a health history, primary survey assessment, focused symptom assessment, focused physical assessment, investigations and interventions. It might be argued that patients with minor illnesses and injuries do not need extensive nursing assessment and documentation, however there needs to be balance between safe levels of documentation of care and optimizing patient throughput.

RITZ nurses initiated a number of investigations and interventions. Nurse initiated that imaging was documented for approximately one-third of patients with distal limb injuries, however RITZ nurses were observed to order X-rays on four occasions but presenting complaint data was not collected. Chart audit showed pathology testing occurred for almost 10% of patients, however pathology testing initiated by RITZ nurses was observed in 22% of patients. There are few studies of nurse-initiated pathology testing. One randomized trial showed that blood tests by nurses (compared with residents) decreased ED LOS by 49 min ($P < 0.05$). In this study, all of the pathology testing occurred early in the nurse–patient encounter, so positive effect on ED LOS is logical, however the definitive effect of nurse-initiated pathology warrants further investigation.

Nurses’ engagement in communication was highlighted by observation but not apparent from the chart audit. Given that 99.5% of RITZ patients were discharged home, discharge advice is an important part of RITZ management and there were 22 discussions about discharge advice observed. In the 12-h observation, there were 109 episodes of communication with other health-care professionals: this equates to an average of nine communications per hour. Only one-third (34%) were nurse/nurse communication and the remaining two-thirds (66%) were nurse/doctor communication. The most common method of information flow in health care is verbal communication between professionals, and information requests by clinicians are more often met by colleagues than documented sources. The high levels of verbal communication in this study might explain, in part, the low levels of documentation of these encounters. Further research is needed to better understand team communication in the context of large numbers of low complexity patients.

During each observation period, nurses left the RITZ on 7–14 occasions to collect equipment, cover meal breaks for other areas of the ED, send pathology specimens or obtain medications. Appropriately skilled staff, functional working environment and ready access to pathology, pharmacy and diagnostic imaging are vital components of ED function, particularly in areas where the aim is rapid patient throughput. In the ED fast-track context, interruptions or redeployment of staff has a negative impact on the effectiveness of rapid assessment and treatment initiatives. It is also estimated that, in general, clinicians spend 24–28% of their time in ‘non-value adding activities’. Further investigation of workflow practices, staffing and system optimization and the impact of staffing interruptions and redeployments on patient throughput and clinical care for all patients in the ED requires detailed investigation.

**Limitations**

There are a number of limitations that should be considered when interpreting the results of this study. Firstly, this study was conducted in one ED and variability in the geography, resources, staffing and patient profiles in other EDs might limit generalizability. Use of chart data has the inherent limitation of missing data, so it was not possible to ascertain whether care had occurred but was not
documented or whether care had not been delivered. Clinical practice observation was a deliberate methodological choice to overcome the limitations of chart audit and although redeployment of RITZ nurses was not evident in observation transcripts, there were many periods where RITZ nurses were required to leave the RITZ.

CONCLUSION
The designation and qualifications of RITZ nurses made little difference to waiting times and ED LOS. There were disparities between documented and observed nursing practice, so further evaluation of emergency nursing care should use a multi-method approach. Specific documentation and communication systems for areas of the ED that manage large volumes of patients with low complexity problems warrant further research to determine the balance between safe patient care and optimizing patient throughput.

ACKNOWLEDGEMENT
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AUTHOR CONTRIBUTIONS
JC and RM designed the study. EL collected the study data. Data analysis was performed by JC, EL and RM. HS, MK and HC interpreted the study data. JC, EL, RM, HS, MK and HC prepared the manuscript.

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