

After hours medical ward duties in a teaching hospital

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Abstract

In many Australian hospitals a medical officer is available for urgent review of inpatients outside normal working hours. Current practice in nurse-initiated requests for medical officer involvement out of hours may adversely affect patient outcome as well as medical and nursing resource use at these times.

Of 10 523 nurse-initiated requests for out-of-hours review recorded by medical officers at our hospital in 2002–2003, the most frequent reasons for the requests were medication review, IV fluid orders, IV resite, venesection, and pathology review, none of which are related to acute changes in clinical condition. Requests for routine review of medication and fluid orders were found to be rarely essential and often inappropriate. Medical officer activity was highest before midnight and least after midnight, suggesting most requests are fulfilled in the evening.

Several strategies to reduce inappropriate out-of-hours requests were identified. Routine tasks could be completed by primary treating unit staff before going off duty. IV cannulation and venesection may be performed by appropriately trained phlebotomists or skilled advanced practice nursing staff. Meticulous ordering of 'as required' analgesia and night sedation would reduce unnecessary requests. Clinical protocols for nurse-initiated adjustment of drugs with variable dosing may also decrease inefficiencies. This would leave the ward cover medical officers more available for their primary function of urgent patient review.

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What is known about the topic?

There are grounds for concern about the safety of clinical care out of hours, and about the workloads and stress levels of the doctors and nurses who staff hospitals at these times.

What does this study add?

Ward cover medical officers consider that two thirds of the requests they receive to attend patients out of hours are either non-urgent or not appropriate. One in five could have been completed during the day; some could be dealt with by nurses or other staff.

What are the implications?

There is potential to improve the timeliness of care out of hours and to address workload concerns. Medical and nursing staff need to work together to differentiate urgent acute clinical problems and non-urgent requests and refine request procedures (eg, by deferring and aggregating non-urgent requests). Better completion of routine care during the day would also help.

INITIAL OUT-OF-HOURS MEDICAL CARE of inpatients in Australian hospitals is often undertaken by ward cover medical officers (MOs) without direct supervision. They often have little or no direct knowledge of the patients they are expected to care for on an ad-hoc basis, leading to suboptimal clinical decisions being made.

Requests for urgent medical review of inpatients in Australian hospitals out of ordinary working hours are communicated by ward nurses to the ward cover medical officer (MO) on an as-required basis. Although on-call registrars are available to provide advice or to attend in emergency situations, this cover is often neither immediate nor readily accessible. This process has developed without an evidence base and may not constitute best practice.¹ There is scarce data regarding urgent medical review out of hours or the suitability of junior medical officers to be delivering this care within acute care hospitals. Out-of-hours inpatient medical care requires baseline study with

I Distribution of the six most frequent request categories

| Category | n | % |
|-------------------------------|-------|-------|
| IV resite | 2051 | 19.5 |
| Medication review | 1886 | 18.0 |
| Venesection | 842 | 8.0 |
| IV fluid orders | 710 | 6.5 |
| Pathology review | 607 | 6.0 |
| Other task | 737 | 7.0 |
| All other categories combined | 3668 | 34.75 |
| Not able to be classified | 22 | 0.25 |
| Total | 10523 | 100 |

emphasis on quality of care improvement and appropriate and adequate medical staffing.²

The ward cover MO is often disrupted during patient assessments by calls for non-urgent or routine tasks that should have been fulfilled during regular working hours. Such requests are medically inappropriate in the context of a busy urgent out-of-hours review service with limited medical staff resources.

Lack of organised teaching and difficulty in contacting covering registrars for advice or assistance reduces work satisfaction for ward cover MOs. Up-referral consultation processes may not be clearly delineated. Evening and overnight shifts cause deleterious physical and psychological effects even in the absence of sleep deprivation.³ During busy periods, meal and rest breaks are missed.⁴

While at times busy, chaotic and stressful, out-of-hours work allows relatively independent practice and is clinically challenging. Examination of the after-hours request process, from a ward nurse communicating a request to its fulfilment by the medical officer, may help identify inappropriate requests, omissions in routine daytime care and other process difficulties.

Methods

The Mater Adult Public Hospital is a metropolitan adult teaching hospital with 200 beds, comprising medical, surgical, orthopaedic, gynaecology,

cancer services, coronary care and intensive care units.

Emergency Department (ED) MOs from 1 to 3 years post-graduation provide out-of-hours medical services to the wards, excluding the intensive care unit, in 8–12-hour shifts during their 3 month Emergency Medicine rotation. From March 2002 until October 2003, the ward cover MO was required to record all nurse-initiated requests on their shifts. This period was chosen to take into account seasonal variation in workload.

At the commencement of their rotation, ED MOs attended a lecture focusing on ward cover responsibilities, common ward clinical scenarios, up-referral and consultation processes. Compliance with maintaining a contemporaneous record of their tasks was emphasised. Time called, time attended, patient's problem, location and the actions taken were documented.

The ward cover MO was also asked to rate the medically perceived appropriateness of each request (in the context of out-of-hours urgent care) as inappropriate, reasonable or essential. This was a subjective assessment by the individual MO and was not audited by an observer.

The data were entered into a purpose-constructed Microsoft Access database and manually extracted for standard statistical calculations to determine distribution of request type, perceived appropriateness for the most frequent requests and work-rate for each shift.

Results

Task frequency breakdown

4345 requests were recorded in 2002 and 6178 requests from January to October 2003. Of 39 request categories, the six most frequent were IV resite, medication review, 'other', venesection, pathology review and fluid orders. Together, they total 65% of all requests.

The six most frequent requests were not noticeably different in incidence when the 2002 period was compared with 2003, except 'medication review' which showed an increase from 15% in 2002 to 20% in 2003. There were 19 unclassifiable

2 Categories that each comprise less than 5% of requests

| | |
|--------------------------------|---------------------------------------|
| Abdominal pain | Hypoxia |
| Admission | IV complications |
| Altered level of consciousness | Limb pain |
| Arrhythmia | Low blood pressure |
| Back pain | Medical emergency response call |
| Blood sugar level | Nasogastric tube problem |
| Cardiac arrest call | Nausea/vomiting |
| Chest pain | Pain control |
| Constipated/diarrhoea | Post-operative problem other |
| Death certificate | Review after fall |
| Decreased urine output | Review of ECG |
| Fever | Review other |
| GIT haemorrhage | Short of breath |
| Haematuria | Treatment problem |
| Haemorrhage/bleeding other | Urinary retention/indwelling catheter |
| High blood pressure | X-ray review |

entries (0.4%) in 2002 and only 3 in 2003. These results are summarised in Box 1.

Medication review is defined as charting up 'as required' analgesia or night sedation, rewriting old medication charts, charting missing medications or clarifying a previous order rather than determining a change to drug treatment based on clinical change. Fluid orders involve recharting routine post-operative or continuing fluid orders rather than instituting a change in treatment.

Categories that each comprise less than 5% of requests (totalling 35% of all requests in 2002 and 2003) are listed in Box 2. In 2003 fever was encountered on 318 occasions (5.1%).

'Treatment problem' is defined as inadequate response to treatment, deterioration not described by another category, or query regarding prescribed therapies. 'Review other' is a request for non-investigative medical review other than that for falls.

Medical staff perception of appropriateness of request

Medical appropriateness was assessed by the MOs, in the context of an out-of-hours urgent review process.

Box 3 demonstrates the perceived appropriateness of nurse-initiated requests for the six most frequent request categories and for 'all other calls combined'. Each of the six most frequent requests were considered essential in fewer than 6.5% of cases. Medication review (16.3%) and fluid orders (21.9%) were most frequently considered inappropriate. Conversely 'all other calls combined', which encapsulated most clinical situations, were considered essential in 10.8% and inappropriate in only 3% of cases.

Requests for venesections (5.6%), IV resites (4.9%), pathology review (2.6%) and 'other' (10.3%) were also considered inappropriate. Requests were reasonable in 38% to 44.8% of all categories recorded.

Data were incomplete in 39% to 49% of cases for each category.

Shift activity

For purposes of analysis, the out-of-hours periods covered by the ward cover MO were broken into the following time periods. These time periods roughly corresponded to shifts worked.

- Weekdays 16:00–24:00
(except Friday 16:00–24:00)*
- Weekdays 24:00–08:00
- Saturday 12:00–24:00[†]
- Sunday 00:00–08:00
- Sunday 08:00–16:00
- Sunday 16:00–24:00
- Monday 00:00–08:00

(* Cover was provided by the ICU MO and data not collected. [†]A primary treating unit officer is on duty Saturday 08:00–12:00.)

These time periods total 116 of 168 weekly hours, meaning that the ward cover MO is the primary medical care provider for the majority of inpatients for 69% of the hours of each week.

Data complete enough for analysis were collected on 7784 of 10 523 requests (74%)

3 Task category by medical appropriateness

| Category | Essential | Reasonable | Inappropriate | Not stated | Total |
|--------------------|-------------|--------------|---------------|--------------|-------|
| Fluid orders | 8 (1.2%) | 262 (37.9%) | 151 (21.9%) | 270 (39 %) | 691 |
| Path review | 41 (6.5%) | 283 (45.2%) | 16 (2.6) | 286 (45.7%) | 626 |
| Venesection | 40 (4.7%) | 368 (43.7%) | 47 (5.6%) | 387 (46%) | 842 |
| Other | 47 (6.4%) | 294 (39.9%) | 76 (10.3%) | 320 (43.4%) | 737 |
| Medication review | 18 (1%) | 765 (40.5%) | 307 (16.3%) | 796 (42.2%) | 1886 |
| IV resite | 26 (1.3%) | 918 (44.8%) | 101 (4.9%) | 1006 (49%) | 2051 |
| All other combined | 395 (10.8%) | 1480 (40.4%) | 112 (3%) | 1681 (45.8%) | 3668 |
| Total | 575 (5.5%) | 4370 (41.6%) | 812 (7.7%) | 4746 (45.2%) | 10501 |

occurring over 612 time periods. Saturday 12:00–24:00 was the busiest time period, with a median call frequency of 18 calls. In terms of median demand (16.5 calls) the second busiest period was Sunday 08:00–16:00. Weekdays 16:00–24:00 constituted the third busiest period with peak median call frequency of 16. The quietest period for both years was Monday 00:00–08:00 at a median of seven calls.

Discussion

Clinical duties of on-call doctors have been studied previously within medical units,^{4–6} paediatric,³ and surgical units,^{7,8} as well as among interns.⁹

At the Mater Hospital in 2002, over half (56.7%) of all requests did not involve direct patient care, that is, requests for medication review, IV fluid order, IV resite, venesection and pathology review. Routine medication review and fluid orders comprised significant out-of-hours workload (21.0% combined) that could have been performed by primary unit medical staff before going off duty.

These results are similar to that of Astill and Watkin, who found that medication and IV fluid orders comprise 40.3% and 27.2% of after-hours work on surgical wards.⁸ In another study, 42% of overnight requests for medical interns were for medication orders.⁹

Of the six most frequent requests, medication review and fluid orders were least essential and most frequently inappropriate. This is in contrast to clinical complaints or a change in the patient's condition ('all other calls combined') which were most frequently essential and infrequently inappropriate, and comprised a third of requests. It is known that expeditious medical review is required for a change in clinical status or acute unanticipated event.⁸

Routine requests which should have been fulfilled during the usual working day comprised two-thirds of out-of-hours medical workload, with clinically more urgent requests in only a third of cases. Moore et al. demonstrated that only a small proportion of after-hours medical time is spent on patient care when compared with routine requests and documentation.⁷

Nurses' and doctors' perception of the urgency or appropriateness of requests differ significantly.^{5,10} Ward nurses have been shown to rate clinical urgency of routine tasks higher than doctors.^{5,10} In another study, 58% of nurse requests were considered by the doctor to be inappropriate.¹¹

Rapidly communicating requests for non-urgent or routine tasks the moment the need becomes apparent may interrupt hands-on clinical care when these requests could be aggregated or delayed.^{4,5} Two-thirds of calls in these studies occurred when interns were engaged in direct

patient care, and only a third required an urgent response and resulted in changes to patient care. Although routine requests need to be communicated to and attended by ward cover MOs at some stage, aggregating and postponing non-urgent requests can reduce disruption to patient care by 42%.⁵

At our hospital, out-of-hours activity peaked on weekends. This is mainly due to limited access to the primary treating team at these times. Another factor is minimal senior clinician-led rounds on the weekend, leading to management uncertainties and thereby generating review requests. Friday afternoon or Saturday morning rounds to formulate weekend management plans may reduce management queries by ward staff. This may also help to improve patient care when typically it would be most at risk from the effects of reduced staffing.

Astill and Watkin found requests for analgesia and night sedation orders peaked on weekday evenings and weekends.⁸ Similarly in our study, weekday 16:00–24:00 was the third busiest period in both years. This activity may be reduced by the completion of routine orders by treating unit medical staff before completion of the working day.

The quietest periods of medical activity on the wards in our study were 24:00–08:00 hours on weekdays and weekends. This may indicate that the majority of more routine requests are made before midnight,⁹ with overnight requests reserved for urgent review.¹ With reduced overnight nurse staffing, the risk of unrecognised clinical deterioration increases at a time when medical staffing is also minimal. This has implications for quality of clinical care overnight.

Limitations

Several limitations in the data collection process were identified in this study.

Compliance with documentation of all data elements for each patient seen was a problem. This is inherent in any study which requires self-documentation by study subjects. Incomplete data may bias study results especially

with reference to perceived appropriateness of the call. It was observed during data transcription that there was poor documentation compliance by certain medical officers for the whole of their shift rather than piecemeal throughout the data pool. As the shift rotation ensured that every medical officer doing ward cover worked every shift at least once, this allows data to be analysed with more confidence than if the non-compliance was either random or directed at specific task categories.

The measure of perceived appropriateness of a task or request is limited by its subjectivity. Mechanisms such as an observer accompanying the ward cover MO to provide simultaneous independent documentation of activity patterns and perceptions, or independent non-contemporaneous validation of the perceived appropriateness of review requests by senior doctors, may increase validity of this measure. Unfortunately both of these checking mechanisms have inherent problems such as the effect of the observer on the subject. Furthermore, the ward nurses' opinions regarding urgency of request, and the process by which that request is communicated, were not assessed.

Conclusion

In our study, routine or non-urgent nurse-initiated requests that are perceived to be medically inappropriate or not essential comprised two-thirds of out-of-hours ward cover MO work-load. These include medication review and IV fluid orders that were not completed by the primary treating unit medical staff during normal working hours.

It is possible that multiple and frequent non-urgent calls to the same location may lead to the perception that future calls will be similarly non-urgent and lead to delays in responding. This has the potential to compromise the care of the acutely unwell patient requiring urgent medical review.

A number of potential mechanisms or system changes could be used to address the problem

of inappropriate requests. Ward or hospital policy and practice could require that primary unit medical officers review and reorder routine medications and IV fluids during usual working hours. The ordering of regular or as-required medications and IV fluids at admission would reduce the need to chart these orders at inappropriate times. Previous research demonstrates that emphasis on legible and comprehensive medical notes and orders reduces calls for clarification.¹²

If medical and nursing staff work together to differentiate between urgent acute clinical problems and non-urgent requests, ward nurses should be able to communicate urgent requests in a timely manner while deferring and aggregating non-urgent requests. This is a crucial issue, as agreement between doctor- and nurse-perceived urgency of request would lead to timely request initiation by nurses and timely attendance of doctors at the bedside.

Lear et al¹¹ demonstrated significant reduction in inappropriate requests when they are screened by senior nurses. This mechanism, in conjunction with request urgency stratification should allow much better differentiation of non-urgent requests.

Batching of non-urgent calls and requests by ward nurses would decrease interruptions to the continuity of hands-on clinical care that ward MOs may be engaged in when contacted. Aggregated non-urgent requests could be communicated at regular agreed intervals or listed in an agreed location on the ward for regular review rounds. Fatigue and dissatisfaction induced by disruption due to frequent non-urgent or inappropriate requests may then improve.

Finally, task reassignment of IV cannulation and venesection to trained phlebotomists or advanced practice nursing staff would reduce after-hours medical workload.^{2,9,4,13}

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Competing interests

None identified.

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