

A review of vital signs monitoring through the night in hospitals found compliance with schedules was generally poor, with potentially serious consequences for patients

Vital signs monitoring in hospitals at night

In this article...

- › The importance of monitoring vital signs
- › A review of current practice in hospitals at night
- › Interventions to improve staff compliance

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Abstract Griffiths P et al (2015) Vital signs monitoring in hospitals at night. *Nursing Times*; 111: 36/37, 16-17.

Vital signs are important indicators of patients' clinical condition and inform required interventions. This article reports on a review of the literature on current practice, which showed that nurses' compliance with monitoring protocols is poor, particularly at night. This has important implications for patient safety and outcomes.

Monitoring vital signs – for example, a patient's blood pressure, pulse rate, respiration rate – is a crucial aspect of patient care in hospital. Vital signs indicate a patient's clinical condition, are necessary to calculate early warning scores and used to determine the monitoring, escalation and interventions that are required subsequently. There is evidence that nurses' compliance with vital sign monitoring protocols and guidelines may be poor, especially at night. In this article we:

- » Explore the evidence describing the current practice of monitoring vital signs at night;
- » Describe the possible consequences;
- » Outline potential solutions to improving compliance with observation schedules.

What is the problem?

The National Institute for Health and Care Excellence (2007) recommends that observations should be monitored at least every 12 hours, with the frequency increasing if abnormal physiology is detected. Evidence shows that inadequate responses to deterioration remain the most common cause of critical incidents reported to a national database in the UK (Donaldson et al, 2014).

In particular, concerns exist that delayed detection and escalation due to current nursing approaches to patient monitoring, as outlined by Odell et al (2009), undermine the effectiveness of innovations aimed at improving detection. The National Patient Safety Agency (2007a) reported that staff "rarely carry out routine observations during the night" and that "observations are seen as tasks with a low priority".

Review methods

We undertook a scoping review aimed at identifying the incidence of the problem and major contributing factors to missed observations at night. A search strategy was built using key terms ("vital sign*" and (observation* OR monitoring) and night*) and run on OVID Medline, the Cochrane Library, the York Centre for Reviews and Dissemination and Scopus. From a total of 321 references screened, seven studies offered evidence to the questions.

How big is the problem?

A study in a Scottish teaching hospital found that nearly all early warning charts for patients causing overnight clinical concern were incomplete, with 64% having one or more observations omitted (Gordon and Beckett, 2011). In a large study from a

5 key points

1 Vital signs provide important information about patients' clinical condition and inform any required interventions

2 Inadequate response to deterioration is the most common cause of reported critical incidents

3 Nurses' compliance with observation protocols can be poor, particularly at night

4 Peaks in observation frequency suggests the timing of observation is often driven by ward routines

5 Electronic vital signs devices and early warning score charts may increase vital signs measurements, but further research is needed



Some nurses prioritise patients' rest at night over monitoring their vital signs

single centre in Southern England, the frequency and documentation of observations were less consistent with the hospital protocol at night (Hands et al, 2013); only 13% of the 950,000 vital signs records were taken between the hours of 23.00 and 05.59, and observations were rarely taken during these hours for low-acuity patients. Even for those patients whose last early warning score between 20.00 and 23.59 indicated that there was a requirement for observations to be taken hourly or more frequently, only 57% had an observation recorded between midnight and 05.59. Compliance was much higher during the day, although still far from optimal (Hands et al, 2013).

Frequency of observations during night shifts for patients discharged from intensive care was significantly lower than during the daytime in a Dutch university hospital, although results are not stratified by patient acuity (De Meester et al, 2013a). In that study the introduction of a standardised nursing observation protocol did not have an effect on the frequency of observations at night.

Impact on patient outcomes

Effectively detecting, and acting on, patient deterioration are complex issues. Vital signs observation is a key part of the “chain of prevention” required to avoid deterioration, cardiac arrest and death (Smith, 2010). A Patient Safety Observatory report into potentially preventable deaths in acute general hospitals identified 64 incidents related to vital signs observations, including failure to take basic observations; two-thirds of these incidents occurred in the evening or overnight (NPSA, 2007b).

A retrospective record review in a Belgian tertiary hospital found that deaths with lower frequency of vital signs recording were more likely to be classified as potentially preventable (De Meester et al, 2013b).

Factors contributing to differences between shifts

While a range of issues such as staffing levels, use of intuition, relationships with medical staff, and nurse education have been implicated in nurses’ compliance with observations in general, there is little research focusing specifically on time of day (Odell et al, 2009).

Issues concerning missed vital signs observations at night are reported to relate to nurses’ views regarding the importance of patient rest and the negative effects of sleep disruption (Yoder et al, 2013). A US

study of adult medical wards suggested that a patient’s acuity was not always taken into consideration when observations were undertaken at night, with 45% of observations conducted on patients with low-risk early warning scores (Yoder et al, 2013). In the UK, vital signs observations were clustered, with peaks in observation frequency occurring between 06.00 and 07.00, and 21.00 and 22.00, irrespective of the level of assessed risk; this suggests the timing of observation was driven by ward routines (Hands et al, 2013).



Interventions to improve observations

Risk stratification of patients at the beginning of the night shift to identify patients at risk of deterioration has been suggested as a strategy to increase compliance of vital signs measurements (De Meester et al, 2013a). The use of electronic vital signs devices, which may improve the vital signs collection process, has been shown to reduce mortality (Schmidt et al, 2015).

The implementation of early warning score charts (such as in Hammond et al, 2013, and Chen et al, 2009) has been associated with increased compliance of vital signs measurements, but studies have shown that compliance remains lower at night compared with day shifts, even when standardised protocols have been implemented (De Meester et al, 2013a).

Conclusions

- » Studies from hospitals in the UK and elsewhere suggest compliance with vital signs observations at night is low;
- » While the optimal timing and frequency of observations for all patients remains unclear, failure to perform observations at night occurs even for patients with severely deranged physiology;
- » The reasons for poor compliance with monitoring protocols are unclear but nurses appear to prioritise patient rest over monitoring;
- » The balance of risks and benefits is unclear but the risks from missed observations can be high;
- » Systematic approaches, including the use of monitoring protocols, improves overall compliance but the deficit at night remains;

- » Factors specifically affecting observations at night need to be better understood. **NT**

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References

- Chen J et al (2009) The impact of introducing medical emergency team system on the documentations of vital signs. *Resuscitation*; 80: 1, 35-43.
- De Meester K et al (2013a) Impact of a standardized nurse observation protocol including MEWS after Intensive Care Unit discharge. *Resuscitation*; 84: 2, 184-188.
- De Meester K et al (2013b) In-hospital mortality after serious adverse events on medical and surgical nursing units: a mixed methods study. *Journal of Clinical Nursing*; 22: 15-16, 2308-2317.
- Donaldson LJ et al (2014) Patient-safety-related hospital deaths in England: thematic Analysis of incidents reported to a national database, 2010-2012. *PLoS Med*; 11: 6, e1001667.
- Gordon CF, Beckett DJ (2011) Significant deficiencies in the overnight use of a Standardised Early Warning Scoring system in a teaching hospital. *Scottish Medical Journal*; 56: 1, 15-18.
- Hammond NE et al (2013) The effect of implementing a modified early warning scoring (MEWS) system on the adequacy of vital sign documentation. *Australian Critical Care*; 26: 1, 18-22.
- Hands C et al (2013) Patterns in the recording of vital signs and early warning scores: compliance with a clinical escalation protocol. *BMJ Quality and Safety*; 22: 9, 719-726.
- National Institute for Health and Care Excellence (2007) *Acutely Ill Patients in Hospital: Recognition of and Response to Acute Illness in Adults in Hospital*. [Bit.ly/NICE.CG50](http://bit.ly/NICE.CG50).
- National Patient Safety Agency (2007a) *Recognising and Responding Appropriately to Early Signs of Deterioration in Hospitalised Patients*. [Bit.ly/NPSADeterioration](http://bit.ly/NPSADeterioration)
- National Patient Safety Agency (2007b) *Safer Care for the Acutely Ill Patient: Learning from Serious Incidents*. [Bit.ly/NPSASeriousIncident](http://bit.ly/NPSASeriousIncident)
- Odell M et al (2009) Nurses’ role in detecting deterioration in ward patients: systematic literature review. *Journal of Advanced Nursing*; 65: 10, 1992-2006.
- Schmidt PE et al (2015) Impact of introducing an electronic physiological surveillance system on hospital mortality. *BMJ Quality and Safety*; 24: 1, 10-20. [Bit.ly/ElectronicAssessment](http://bit.ly/ElectronicAssessment)
- Smith GB (2010) In-hospital cardiac arrest: is it time for an in-hospital ‘chain of prevention’? *Resuscitation*; 81: 9, 1209-1211.
- Yoder JC et al (2013) A prospective study of nighttime vital sign monitoring frequency and risk of clinical deterioration. *JAMA Internal Medicine*; 173: 16, 1554-1555.

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