Abstract
Deteriorating patients often present with suboptimal vital signs. If these are not recognised by healthcare staff, the patient’s condition can deteriorate further, potentially leading to serious complications and even death. Despite efforts to improve ward nurses’ recognition of, and responses to, deteriorating patients, this aspect of care has been found to be suboptimal.

Aim
To identify factors that influence ward nurses’ responses to deteriorating patients.

Method
A literature review was undertaken, based on the research question ‘What factors influence the trigger component of ward-based registered nurses’ afferent response to deteriorating patients?’ Several electronic databases were searched electronically to identify relevant articles, alongside hand-searching. Inclusion and exclusion criteria were set to determine which articles should be included in the literature review.

Findings
Nine studies were identified for inclusion in the literature review. Four main themes that influenced ward nurses’ responses to deteriorating patients emerged: communication, diurnal and weekend variation, knowledge and attitudes, and nurse staffing levels.

Conclusion
Effective communication was identified as an important factor in improving ward nurses’ responses to deteriorating patients, as was improved knowledge of ‘do not attempt cardiopulmonary resuscitation’ (DNACPR) orders. It was also identified that increased ward nurse numbers improved responses to deteriorating patients, as did increased availability of senior healthcare staff, which enabled junior staff to escalate care.

Keywords
communication, critical care, education, high dependency care, intensive care, simulation, staffing levels, workforce, workforce planning

Deterioration in hospitalised patients has been defined as a declining and potentially dangerous clinical state (Jones et al 2013). In any clinical setting, a deteriorating patient can present with suboptimal vital signs. Vital signs include respiratory rate, oxygen saturations, temperature, systolic blood pressure, pulse rate and level of consciousness (Royal College of Physicians (RCP) 2017). Failure to recognise suboptimal vital signs may lead to avoidable patient deterioration, which may result in ‘failure to rescue’, where hospital systems and healthcare professionals do not adequately identify and treat complications when they occur (McQuillan et al 1998). An example of failure to rescue would be a patient dying from a treatable complication such as an infection (Silber et al 1992). Donaldson et al’s (2014) analysis of adult patient deaths in the NHS found that the most frequent cause was the mismanagement of deterioration, within which...
the failure to act on deterioration was a central issue.

Attempts to improve nurses’ responses to deteriorating patients have prompted the development of rapid response systems (DeVita et al 2010), which comprise an afferent limb and an efferent limb. The afferent limb consists of a tracking (detecting an event) and triggering (initiating a response) system, often referred to as ‘track and trigger’. Patient deterioration is tracked with early warning scores. In England, the National Early Warning Score (NEWS) 2 (RCP 2017) – which replaced the original NEWS in 2017 – is a commonly used early warning score. NEWS 2 uses six physiological parameters (vital signs) (RCP 2017): respiration rate; oxygen saturation; systolic blood pressure; pulse rate; level of consciousness or new confusion; and temperature. A score is allocated to each parameter as it is recorded; the more abnormal the result, the higher the score (range 0-3). A NEWS 2 score of 5 or more is regarded as the threshold for urgent clinical response (RCP 2017). Once tracked, the afferent response should trigger a graded clinical response – the efferent limb – for example, the ward nurse may contact the critical care outreach team. The National Institute for Health and Care Excellence (NICE) (2007) guideline on acutely ill patients in hospital recommends the following graded response strategy for patients identified as being at risk of clinical deterioration using an appropriate early warning system:

- Low scores – increase frequency of observations and alert the charge nurse.
- Medium scores – contact the responsible medics and acute illness team, for example the critical care outreach team.
- High scores – call a team with critical care competencies and diagnostic skills.

In the UK, 98% of hospitals use track and trigger systems (National Confidential Enquiry into Patient Outcome and Death (NCEPOD) 2012). The use of NEWS is supported by evidence of its sensitivity in accurately predicting deterioration in patients who are acutely ill (Smith et al 2013, Bilben et al 2016, Smith et al 2016, Shaw et al 2017). Despite this well-defined and widely used system, there is evidence that nurses do not consistently follow guidelines and trigger appropriate responses when presented with deteriorating patients (Donaldson et al 2014). Therefore, the authors decided to undertake a literature review that focuses specifically on what influences the trigger aspect of nurses’ afferent responses.

**Aim**

To identify factors that influence ward nurses’ responses to deteriorating patients. The objectives were to:

- Undertake a robust review of the available literature.
- Identify common themes from the literature.
- Extrapolate implications for healthcare delivery, education, further research and practice.

**Method**

The authors undertook a literature review. They used the PIO (population, intervention, outcome) tool (Box 1) (Polit and Beck 2014) to formulate the research question, which was: ‘What factors influence the trigger component of ward-based registered nurses’ afferent response to deteriorating patients?’ To identify relevant articles, an electronic database search of Academic Search Complete, Ovid Online and PubMed was undertaken, alongside hand-searching. The keywords ‘ward’ and ‘deteriorating patient’ were extrapolated from the research question and used to identify as many relevant articles as possible. The terms ‘hospital’ and ‘inpatient’ were identified from the literature and used as synonyms for the term ‘ward’, while ‘patient deterioration’, ‘suboptimal care’ and ‘failure to rescue’ were used as synonyms for the term ‘deteriorating patient’. The word ‘nurse’ was not used as a search term because it was found that it excluded some relevant results.

Article abstracts were searched because they provided a compromise between full text and title searching (Aveyard 2014). The titles and abstracts of the articles identified were screened using the inclusion and exclusion criteria outlined in Table 1. Additional inclusion criteria were the use of peer-reviewed articles only, articles written in English and articles published since 2011. The full texts of the remaining articles were then screened according to the inclusion and exclusion criteria.

**Findings**

The initial literature search produced 4,834 results, of which

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**Key points**

- Attempts to improve nurses’ responses to deteriorating patients have prompted the development of rapid response systems, which comprise an afferent limb and an efferent limb. The afferent limb consists of a tracking (detecting an event) and triggering (initiating a response) system, often referred to as ‘track and trigger’

- There is evidence that nurses do not consistently follow guidelines and trigger appropriate responses when presented with deteriorating patients. Therefore, the authors decided to undertake a literature review that focuses specifically on what influences the trigger aspect of nurses’ afferent responses

- This literature review identified communication, diurnal and weekend variation, knowledge and attitudes, and nurse staffing levels as important factors in ward nurses’ responses to deteriorating patients

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**Box 1. Use of the PIO (population, intervention, outcome) tool to formulate the research question**

- Population – registered nurses on hospital wards
- Intervention – trigger component of the afferent response to deteriorating patients
- Outcome – influential factors

Research question – what factors influence the trigger component of ward-based registered nurses’ afferent response to deteriorating patients?
16 studies met the inclusion criteria based on the titles and abstracts. The full text screening using the inclusion and exclusion criteria identified nine eligible studies that were a mixture of qualitative and quantitative in nature, and are summarised in Table 2. Hand-searching generated no additional studies. The authors identified commonalities in the findings of the nine studies, from which four main themes were developed:

- Communication.
- Diurnal and weekend variation.
- Knowledge and attitudes.
- Nurse staffing levels.

The Mixed Methods Appraisal Tool (MMAT) was designed to appraise systematic literature reviews that include qualitative, quantitative and mixed methods studies (Pluye et al 2011, Pace et al 2012). The MMAT checklist applies screening questions to all of the selected studies, for example whether the research design is relevant to the research question and whether the integration of qualitative and quantitative data addresses the research question. An overall quality score, expressed as a percentage, was calculated using the MMAT for each study included in this literature review, as shown in Table 2.

### Discussion

#### Communication

Smith and Aitken (2016) used a questionnaire to collate views on patient monitoring from 105 nurses, nursing students and healthcare assistants (HCAs) from surgical and medical wards. The researchers found that nurses often delegated the recording of patients’ vital signs to HCAs, with HCAs usually undertaking four sets of vital signs observations per shift. Participants in Smith and Aitken’s (2016) study also identified communication and hierarchy as challenges to the efficient identification of deteriorating patients, for example one HCA explained that abnormal vital signs had first to be reported to nurses, then to doctors.

One study by Mackintosh et al (2014) comprised interviews with 35 nurses, doctors, HCAs and managers in two UK hospitals, and found that the recording of patients’ vital signs was delegated to HCAs. HCAs’ voluntary Code of Conduct for Healthcare Support Workers and Adult Social Care Workers in England (Skills for Care and Skills for Health 2013) states that they should report concerns regarding patients to senior staff, and one HCA in Mackintosh et al’s (2014) study stated that nurses permitted competent HCAs to make direct contact with doctors. However, if HCAs bypass nurses when communicating concerns, this could affect nurses’ responsibility to ensure that delegated tasks are adequately completed (Nursing and Midwifery Council 2015). It could also potentially exclude nurses from information about deteriorating patients, which in turn could impede their ability to intervene in patient care.

#### Diurnal and weekend variation

Diurnal and weekend variation Diurnal and weekend variation in the NHS is concepts that relate to the way in which healthcare professionals’ performance levels can vary between different days of the week, and during nights in comparison to days.

The Department of Health (DH) (2005) introduced the Hospital at Night initiative, an electronic management system that provides on-call services across a hospital rather than for individual wards, in response to doctors shortened working hours (Chapman 2016). Furthermore, the DH (2015) stated that there are higher patient mortality rates during weekends because of reduced services compared with weekdays (the ‘weekend effect’).

Kolic et al (2015) studied 370 adult patients admitted to an acute medical ward in a London district general hospital. The researchers recorded patient characteristics, the accuracy of NEWS, time of day, day of the week and clinical response data for the first 24 hours of admission. In 19% (n=70) of patients, the NEWS was calculated inaccurately, and the clinical response became increasingly suboptimal as the NEWS increased. Patients admitted at the weekend were more likely to receive an inadequate response than those admitted during the week.

Odell (2015) examined patient

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### Table 1. Inclusion and exclusion criteria for the literature review

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
<th>Rationale</th>
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<tbody>
<tr>
<td>Primary research</td>
<td>Non-primary research</td>
<td>Synthesising themes from qualitative, quantitative and mixed methods research requires primary research. Secondary sources often lack detail and can be subjective (Polit and Beck 2014)</td>
</tr>
<tr>
<td>Research conducted in England</td>
<td>Research conducted outside England</td>
<td>Different countries have various healthcare and rapid response systems. Also, translation was beyond the authors’ resources</td>
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<tr>
<td>Research focusing on inpatients aged over 18 years, in general ward settings</td>
<td>Research in specialist areas</td>
<td>Specialist areas tend to differ from adult general ward settings, since they often have specialist drugs and equipment, for example mechanical ventilators, as well as reduced staff-patient ratios (Massey et al 2017). Also, the physiologies of patients in specialist care vary, for example paediatric patients have different physical parameters to adult patients</td>
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<tr>
<td>Research concerning ward nurses’ usual scope of practice</td>
<td>Research not concerning ward nurses’ usual scope of practice</td>
<td>To ensure that the literature reviewed aligned with the aim of the study</td>
</tr>
<tr>
<td>Focused on nurses’ afferent responses to deteriorating patients once deterioration has been identified</td>
<td>Focused on nurses’ afferent responses to deteriorating patients once deterioration has been identified</td>
<td>A review of the afferent and efferent responses would have constituted a broad subject. Instead, this literature review focused on nurses’ afferent responses once patient deterioration had been identified (tracked). Tracking is important; however, it becomes redundant if it does not trigger a response</td>
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### Table 2. Summary of the studies included in the literature review

<table>
<thead>
<tr>
<th>Title and author</th>
<th>Study description</th>
<th>Main findings and Mixed Methods Appraisal Tool (MMAT) score</th>
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</table>
| Is ‘failure to rescue’ derived from administrative data in England a nurse sensitive patient safety indicator for surgical care? (Griffiths et al 2013) | Cross-sectional observational study of routinely collected discharge data from 66,106,672 surgical admissions to 146 general acute hospital trusts in England | » Failure-to-rescue rates were associated with staffing levels (doctors and nurses) and patient age  
» Failure to rescue occurred less frequently when there were more nurses available per bed  
MMAT score: 100% |
| Patterns in the recording of vital signs and early warning scores: compliance with a clinical escalation protocol (Hands et al 2013) | Single-site retrospective cohort study comparing vital signs and early warning data collected from adult admissions to an NHS hospital in the south of England, with the hospital’s clinical escalation protocol | » Early warning scores elicited a significantly slower response at night compared with during the day  
» Seriously unwell patients were increasingly likely to have their vital signs recorded overnight  
MMAT score: 100% |
| Escalation of care and failure to rescue: a multicenter, multiprofessional qualitative study (Johnston et al 2014) | Multi-site qualitative evaluation of influences on escalation of care in surgery, featuring semi-structured interviews with 41 healthcare staff at three London hospitals | » A shortage of available senior healthcare staff placed unsafe levels of responsibility on junior healthcare staff  
» Increased nurse numbers reduced incidents of failure to rescue  
» Nurses perceived excessive workload and the unavailability of senior healthcare staff as barriers to appropriate responses to deteriorating patients  
MMAT score: 75% |
| Factors affecting response to National Early Warning Score (NEWS) (Kolic et al 2015) | Single-site prospective cohort study of 370 adult patients admitted to an acute medical ward in one London hospital, assessing the accuracy of, and clinical responses to, early warning systems and whether responses were affected by time of day, day of the week and score severity | » Clinical responses deteriorated as early warning scores increased  
» Patients admitted at the weekend were more likely to receive a suboptimal response to deterioration than those admitted during the week  
MMAT score: 25% |
| The habits of ‘rescue’ and its significance for implementation of rapid response systems in acute health care (Mackintosh et al 2014) | Multi-site ethnographic study of two UK hospitals involving 180 hours of observation and 35 healthcare staff interviews exploring the implementation and effectiveness of rapid response systems in acute healthcare | » Recording vital signs was delegated to healthcare assistants (HCAs)  
» Nurses’ practice received greater scrutiny compared with doctors’ practice  
» Nurses emphasised the importance of recording vital signs, although this was perceived as a basic task suitable for HCAs  
MMAT score: 75% |
| Does resuscitation status affect decision making in a deteriorating patient? Results from a randomised vignette study (Moffat et al 2016) | Multi-site randomised online vignette study involving 231 nurse participants from ten NHS trusts to investigate the influence of ‘do not attempt cardiopulmonary resuscitation’ (DNACPR) orders and Universal Form of Treatment Options (UFTOs) | » Nurses initiated fewer interventions in patients with DNACPR forms  
» No differences were observed between patients with UFTOs and patients with no resuscitation protocol in place  
MMAT score: 75% |
| Detection and management of the deteriorating ward patient: an evaluation of nursing practice (Odell 2015) | Retrospective cohort study of nurses’ adherence to an early warning score in the detection and initial management of deteriorating patients, using cardiac arrest as a marker for deterioration | » Researchers found that the recording of vital signs improved in the 12-hour period leading up to a cardiorespiratory arrest  
» Inadequate responses to deteriorating patients were more common for patients admitted at weekends compared with weekdays  
MMAT score: 25% |
| Use of a single-parameter track and trigger chart and the perceived barriers and facilitators to escalation of a deteriorating ward patient: a mixed methods study (Smith and Aitken 2016) | Mixed methods study investigating nurses’ use of a ‘track and trigger’ chart and their perceptions of barriers and facilitators to patient monitoring | » Communication and hierarchy represented challenges to the efficient identification of deteriorating patients  
» Hierarchical divisions between professional groups have persisted  
» Unavailability of a senior nurse, or nurse in charge, was perceived as a barrier to prompt escalation of the care of deteriorating patients  
MMAT score: 50% |
| The over-interpretation of DNAR (Stewart and Baldry 2011) | Cross-sectional study of nurses and doctors investigating the effect of ‘do not attempt resuscitation’ (DNAR) orders on clinical decision-making | » Once a DNAR was in place, nurses tended to perceive a medical review as less urgent or even unnecessary  
» DNAR orders are a potential barrier to appropriate responses in deteriorating patients, and are not well understood  
MMAT score: 25% |
documentation 12 hours preceding a cardiorespiratory arrest to measure nurses’ adherence to local early warning scoring protocols in 13 medical, eight surgical and five care-of-older-people wards. As in the Kolic et al (2015) study, inadequate responses to deteriorating patients were more common for patients admitted at weekends compared with weekdays. Neither Kolic et al (2015) nor Odell (2015) found statistically significant relationships between inadequate responses during night shifts compared with day shifts.

Hands et al (2013) compared the vital signs and early warning score data collected by nurses from all general adult inpatients – except those in critical care areas – admitted to a NHS district general hospital across a one-year period. The study analysed data from 950,043 vital sign datasets. Unlike the findings by Kolic et al (2015) and Odell (2015), Hands et al (2013) demonstrated that the use of early warning scores elicited a significantly slower clinical response at night compared with during the day.

Knowledge and attitudes
The theme of knowledge and attitudes included findings in two main areas: nurses’ understanding of treatment protocols, and stigma.

Nurses’ understanding of treatment protocols
Rapid response systems are intended to deliver appropriate interventions to deteriorating patients. One of the tools commonly used to support this is the ‘do not attempt cardiopulmonary resuscitation’ (DNACPR) order, which aims to prevent patients being subjected to unnecessary avoidable interventions (British Medical Association et al 2016).

Moffat et al (2016) sought to determine the efficacy of DNACPR orders and Universal Form of Treatment Options (UFTOs), which aim to contextualise DNACPR decisions within the patient’s overall treatment plan. The researchers emailed a survey that included a deteriorating patient case scenario to 231 nurses at ten NHS trusts. Nurses were randomised into one of three groups, each of which used either a DNACPR order, a UFTO protocol, or no protocol. Analysis suggested that participants in the DNACPR group were less likely to respond appropriately than those in the UFTO and no protocol groups.

Stewart and Baldry (2011) distributed 127 questionnaires alongside a case vignette to doctors and nurses in general medical, surgical and orthopaedic wards; 71 questionnaires were returned, of which 38 were completed by doctors and 33 by nurses. The vignette described a deteriorating patient with lobar pneumonia (severe infection of the lobes of the lungs) before and after a DNACPR order was put in place. Before the DNACPR order was put in place, all respondents responded appropriately to the vignette, which required bag-valve-ventilation. Once the DNACPR order was put in place and the patient had deteriorated further, 27% (n=9) of nurse respondents stated that they would not call a doctor urgently and 15% (n=5) of nurse respondents thought it was inappropriate to contact the critical care outreach team. Furthermore, when the patient had developed bradypnoea (abnormally slow respirations), only 27% (n=9) of nurse respondents stated that they would commence bag-valve-ventilation.

The results of Stewart and Baldry (2011) and Moffat et al’s (2016) studies indicated that DNACPR orders are a potential barrier to appropriate responses in deteriorating patients and, despite their importance, are not well understood. However, Moffat et al (2016) demonstrated that the misinterpretation of DNACPR orders can be significantly reduced using UFTOs.

Stigma
Mackintosh et al (2014) and Smith and Aitken (2016) suggested that recording vital signs was often stigmatised as a menial task and delegated to HCAs, which demonstrated a hierarchical division of labour. The development of modern nursing in the UK began in the Victorian era when nurses were considered subservient to doctors (Smith and Allan 2016). Mackintosh et al (2014) and Smith and Aitken (2016) suggested that these hierarchical divisions have persisted. In rigid hierarchies, those regarded as ‘higher’ in the hierarchy such as doctors tend to be less inclined to regard those ‘lower’ in the hierarchy – such as nurses – as credible, which can present a challenge to the effective escalation of deteriorating patients (Mackintosh and Sandall 2010).

The respondents in the study by Mackintosh et al (2014) emphasised the importance of recording vital signs, even though this was perceived as a basic task suitable for HCAs. Mackintosh et al (2014) linked early warning protocols with the concept of ‘dirty work’, in which the recording of vital signs was stigmatised as a menial task. Nurse respondents suggested that early warning score protocols acted as a ‘safety net’ that legitimised hierarchical division of labour because they ensured that a deteriorating patient would be escalated appropriately irrespective of the HCA’s level of clinical knowledge. Respondents in the study by Mackintosh et al (2014) also suggested that high workloads often necessitated delegation of tasks such as recording vital signs.

Conversely, Smith and Aitken (2016) suggested that nurses did not perceive the recording of vital signs as a stigmatised activity, since all of the nurse respondents (n=11) accepted responsibility for undertaking them. However, although nurses accepted responsibility for vital signs, the task of recording them was often delegated. The respondents acknowledged this contradiction and suggested that excessive workloads were the cause.

The SBAR (situation, background, assessment, recommendation) framework (NHS Improvement 2018) is a well-known model that can be used to standardise and structure nurses’ communication with doctors. It has been suggested that its prompt for nurses to make recommendations regarding patient
care and escalation can assist them to overcome nurses’ traditionally subordinate hierarchical positions in relation to doctors. De Meester et al (2013) studied 37,239 admissions to 16 hospital wards, and found that unexpected deaths decreased from 0.99 per 1,000 admissions to 0.34 per 1,000 admissions following the implementation of the SBAR framework. Although the SBAR framework appears to be effective, Ludikhuize et al (2011) found that, despite a rigorous implementation strategy, only one out of 47 nurses used the SBAR one year after its introduction. Its lack of sustained use may have been attributable to its implementation by those higher in the hierarchy (a ‘top down’ approach). The King’s Fund explained that successful quality improvement in the NHS requires complementary ‘top down’ and ‘bottom up’ approaches (approaches emerging from those lower in the hierarchy) (Ham et al 2016).

Nurse staffing levels
Griffiths et al (2013) studied the discharge data from 66,100,672 surgical admissions to 146 general acute hospital trusts in England to measure the relationship between staffing levels and failure to rescue resulting in death from serious complications. The study found a total failure-to-rescue incidence of 4% (n=2,496,356). Griffiths et al (2013) suggested that failure to rescue occurred less frequently when there were more nurses available per bed. Conversely, Odell (2015) analysed the association between nurse staffing levels and nurse adherence to early warning systems in cardiorespiratory arrest and found no association between the two factors.

Johnston et al (2014) found that a shortage of available senior healthcare staff placed unsafe levels of responsibility on junior healthcare staff. Furthermore, participants including nurses stated that an increase in the availability of senior healthcare staff would encourage junior healthcare staff to seek assistance. Similarly, Smith and Aitken (2016) reported that the unavailability of a senior nurse, or nurse in charge, was perceived as a barrier to prompt escalation of the care of deteriorating patients.

Overall, Griffiths et al (2013), Johnston et al (2014) and Smith and Aitken (2016) suggested that increased nurse numbers reduced incidents of failure to rescue, which in turn reduced death from serious complications; these studies also found that nurses perceived excessive workload and the unavailability of senior healthcare staff as barriers to appropriate responses to deteriorating patients. Despite differing methodologies, Johnston et al (2014) and Smith and Aitken (2016) also agreed on the importance of the availability of senior healthcare staff when escalating the care of a deteriorating patient.

Although these conclusions are not definitive, they support Francis’ (2013) emphasis on increased nurse staffing levels as a strategy for improving standards of care. As part of the response to counter staff shortages, the Department of Health and Gummer (2015) introduced the role of nursing associates to expand the workforce. Nursing associates are located between registered nurses and HCAs and their role involves delivering hands-on patient care.

Limitations
A higher-quality systematic review was beyond the resources of the authors. For example, recommendations for comprehensive systematic reviews state that they should be undertaken by two researchers to reduce the risk of bias (Centre for Reviews and Dissemination 2008), whereas this literature review was undertaken by one researcher. Because of this limitation, it is possible that the literature search may have disregarded some studies that would have been suitable for inclusion in the literature review. Additionally, because this literature review was designed to relate specifically to NHS practice in England, there was a considerable amount of international research that was ineligible for inclusion. Therefore, the findings of this literature review may not be generalisable and should be treated with caution.

Conclusion
This literature review identified communication, diurnal and weekend variation, knowledge and attitudes, and nurse staffing levels as important factors in ward nurses’ responses to deteriorating patients. Ward nurses’ responses to deteriorating patients demonstrated diurnal and weekend variation, with suboptimal responses associated with night and weekend shifts. It was also identified that increased knowledge of DNACPR orders may enhance ward nurses’ responses to deteriorating patients. With regards to staffing levels, it was found that increased numbers of ward nurses improved responses to deteriorating patients, as did increased availability of senior healthcare staff.

IMPLICATIONS FOR PRACTICE
» Healthcare assistants require more robust regulation than a voluntary code of conduct (Skills for Care and Skills for Health 2013). Additionally, the introduction of nursing associates may require a concomitant increase in the number of senior nurses to provide adequate responses to deteriorating patients. This is because a lack of senior staff can place excessive responsibility on junior staff to recognise patient deterioration; similarly, the presence of senior staff encourages junior staff to escalate patient deterioration

» High-fidelity interprofessional simulation training, for example in the application of DNACPR orders, should be widespread, particularly as protocols are frequently misunderstood by nurses

» Most of the evidence in this literature review was quantitative in nature. However, since nurses’ responses to patient deterioration are affected by a complex range of issues, further mixed methods research would be useful in the future to enable a holistic examination of this subject

» Evidence suggests that there is diurnal and weekend variation in nurses’ responses to deteriorating patients. Further research is required to explore the possible causes, such as the effect of shift patterns