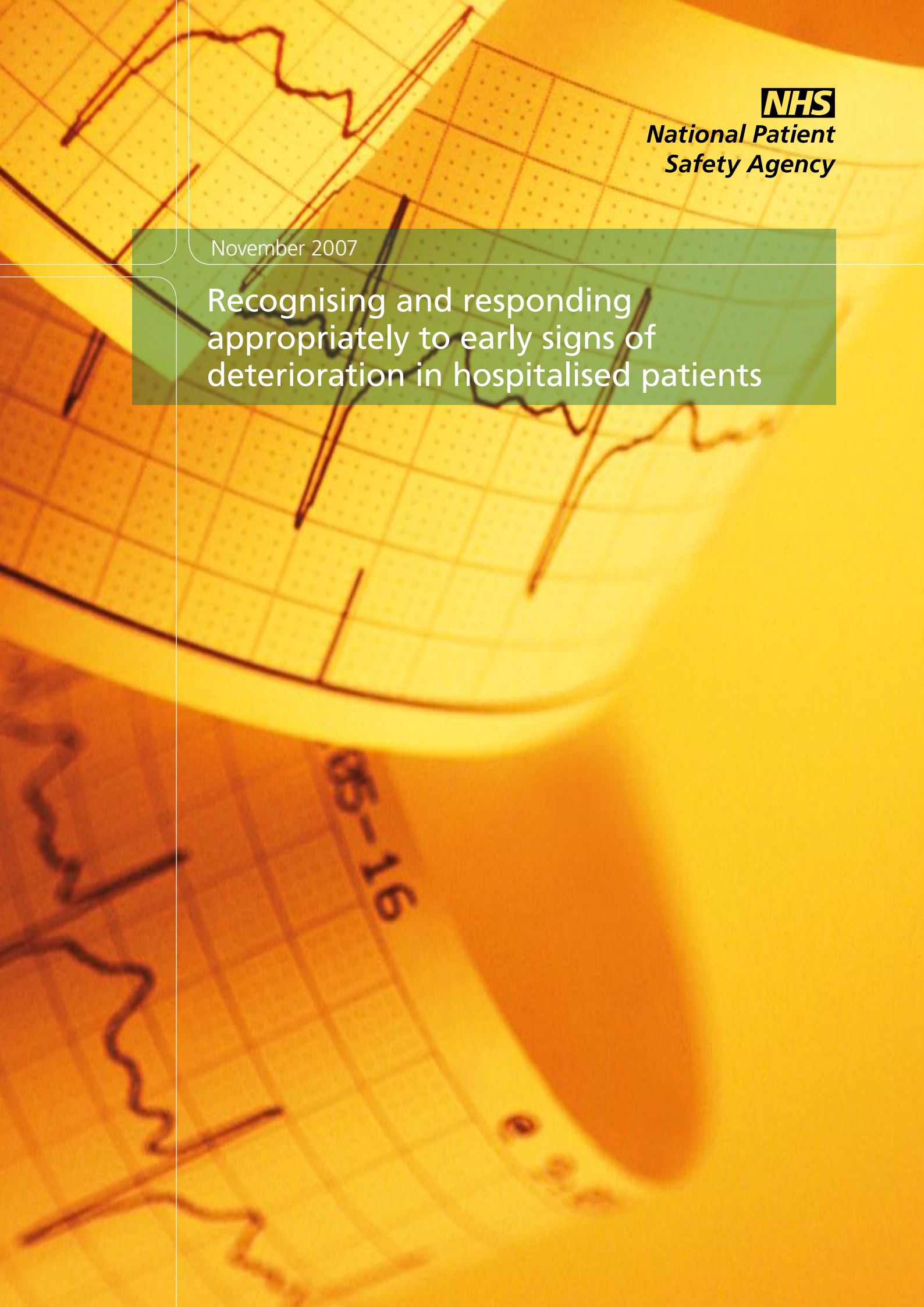

NHS
National Patient Safety Agency

November 2007

Recognising and responding appropriately to early signs of deterioration in hospitalised patients

Contents

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This report was written by Dagmar Luettel, Kate Beaumont and Frances Healey.

Foreword

Patients who are admitted to hospital believe that they are entering a place of safety, and they, and their families and carers, have a right to believe that they will receive the best possible care there. They feel confident that should their condition deteriorate, they are in the best place for prompt and effective treatment.

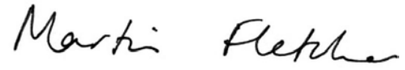
However, some patients who are, or become, acutely unwell in hospital may receive sub-optimal care because their deterioration is not recognised, not appreciated or not acted upon sufficiently quickly. Communication and documentation are sometimes poor, experience might be lacking and provision of critical care expertise, including admission to critical care areas, can be delayed.

To investigate these incidents, the National Patient Safety Agency commissioned a programme of work which aimed to identify the underlying causes and contributing factors in deterioration incidents, and to explore how these factors interrelate.

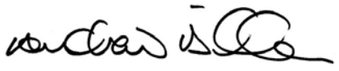
The purpose of this report is to illustrate why deterioration incidents happen and to help NHS staff working in acute hospitals to improve patient safety.

In July 2007 the National Institute for Health and Clinical Excellence (NICE) issued a guideline on the monitoring and treatment of acutely ill patients in hospital. The guideline offers advice on the care of adult patients who are or who become acutely ill while in hospital, and advises how serious problems can be avoided by monitoring patients regularly and taking appropriate action if they show signs of becoming worse.

We hope you will use this report and the NICE guideline along with the NPSA report *Safer care for the acutely ill patient: learning from serious incidents* (launched in July 2007) to significantly improve the care and safety of acutely ill patients.



Martin Fletcher
Chief Executive, National Patient Safety Agency



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Chief Executive, National Institute for Health and Clinical Excellence

Lord Naren Patel of Dunkeld
Chairman, National Patient Safety Agency

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Summary

Early identification of clinical deterioration is important in preventing subsequent cardiopulmonary arrest and to reduce mortality, but sometimes patients' conditions deteriorate before nursing and medical staff recognise and respond to the signs.

Analysis of 576 deaths reported to the National Patient Safety Agency's (NPSA) National Reporting and Learning System (NRLS) over a one year period (2005) identified that 11 per cent were as a result of deterioration not recognised or acted upon (n = 66).

Over the last year the NPSA has explored this problem and formed a multidisciplinary and multi-agency group to coordinate further work. Several national and international work programmes aim to improve patient safety in this area but there was a need to gain a better understanding of why such incidents happen. Therefore, the NPSA commissioned a programme of work that aimed to identify the underlying causal and contributory factors in deterioration incidents and to explore how these factors interrelate. This work included semi-structured interviews with clinicians, aggregate root cause analysis, ethnographic analysis, literature review and focus groups with doctors and nurses. By using these different methods to collect data from frontline staff it was possible to identify and better understand the most common factors contributing to deterioration incidents.

The findings indicate that consistently and effectively detecting and acting upon patient deterioration is a complex issue. A series of points where the process can fail were identified, including not taking observations, not recognising early signs of deterioration, not communicating observations causing concern and not responding to these appropriately.

The underlying contributing and causal factors were also found to be complex and participants identified a wide range of factors that contribute to the problem. These include challenges in prioritising competing demands, a lack of effective teamworking and leadership, verbal and written communication breakdown, insufficient training to understand the relevance of observations and a lack of successful implementation of relevant policies and procedures.

Understanding both the points where the process can fail, and the complexity of underlying reasons for why this happens can help healthcare organisations prioritise and target their efforts to improve patient safety.

The NPSA recommends that every acute trust has a multidisciplinary deterioration recognition group to lead and coordinate efforts to improve the safety of patients who are vulnerable to unexpected deterioration. To be effective this group would need to measure baselines and monitor improvements following local interventions. In order to support the local review of systems and processes, a checklist of reflective questions based on the findings from this work has been produced (see Appendix 1). Appendix 2 is intended as a toolkit for use by the deterioration recognition group and includes links to a variety of resources and good practice examples, which might prove helpful for local action.

Introduction

Clinical deterioration can happen at any point in a patient's illness, or care process, but patients are particularly vulnerable following an emergency admission to hospital, after surgery and during recovery from a critical illness.

Many patients who suffer cardiopulmonary arrests show signs of deterioration during the 24 hours before the arrest[1] and it has been estimated that approximately 23,000 in-hospital cardiac arrests in the UK could be avoided each year with better care[2].

By closely monitoring changes in physiological observations, deteriorating patients are more likely to be identified before a serious adverse event occurs. Early identification is important to reduce mortality, avoidable morbidity, length of stay and associated healthcare costs.

The NPSA launched the fifth Patient Safety Observatory report *Safer care for the acutely ill patient: learning from serious incidents*[3] in July 2007, in which 'deterioration' was identified as a key theme. The report contains a detailed analysis of serious patient safety incidents reported to the Agency's NRLS over a one-year period. It was found that 11 per cent of these reports relate to the subject of 'deterioration not recognised or acted upon' (n = 66) and a similar profile is seen in reviewing more recent reports. The majority of these incidents can be attributed to three themes:

- no observations made for a prolonged period and therefore changes in a patient's vital signs not detected;
- no recognition of the importance of the deterioration and/or no action taken other than recording of observations;
- delay in the patient receiving medical attention, even when deterioration has been detected and recognised.

Several national and international work programmes aim to improve patient safety in this area, including:

- The National Institute for Health and Clinical Excellence (NICE) released the clinical guideline *Acutely Ill Patients in Hospital: Recognition of and response to acute illness in adults in hospital*[4] in July 2007, and a suite of implementation support tools is available on the NICE website[5].
- The Department of Health expects to consult in the near future on a framework of core competencies and skills that need to be held by teams caring for acutely ill patients. These have been developed by leading expert clinicians drawn from a range of organisations and professions. The framework will assist the development of appropriate training and educational programmes necessary to equip clinical staff with the required skills.
- A two-year Patient Safety Campaign for the NHS in England is planned to begin in 2008. One of the key themes for clinical teams to be involved with is focused on the deteriorating patient.
- The World Health Organization's Collaborating Centre for Patient Safety Solutions plans solutions for 2008 on the topic *Managing Deteriorating Patients*. Further information is available on the Joint Commission International Centre for Patient Safety website: **www.jcipatientsafety.org/24725**

The NPSA coordinated an advisory group with key representatives from relevant bodies (see Appendix 3) in order to plan further work in this area. It was found that the problem of deterioration incidents is well recognised and quantified but there was a need to gain a better understanding of why such incidents happen. Therefore, the NPSA commissioned a programme of work that aimed to identify the underlying causal and contributory factors in deterioration incidents and to explore how these factors interrelate. This work included:

- focus groups with doctors and nurses;
- semi-structured interviews with clinicians;
- aggregate root cause analysis;
- ethnographic analysis;
- literature review.

These sub-projects are described in the methods section of this report and the results are also presented here. This report describes how these findings can be used to improve practice, and conclusions and recommendations are also outlined.

The purpose of this report is to illustrate why deterioration incidents happen and to help NHS staff working in acute hospitals to improve patient safety.

The report is particularly aimed at:

- chief executives and senior management teams to highlight the importance of early recognition of and response to deteriorating patients;
- nursing directors, medical directors, therapy and clinical governance leads to review their approach in recognising and responding to the deteriorating patient;
- frontline nursing staff, doctors and allied health professionals to help them put actions into practice;
- risk management teams to support local reporting and learning from incidents.

In order to support the local review of systems and processes for recognising and responding appropriately to early signs of deterioration in hospitalised patients, we have produced a checklist of reflective questions based on the findings from this work (see Appendix 1). In Appendix 2 links to a variety of resources and good practice examples that might prove helpful for local action are set out.

Methods

To best understand why deterioration incidents happen, it was important to use different data collection methods so that underlying causes could be identified from various perspectives.

It was decided to undertake focus groups and interviews with clinicians, aggregate root cause analysis, an ethnographic analysis[a] and a literature review, commissioning some of these sub-projects from external organisations. Following competitive tender, the interviews were commissioned from TwoCan Associates[6] and the aggregate root cause analysis from Human Reliability Associates[7]. The ethnographic study[8] was completed by researchers from the Universities of Leicester and Birmingham and the focus groups and the literature review were conducted by NPSA staff.

This section describes these sub-projects in more detail.

Focus groups with doctors and nurses

Forty-four nursing staff and 12 doctors from acute trusts across England and Wales attended the focus groups. Separate meetings were held to compare and contrast views from the nursing and medical professions.

The format of the focus groups was the same for both sessions and centred on James Reason's 'three buckets model' [b] of error likelihood.[9] This was followed by a short video, developed in conjunction with other foresight work by the NPSA, which demonstrates a deterioration scenario. Participants were asked to identify the possible contributory factors in the scenario using the 'three buckets' framework (see figure 1, page 11), sharing their ideas in small groups. Participants then discussed their own experience of deterioration incidents in groups of two or three and then fed back in a larger group of five or six people. Each session ended with a whole group discussion.

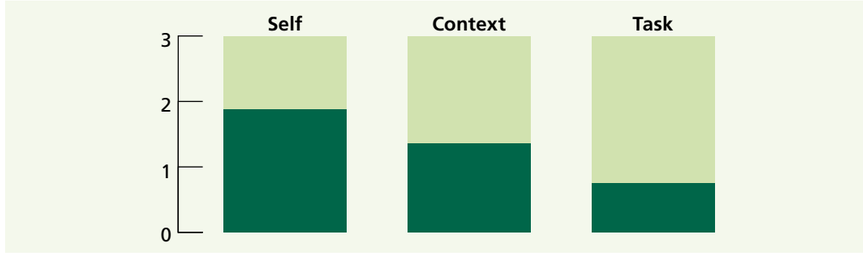
Facilitators and participants took notes during the sessions and the data were analysed using a thematic analysis approach[c]. The coding was shared with all facilitators, who commented on the draft and added further statements and memos.

a **Ethnography** is a form of qualitative research, which combines methods such as interviewing and observation, and involves studying people in their 'natural' setting. Ethnographic questions generally concern the link between culture and behaviour and/or how cultural processes develop over time.

b The '**three buckets model**' is a simple tool for individuals and teams to understand their own safety levels and has been devised by Professor James Reason. The tool is based on the idea that in any given situation, the probability of unsafe acts being committed is a function of the amount of 'bad stuff' in three buckets. The first bucket relates to the current state of the individual(s) involved (self), the second reflects the nature of the context, and the third depends upon the error potential of the task.

c **Thematic Analysis** is an approach to dealing with data that involves identifying passages of text and applying labels (or codes or categories) to them that indicate they are examples of some thematic idea. The emerging themes from the data are then organised in a meaningful way.

Figure 1:
Three bucket model of error likelihood
Reason, 2004



Semi-structured interviews with clinicians

The researchers interviewed a total of 16 staff from four acute trusts in England. This included:

- five junior doctors (three foundation year one doctors and two senior house officers);
- five staff nurses (with a wide range of experience, from 8 months to 20+ years);
- six senior nurses (a clinical manager, a critical care nurse consultant, two outreach managers and a ward manager).

With permission from the interviewees, all interviews were tape-recorded and transcribed. The data were analysed using a thematic analysis approach. The participants' views were identified in relation to:

- factors contributing to the problem;
- policies and procedures currently in place that help to reduce risks; and
- ideas and recommendations for the future.

Aggregate root cause analysis

Fifty-one anonymous root cause analysis reports relating to deterioration incidents were analysed using a systematic method outlined in the following five steps:

1. Where reports contained a chronology or timeline of events, this was examined first to identify any adverse events.
2. Where reports contained additional information in the form of care management problems or issues identified, contributing factors or root causes, these were examined next to identify any additional information about adverse events.
3. A classification of factors was developed, based on the 'NPSA contributory factors taxonomy'[10], as the reports were reviewed.

4. Any factors identified by the analysis that did not 'fit' into the NPSA framework were put into a new category.

5. Factors identified were then scored against the categories and aggregated using Microsoft Excel and SPSS software packages.

Ethnographic analysis

The NPSA had access to an early report of an evaluation led by the Universities of Leicester and Birmingham being conducted as part of the evaluation of the Health Foundation's Safer Patients Initiative. The data collected comprise ethnographic fieldnotes of approximately 60 hours of observations at each site and 10-12 semi-structured interviews with staff on each ward. The wards studied included two respiratory, one mixed general medicine and one ward for the care of the elderly. Data were analysed using the constant comparative methods, facilitated by use of qualitative data analysis software.

Literature review

The review of the literature was undertaken in order to identify what is known about factors contributing to deterioration incidents. Electronic databases were searched including Medline, Embase, CINAHL, British Nursing Index and Proquest; the search terms used are listed in Appendix 4. Despite many references relating to the subject 'deterioration' being found, only a few research studies have been conducted to establish why these problems occur.

Triangulation methodology

Triangulation simply means using different theories, methods, data sources, investigators or analytical methods to explore a single problem or phenomenon.[11] Using various approaches to collect data means that the research will not become constrained by the nature and limitations of one method. It enables the researcher to gather insights that may not have been possible with a single approach and to 'see' the subject from a variety of angles. The purpose of triangulation is to achieve greater confidence in the findings and to validate the conclusions.[12]

For this project, five studies were undertaken to identify causal and contributing factors in deterioration incidents. Different researchers used different methodologies and collected qualitative data from various sources (as described above). All researchers produced a final report of their study. In order to triangulate the findings from all studies, a classification of factors, based on the 'NPSA contributory factors taxonomy'[10], was used. These were:

- communication factors;
- working conditions and environmental factors;
- task factors;
- education and training factors;
- patient factors;
- team and social factors;
- organisational factors;
- equipment and resources factors;
- individual factors.

A project team member scanned all final reports of the research studies for themes relating to these classifications and the findings were recorded in an Excel spreadsheet. This allowed a clear overview of all contributing factors and illustrated overlapping and distinct themes identified in each study. Two other project team members checked the spreadsheet to confirm that all factors were included and correctly interpreted. An example of the data triangulation method is illustrated in Appendix 5.

In addition, an expert group workshop was held in order to explore contributing factors. The results from this meeting were checked against the findings in the spreadsheet. The results were then compiled in a report and shared with all researchers conducting the studies in order to establish if the overall findings reflected the results of the individual studies.

Limitations of the study

A limitation of the study is that the findings included studies that involved a relatively small number of sites or staff. However, the participants were selected from different hospital sites across the UK and included nursing and medical staff with different positions, grades and experience. In addition, the triangulation across the different studies adds weight to the conclusions.

A second limitation is the possibility of 'social desirability bias'. Some participants in the interviews might have provided what they considered to be 'acceptable' responses and tried not to present themselves negatively. This social desirability bias may lead respondents to self-censor their actual views, especially when they are in a group setting such as a focus group. However, by using different methodologies it was hoped to overcome this problem; most participants seemed to be very open and their comments are very much consistent with what was found in the observations, the aggregate root cause analysis and the literature review.

A major strength of the study is that by using various researchers and different methods to collect data, it was possible to identify and understand common causal and contributing factors in deterioration incidents, which was the main goal of the project.

The following section describes the results of the data triangulation.

Results

The results of the data triangulation are described below. Nine contributing factors were used to structure the results, and the sources of the findings are illustrated by using abbreviations of the various studies:

- focus groups = FG
- interviews = I
- aggregate root cause analysis = RCA
- literature review = LR

The findings of the ethnographic analysis broadly supported the results of the other studies but are not cited in this section; the results will be published separately.

Communication factors

Verbal communication factors

Communication problems were identified in all reports and are, according to the aggregate root cause analysis report, the biggest problem area within deterioration incidents.

It was suggested that staff may not adequately inform each other regarding patients' care. Problems occur in particular during handovers and transfers because the amount of information handed over is difficult to remember and less easy to understand for inexperienced staff [RCA, I, FG, LR].

"I have had a scenario where things were not being handed over properly between shifts. There was poor communication of what was going on and how urgently the patient needed to be reviewed." *[junior doctor]*

Another communication problem occurs when there are 'outlying patients'[d] or 'outliers' on the ward; in these situations there is often confusion over who to call when medical advice is required [RCA, I, FG].

"Sometimes it is not clear in the documentation... you don't know which consultant they are under! This happens on a regular basis... The wards don't have the on-take list. I have the wild goose chase of finding out which consultant they belong to, to get the appropriate bleep numbers." *[senior nurse]*

Communication between medical and nursing staff is described as problematic. Nurses may not communicate clearly enough [I, FG] and struggle to convey information in a manner that would convince doctors of the urgency of the situation [LR].

d 'Outlying' patients are those patients who are placed in an area which is not normally designated to their particular clinical condition e.g. a medical patient being admitted to a surgical ward.

"If you're not confident and articulate on the phone... then you don't get the response. So there is something about your phone manner – succinct and clear about needs/demand." *[senior nurse]*

Nurses may be sensitive to the availability of doctors and reluctant to 'lose face' or cause extra work when it is unnecessary. Therefore, they are reluctant to call doctors or consultants [I, FG] and prefer using the outreach team when available [FG].

From the doctors' perspective, they are faced with making a difficult decision about how urgently a patient needs help based on a phone call. This is particularly difficult if they don't know the patient [I].

"There are problems on call when you don't know patients. The nurse will say 'their blood pressure just dropped'... they should be able to give the clinical context so you can work out how serious this is... " *[junior doctor]*

Written communication factors

Incomplete and inadequate documentation were identified as contributing factors. Observation and fluid charts may not always be completed [I, FG, LR]; in particular, the times when observations are taken, the initials of staff and instructions may be missing or difficult to read [RCA].

"Sometimes you can't follow instructions if they're not written clearly, if the handwriting's poor or management plan not clear enough." *[junior doctor]*

Decisions or medical orders may not always be documented in the patient's notes [RCA, FG], or there may be discrepancies between what was documented and what actually happened [RCA]. It was also found that some paper charts are not effective in identifying trends because observations are just recorded as numbers and information is provided in a disjointed manner (e.g. separate charts for vital signs, fluids and medication usages) [LR, FG]. In addition, nursing and medical documentation is recorded in separate folders [RCA] and therefore medical notes are not always read by nursing staff and vice versa [I].

"Sometimes they call you and ask 'What do you want us to do?' and you've written it in the notes." *[junior doctor]*

"Doctors assume that if it's in the medical notes nurses will read it. But if they're busy doing something this is not going to be the case." *[senior nurse]*

Working conditions and environmental factors

Working conditions were identified as contributing to the problem of deterioration not recognised or not acted upon. Staffing levels are particularly difficult to maintain when staff accompany patients to other departments, are on a break or are on sick leave [RCA, FG, I].

"In some wards a lot of the issue is with sickness – people come in sick because there are hardly any nurses left. With two nurses and one auxiliary split between one ward and trying to do the washes in the morning – you wouldn't be able to physically do observations even if you wanted to." *[staff nurse]*

As a result, nurses do not have the time to satisfactorily care for the number of patients in the ward and to teach newly qualified staff, take breaks or attend ward rounds [I, FG].

"Nurses are supposed to come on the daily ward round but nurses are so busy – it's difficult for them to join. It would be ideal so they know the management plan for the patient for that day and they know what to look out for." *[junior doctor]*

Weekends and nights, when outreach teams and senior staff are often unavailable, were considered as especially busy times [I, FG].

"At weekends you don't have as many doctors – and no senior people – so junior doctors are under a lot more pressure then. It causes a problem if multiple patients deteriorate at the same time." *[staff nurse]*

The interviews indicated that staff rarely carry out routine observations during the night (between 10.30pm-6am) and this means that no observations are taken for approximately eight hours.

"I recently went to see a patient, where they had been poorly...They had been doing perfect hourly obs and had been asked to do them overnight – but staff had stopped at ten-to-six and hadn't done anything again until just before handover. Nothing had happened but the potential was there." *[senior nurse]*

Nurses in the focus groups reported that teams are often dominated by junior and agency staff and the lack of experienced staff in the wards was also highlighted in interviews.

"Ward managers need to ensure balance of staff on each shift of experienced and less experienced staff. Sometimes there are too many junior members." *[senior nurse]*

Participants in the focus groups described that patients admitted to wards often have serious and complex medical conditions and are heavily dependent on nursing care; they are transferred earlier from A&E departments to meet hospital targets (even when they are not stable), and they are discharged quicker because of bed pressures (resulting in a high turnover).

"They had to get the patient down before the patient breeched the four hour rule. Deterioration had taken place over quite a short period of time… they should have been managed in A&E before transfer." *[doctor]*

In addition, there are 'outliers' on the ward and staff are not familiar with the care plans and needs of these patients [RCA, FG].

"You don't know what you don't know…There are certain things which are harder for us to recognise when it is not our speciality." *[senior nurse]*

The inadequate staffing levels, together with the high workload, create time pressure, and nursing and medical staff have difficulties in prioritising their workload [RCA, I, FG, LR].

"When staff come on duty, they've got several must-dos. Patients must get their breakfast, drugs have to be given out and staff have to prepare for 10 o'clock hospital discharges. This is also the time to start ward rounds. There's a lot of pressure in the early part of morning. So when do you fit in doing your obs?" *[senior nurse]*

Doctors also have many tasks to do and find it hard to decide what to do first.

"You sometimes feel flooded with jobs to do, desperately trying to juggle them all. Therefore it becomes more difficult to prioritise and to try and be in more than one place at once. You have to try and prioritise whoever is most sick." *[junior doctor]*

Nurses described how such conditions have created a working culture where it is acceptable not to read policies or procedures, and where a low morale on the wards and a lack of respect towards colleagues and patients are common [FG]. The influence of the ward culture can mean that standards learnt in training are not maintained [I].

In relation to environmental factors, it was described that the atmosphere on the ward might be noisy, which makes it difficult to hear orders or requests from other staff [RCA]. It was also found that it could be difficult to monitor patients in side rooms adequately because the view is obscured and staff cannot constantly keep an eye on these patients [RCA, I].

Task factors

Participants in the interviews and focus groups described that observations are seen as tasks with a low priority; they are perceived as simple tasks that can be ticked off the list and that need to be done as quickly as possible.

Staff may become complacent about routine observations, simply because they are routine and patients are not expected to become unwell [I].

"There are times I've been on certain wards when a patient has not had obs done the previous day... the patient has been stable... so they get complacent." *[staff nurse]*

"Because obs become so routine, it's very easy to not attach importance to them." *[junior doctor]*

In some clinical areas observations are more frequently completed than in others, for example in high dependency units, where they are seen as an integral part of the ward culture and patient care. Observations are also frequently completed on patients after surgery or patients with certain diagnoses (e.g. head injury).

It was found that the frequency of patient observations is not reviewed and patients stay at whatever frequency to which they were first assigned. It appears that sometimes observations are carried out too frequently and patients who do not need close monitoring are frequently disturbed.

"There are always times of being short-staffed so then it's about prioritising workload and taking obs appropriately. Some patients with delayed discharge are having regular obs when there's really no need for that and other patients who need it aren't getting it done." *[senior nurse]*

When early warning scoring systems are in place observations are taken, but the overall scores are sometimes not completed or are calculated incorrectly [RCA]. Equally, respiratory rates are frequently not recorded.

"Respiratory rate is not done accurately or left off, when actually it's a useful indicator of how unwell someone is." *[junior doctor]*

Early warning scores were in general seen as useful. However, participants of the focus groups described these as not always being tailored to the specifics of different patients. They risk being over sensitive, causing too many alerts and consuming resources inappropriately. Too frequent triggering might reduce appropriate response and staff may suffer 'trigger fatigue'.

Education and training factors

A lack of knowledge and training was highlighted as possibly contributing to the problem of deterioration.

"A nurse may not pick up the signs because of a lack of training or understanding. Or they might not be seeing it, they're writing it down and not seeing what's in front of them." *[staff nurse]*

There were indications that not all staff undertaking observations have an understanding of the various measures or how they should be interpreted. Some nurses may not have the required numerical skills to apply the scoring system and, in particular, newly qualified staff may lack competence [FG]. Inexperienced staff may not recognise other signs of deterioration and may not be aware of the seriousness of the situation [I].

The task of undertaking observations appears to be most usually delegated to junior nurses, student nurses or healthcare assistants (HCA). However, there was much concern in the reports that junior and auxiliary staff are trained to perform the observations, yet they are neither trained nor qualified to interpret the results [I, FG]. They might not have the knowledge of the physiology and pathophysiology behind the measures, and therefore may not be able to make appropriate judgments. Too much reliance on junior and auxiliary staff undertaking observations may mean some deteriorating patients remain undetected.

Another reason why observations are not carried out is a lack of knowledge that seemingly healthy patients are still at risk of deterioration:

"Staff don't understand the importance of doing obs. They might do them when a patient comes back from theatre, but they don't see that even if the patient is stable for the first few hours, there is still potential for something to go wrong." *[senior nurse]*

Experience appeared to be important in assessing a patient's wellbeing [FG, LR]. Knowing when it's necessary to carry out a set of observations is something that is learnt on the job and becomes a 'gut reaction' in more experienced staff.

"For some of the experienced nurses, you often hear people talk about the 'gut feeling'... you observe, you look closer, you question your patients. Somewhere along the line something will give information that a younger member of staff could overlook". *[senior nurse]*

"If you pick up subtle deterioration, you can't always stop it but a lot of the time you can. Sometimes you can just tell. It's really processing all the knowledge without realising. You recognise all the signs much quicker and put it all together… it's wisdom." *[senior nurse]*

Some junior doctors commented that they thought their training had not adequately prepared them and they learnt more through being on the job.

"You're not fully prepared when you leave medical school – you need more training to deal with people who are acutely unwell." *[junior doctor]*

"I can tell you how to swim but it doesn't mean you can swim." *[junior doctor]*

Patient factors

Some contributing factors relating to patients were identified in the studies. Deterioration incidents may occur because patients do not speak English as their primary language and this may create a barrier for understanding and communication [RCA]. It was also found that some patients refuse to have their observations done and become aggressive; this is mainly a problem when people are confused, coming round from anaesthetic or if they are elderly with dementia [RCA, I].

"On this ward, if a patient refuses to have their blood pressure taken we have to document it and let the doctor know… You would be surprised how hard a little 80 year old lady can punch!" *[staff nurse]*

Some patients seem to be more demanding and have higher expectations which places more demands on staff time [I, FG].

"It's more and more the culture where the girls are having to deal with 'I want the doctor, I want the doctor now'. It takes their time, then they get scared, they don't function well." *[senior nurse]*

"Patients have high expectations - like bank customers." *[senior nurse]*

In addition, some patients may not appear to be ill and therefore signs of deterioration could be missed [RCA]. In the root cause analysis it was identified that a patient was, for example, fully aware, talking and eating and did not appear to be ill, thus lulling the medical team into a false sense of security. Some signs of deterioration may be 'non-clinical' and not included in the observation charts. Such signs might include mood changes, quietness and tiredness.

Team and social factors

A lack of team work contributes to deterioration problems. Teams may not exist on wards because of a high turnover of nursing staff and the way in which medical teams are organised [I].

"If you know the people you're working with, then you can better trust their judgment." *[junior doctor]*

"Knowing your team and your doctors helps. Often things don't work as well in the first week after doctors change because people don't know each other, and the people you do call don't know how to respond." *[senior nurse]*

Less experienced nursing staff might not feel comfortable or confident to call more senior staff because of fear of doing the wrong thing or crossing the occupational and hierarchical boundaries [RCA, I, FG].

"It's very hierarchical here. Junior doctors, you can talk to them quite easily. Senior doctors are more difficult to talk to." *[staff nurse]*

The same problems were also raised by junior doctors who feel reluctant to call for senior support.

"You are overstretched and the consultant says you should be able to manage."

"Yeah, the consultant will say, 'why did you call me and not the SHO'?" *[junior doctors]*

Problems associated with professional hierarchies were recognised in all reports and it was acknowledged that these issues contribute to the difficulty of finding assistance when support is required. It was also found that little or no support networks for staff and a lack of leadership, e.g. from ward managers, contribute to deterioration incidents [RCA, I, FG]. In addition, the roles and responsibilities of the staff involved in caring for the patients are unclear and if there are many teams involved, no team may accept responsibility for the patient [RCA, FG].

Organisational factors

Another contributing factor to deterioration incidents may be the lack of guidelines for specific action regarding patient care. It was found that in some trusts no policies were in place for the monitoring of patients; e.g. detailing frequency and types of observations [RCA, I]. In addition, the lack of written guidelines regarding the responsibilities of staff [RCA] or the escalation procedures [FG] may contribute to the problem.

As described on pages 16 and 17, the working conditions may create a low morale on the wards, a lack of respect towards colleagues and patients and a culture where it is acceptable not to read policies or procedures.

Equipment and resources factors

A lack of equipment was identified as contributing to deterioration incidents. It was suggested that the number of monitoring sets is small on wards and is further reduced by faults and delayed maintenance work [RCA, I]. Time is wasted by chasing and rotating the equipment within and between wards and, for that reason, observations are not being done.

"You can get 2-3 post-op patients and one going to theatre who all need continuous monitoring, but you only have two blood pressure machines. So it's not going to get done. I come across this a lot." *[staff nurse]*

"Sometimes wards have to share equipment. There should be spares in place. It's slightly ridiculous in a big hospital to be doing that, when it's so crucial." *[junior doctor]*

In general, over-reliance on technology and electronic equipment was seen as a risk since it may reduce hands-on patient care and the opportunity for detecting more intangible signs [I, FG].

"Staff are very reliant on machinery. They aren't observing patients as much because they just go round and stick a thing on a patient, press the button and write down results. They don't talk to the patients. If the machine isn't there they won't do it manually because it takes longer." *[senior nurse]*

"With all these monitors and stuff we never go up to our patients and touch them and find they're really cold or they're a bit grey… you need to look at your patient as well." *[staff nurse]*

Individual factors

Individual factors were identified by staff participating in the interviews and focus group. Staff suggested that tiredness and a lack of concentration contributed to deterioration incidents.

Nursing staff have developed their own coping strategies in order to manage the workload. In the nursing focus group it was suggested by one participant that nurses sometimes don't score a patient because they know it will create extra work for them and would tie up the nurse for hours. Other nurses agreed that it wasn't good to get tied up with one patient. This strategy was seen as similar to not declaring an empty ward bed.

In addition, nurses reported that the current working conditions may not encourage and support them to take ownership and responsibility for patients and their care.

"It's the responsibility of individuals to do their job – I don't know where that's been lost." *[senior nurse]*

Using these findings to improve practice

As the results set out here indicate, consistently and effectively detecting and acting upon patient deterioration is a complex issue.

The findings described suggest a series of points where the process can fail, including:

- not taking formal observations (e.g. temperature, pulse, BP, oxygen saturation, respirations);
- not making basic visual observations (e.g. of colour, consciousness);
- taking incomplete observations (especially omitting respiratory rate);
- calculating early warning scores incorrectly;
- not recording observations;
- not recognising observations are a cause for concern;
- not communicating previous observations and clinical history at staff handover;
- not communicating previous observations and clinical history at transfer between wards or departments;
- not effectively communicating concern to other staff;
- staff receiving the communication not responding with appropriate urgency.

The underlying causes were also complex. Key findings are outlined below, followed by recommendations, resources and good practice examples from NHS organisations.

Staffing and workload issues were identified as a key underlying cause. These related not only to lack of time to carry out observations or follow up patients showing signs of deterioration, but also meant staff were less able to spend time with patients. Staff reported that this makes it more difficult for them to carry out visual observation or to be certain of the significance of observations in the context of the patient's previous history. The significance and value of doing observations was sometimes not well understood, but even where it was recognised, tasks that were important to patient comfort (including mealtimes, morning washes etc) competed for staff time. Staffing availability could be very different out of hours, especially at night and at weekends, and might be affected by levels of agency or bank staff and the mix of junior and senior staff.

Both ward nurses and doctors described challenges in **prioritising competing demands** within staffing resources and workload demands. Senior and experienced nursing staff are thought to prioritise ward workload most effectively, with junior and temporary staff having the greatest difficulty. To recognise deterioration, staff needed an understanding of the patient's recent clinical condition, and any disruption to continuity of staffing affected this, as did patient transfer between departments, or a patient 'outlying' on a ward. Nurses may struggle to interpret the results of observations correctly without time spent with the patient to gain an understanding of their clinical history, while doctors may have difficulties deciding how to prioritise amongst a group of sick patients without having previously assessed them.

A lack of **strong and effective leadership** further contributed to the problem. The findings suggest that nursing staff on acute wards were sometimes not led by an appropriately experienced and trained nurse, whose responsibility it is to maintain an overview of the wellbeing of all patients on the ward and to be available to junior staff for consultation, supervision and support.

Underlying causes included both **verbal and written communication factors**, and related not only to accurate and complete recording of observations, but clear communication on plans of action and being able to find relevant information quickly and easily. Verbal communication was affected by the sheer volume of information that needed to be handed over, and by staffing and workload issues. The art of being able to communicate information succinctly and to make requests assertively was thought to be important in securing an appropriate response. Problems with knowing who to contact, when, and how, delayed the right information getting to the right place. Written communication could be incomplete, missing, hard to locate, or difficult to understand. Having different information in different places (charts, notes etc) made it hard to see changes in the overall picture of a patient's condition.

Team and social factors affected communication issues. Shift patterns, staff shortages, reliance on agency staff and the structure of medical teams can all create barriers to developing effective team working. Staff reported not having time to get to know their colleagues; this prohibits the development of good working relationships needed for effective communication. Hierarchies and professional groupings were also important factors in team dynamics; nurses said they would rather ask another nurse than ask a doctor, and both nurses and doctors were reluctant to seek more senior help if they could not get the support they needed from their first level contact. A lack of clarity on roles and responsibilities also affected communication between individuals and teams.

Availability of equipment was an issue, and included access to watches or clocks with second hands as well as sufficient supplies of more expensive equipment. The use of technology to record blood pressure and pulse potentially reduced face-to-face observation of the patient and assessment of other potential signs of deterioration. Staff needed enough equipment to function safely even if some equipment was temporarily unavailable whilst undergoing maintenance or repair. Skills in taking observations without expensive equipment were thought to have become eroded.

Some **patient factors** affected staff's ability to carry out observations including language barriers and confusion. Staff also discussed that time spent responding to patients' requests was increasingly affecting time available for observation as patients' expectations of their care and treatment, as well as illness and dependency levels, had constantly increased. Observations were said to be missed or delayed most often at night, due to staff reluctance to disturb patients' sleep, and during morning washes and mealtimes, which were important and urgent tasks from the patients' perspective. This suggests that for observation recording

to receive an appropriate priority patients also need to be convinced of its value, since staff will be responding to patients' priorities and wishes as well as to clinical priorities. Additionally, some patients may have atypical presentations and appear unaffected until a late stage of deterioration.

Observations were seen as a specific **task**. The task was not perceived as having high priority or high status, but seen more as a simple task that needed completing as quickly as possible to 'tick the box'. Because most observations were normal, a sense of complacency could develop. Additionally, patients were described as being left on unnecessarily high observation frequencies because this was not reviewed as their condition stabilised; this meant staff were completing observations that they did not think were necessary, which tended to devalue the task as a whole. Calculating the early warning score was a linked task in areas where these scores were used, but staff described 'trigger fatigue' where oversensitivity of a score diverted staff time inappropriately or led to complacency. It could become accepted practice to omit some observations, with respiration rates most likely to be omitted.

Education and training were seen as important in several respects. Outside high dependency environments, routine observations were usually carried out by healthcare assistants or student nurses. Whilst technically able to carry out the observations, there were concerns that they did not have sufficient training to understand the relevance of any findings and how to communicate these onwards effectively and promptly. Interpreting the significance of the results also depends on an in-depth understanding of the patient's recent history and condition, and an ability to synthesise several sources of information, which less skilled staff were unlikely to possess. A lack of basic maths skills affected staff ability to calculate early warning scores. Skills in time management and prioritisation of workload, leadership and communication were thought essential to respond appropriately to early signs of deterioration in hospitalised patients. Several staff described how these were usually developed only with time and experience, rather than any speeding of the development of junior staff through education and training.

Policies and procedures relevant to recognising and acting on deterioration, including escalation policies, were not always in place, or awareness of them was low, or they were described as difficult to follow. Staff also described it being accepted as normal practice not to read policy or guidance under pressure from immediate workload. Contact systems could be complex, with bleep holders and contact numbers changing with shift changes and patient allocation.

Environment was also thought to be important in terms of noise, interruptions, and patients being out of sight in single rooms. **Individual staff** could be affected by factors such as tiredness, demands on concentration, feeling discouraged, feeling unsupported, and not feeling personally responsible for their work.

Understanding both the points where the process of consistently and effectively detecting and acting upon patient deterioration can fail, and the complexity of underlying reasons for why this happens, can help healthcare organisations prioritise and target their efforts to improve patient safety. Suggestions for effective systems to take this forward in individual trusts are outlined in the following section.

Conclusions and recommendations

To address complex safety issues, it is important that the right people are involved within each healthcare organisation, and that efforts to improve the safety of patients vulnerable to deterioration are an ongoing process.

Therefore, the key recommendations of this report are that:

Every acute trust ensures leadership and coordinates efforts to improve the safety of patients who are vulnerable to unexpected deterioration by establishing a 'Deterioration Recognition Group'. The group needs appropriate multi-disciplinary membership, including healthcare professionals, managers, educators and a patient perspective. The group will need to have appropriate links with local structures and processes, including links with clinical governance and risk management, workforce planning, education programmes, critical care staff and strategic health authorities/regional offices. The group should include at least one senior member who can link effectively with their trust's Board. To be effective, this group would need to measure baselines and monitor improvements following local interventions.

We would also suggest trusts learn from their local equivalents of the data sources we used to develop this report. Trusts should consider trends or patterns in their local incident reports, look for common findings within the results of local root cause analysis investigations, and consider observing ward practice and holding focus groups with their own frontline staff, including temporary and junior staff. Trusts should also consider other local information sources, including outcome data and audit results.

In order to support the local review of systems and processes, we have produced a checklist of reflective questions based on the findings from this work (see Appendix 1). The checklist is targeted towards actions that could be applied in the short term and **we recommend that acute trusts review their approach using this checklist.** Reflecting on the questions will help to identify effective implementation strategies sensitive to local organisation, culture and present policies. We have also compiled a number of links to a variety of resources and good practice examples that might prove helpful (see Appendix 2).

We hope you will use this report to inform the work of your local group, together with the NICE guidelines *Acutely Ill Patients in Hospital*[4], the NICE Guidelines implementation package[5], and the NPSA report *Safer care for the acutely ill patient: learning from serious incidents*[3] launched in July 2007. We know that approaches vary from trust to trust and many already have very good systems; however, even those with the best systems may still be able to identify opportunities for improvement.

Appendix 1

Checklist (also available at **www.npsa.nhs.uk**)

Communication and teamwork

- ☐ Do you think communication can be improved in relation to deteriorating patients?
- ☐ Have you considered introducing a communication tool (such as SBAR or RSVP; see Appendix 2)?
- ☐ Have you considered introducing multidisciplinary structured handovers?
- ☐ Have you considered introducing multidisciplinary team meetings?
- ☐ Are roles and responsibilities clear to all staff members in the team?
- ☐ Do you think your team would benefit from training to improve teamwork?

Monitoring and escalation procedures

- ☐ Do patients have a clear, written monitoring plan that specifies which physiological observations should be recorded and how often?
- ☐ Are the monitoring plans being reviewed on a regular basis?
- ☐ Are you using physiological track and trigger systems to monitor all patients?
- ☐ Have you considered introducing colour-coded observation charts?
- ☐ Is the task of taking observations assigned to an appropriate person?
- ☐ Do you have systems in place (i.e. regular audits) for checking the quality and appropriateness of observations?
- ☐ Do staff need training in the recognition, assessment and management of acutely ill adult patients?
- ☐ Is the required equipment available on the ward?
- ☐ Do you have an 'Escalation Policy' or clinical response strategy in place?
- ☐ Do you have a policy in place for transferring patients to other departments?

Management and workload

- ☐ Are you supporting colleagues in setting the right priorities for their workload?
- ☐ Are you encouraging colleagues to see observations as an important element of their work?
- ☐ Are you encouraging colleagues to seek advice more readily?
- ☐ Are you encouraging colleagues in taking ownership and responsibility for patients and their care?
- ☐ How are you making colleagues feel valued?
- ☐ Do you have a suitably experienced ward leader on every shift who maintains an overview of the wellbeing of all patients?
- ☐ Have you considered implementing iBleep (see Appendix 2)?
- ☐ Are staff aware that seemingly healthy patients are still at risk of deterioration?
- ☐ Are staff aware of policies?
- ☐ Do staff understand the process of undertaking a root cause analysis?
- ☐ Are changes being implemented following investigations?

Appendix 2
Resources and good practice examples

There is a Patient Safety Action Team in every Strategic Health Authority in England and one nationally in Wales, which is available as a resource for all patient safety matters.

Communication and teamwork	
Guidelines and documents	The document *Safe handover: safe patients* (NPSA, NHS Modernisation Agency, August 2004) provides guidance for clinicians and managers on best practice in handover. **www.npsa.nhs.uk/site/media/documents/1037_Handover.pdf** The Team Resource Management (TRM) programme was launched in 2002. It applies learning from the aviation industry and elsewhere to address issues of teamworking in the healthcare environment and its impact on a number of factors, including patient safety. More information is available at **www.cgsupport.nhs.uk/PDFs/articles/Team_Resource_Management.pdf** National Confidential Enquiry into Patient Outcome and Death (NCEPOD) *Emergency Admissions: A journey in the right direction?* (October 2007). Available at **www.ncepod.org.uk/2007.htm**
Training courses	A range of training courses are available for NHS staff, including communication skills and assertiveness training. For more information see **www.nhstraining.co.uk** The NHS healthcare skills website has an interactive training course on teamwork and leadership. It covers why teamwork is good for patient care, what makes a good team, how differences affect teamwork, what makes a good leader and how leaders and their teams can work towards safer patient care. The course can be completed online. **www.healthcareskills.nhs.uk/teams-leadership.html**

Communication and teamwork	
Other initiatives, tools and good practice examples	The SBAR (Situation-Background-Assessment-Recommendation) technique provides a framework for communication between members of the healthcare team about a patient's condition. A toolkit is available on the website; this includes tools that provide instructions on how to use the SBAR technique and a form to gather necessary information to be communicated. More information is available at **www.ihi.org/IHI/Topics/PatientSafety/SafetyGeneral/Tools/SBARTechniqueforCommunicationASituationalBriefingModel.htm** A template for a SBAR report has also been developed by Luton and Dunstable Hospital NHS Foundation Trust. For more information please contact: William Randell, Clinical Risk, Emergency Planning and Information Governance Manager, Luton and Dunstable NHS Foundation Trust Hospital email: **william.randell@ldh.nhs.uk** A tool has been developed at Portsmouth Hospitals for communicating information about 'patient condition or deterioration'. The RSVP tool (Reason-Story-Vital Signs-Plan) is simple to use and the term 'RSVP' is already in common use in the everyday language, meaning 'please reply or respond'. RSVP will form an integral part of the updated ALERT course. Further information is available from Dr Peter Featherstone. email: **peter.featherstone@porthosp.nhs.uk** The World Health Organization's Collaborating Centre for Patient Safety Solutions unveiled nine solutions to prevent healthcare errors in April 2007. One of the solutions relates to *Communication during Patient Handovers*. More information is available at **www.jcipatientsafety.org/fpdf/presskit/PS-Solution3.pdf**

Monitoring and escalation procedures

Guidelines and documents	The NICE guidelines *Acutely Ill Patients in Hospitals* (July 2007) cover the care of all acutely ill adult patients in hospital, including patients in emergency departments. They are available at **www.guidance.nice.org.uk/CG50#documents** A suite of implementation support tools to accompany the NICE guidelines is also available on the NICE website and includes: • **implementation advice**, providing practical advice to help those responsible for planning and implementing the guideline • **audit criteria** designed to help NHS organisations with their baseline assessment and to help them review and monitor practice to ensure compliance with the key recommendations • a **slide set** to raise awareness of the NICE clinical guidelines on acutely ill patients in hospital. *Guidelines for the Transport of the Critically Ill Adult* have been issued by the Intensive Care Society in 2002. These are available at **www.ics.ac.uk/icmprof/downloads/icstransport2002mem.pdf** *Resuscitation Guidelines 2005* were published by the Resuscitation Council (UK) and are available at **www.resus.org.uk/pages/guide.htm**. The Guidelines cover basic and advanced life support and include a chapter on *Prevention of in-hospital cardiac arrest and decisions about cardiopulmonary resuscitation* (pages 27-32).

Monitoring and escalation procedures

Training courses	Following are examples of training courses aimed at improving recognition and response to deterioration.* *Acute Life-threatening Events – Recognition and Treatment (ALERT)* is a one-day, multi-professional course in care of the acutely ill patient. The course incorporates interactive seminars, practical demonstrations and role–play clinical scenarios. **www.alert-course.com/** The *Acute Illness Management (AIM) Course* is a one-day inter-professional course developed to standardise the clinical approach to the recognition, assessment and management of acutely ill adult patients. **www.gmskillsinstitute.nhs.uk/aimcourse/4515409031** The *Care of the Critically Ill Surgical Patient (CCrISP®)* is a 2½-day course and is designed to advance the practical, theoretical and personal skills necessary for the care of critically ill surgical patients. **www.rcseng.ac.uk/education/courses/care_of_critically_ill.html** The *IMPACT (Ill Medical Patients' Acute Care and Treatment)* course introduces the principles and practice of acute general medical care and the related knowledge, skills, understanding and attitudes. The two-day course provides SHOs in medicine with key point presentations, workshops, 'hands-on' skills stations and critically ill patient scenarios to enhance skills needed for dealing with life-threatening medical emergencies. **www.impactmedical.org** Various courses on life support are provided by the Resuscitation Council **www.resus.org.uk** The NPSA is developing a Foresight Training programme for nurses and midwives. This training uses a series of scenarios based on real life events to help participants identify factors that can impair safe practice. The training aims to improve the foresight skills of participants from primary care, acute and mental health settings. Further information will be available on the NPSA website early in 2008. However, in the meantime, please contact Jo Parker, Head of Safer Practice (**joanna.parker@npsa.nhs.uk**) for more information. * The NPSA does not endorse any of these training courses. Organisations should investigate locally which courses are available and appropriate to their needs.

Monitoring and escalation procedures

Other initiatives, tools and good practice examples	A colour-coded banded card, which removes the need for a score to be calculated, has been developed by Luton and Dunstable Hospital. The information is explicit – if the patient's condition is in decline, scores fall into red or yellow boxes. If two yellow, or one red box are filled, the nurse must take action and respond to the patient's condition. More information is available at **www.health.org.uk/news/features/stopping_needless.html** Contact: William Randell, Clinical Risk, Emergency Planning and Information Governance Manager, Luton and Dunstable NHS Foundation Trust Hospital. email: **william.randell@ldh.nhs.uk** A system has been designed by Portsmouth Hospitals NHS Trust and the Learning Clinic enabling nurses to collect routine vital signs at the bedside using handheld computers. These PDAs integrate the data with a locally agreed track and trigger algorithm to calculate and display an early warning score (EWS). For more information please contact Professor Gary Smith, Department of Critical Care, Queen Alexandra Hospital, Portsmouth. **email: gary.smith@porthosp.nhs.uk** A 'Trust Standard for physiological observation of adult, non-obstetric in patients' has been developed by Royal Berkshire NHS Foundation Trust. The document outlines the types and frequency of physiological observations that should be undertaken and documented; it also includes a section on 'seeking help'. If you would like to receive a copy of the policy please contact Mandy Odell, Consultant Nurse, Critical Care, Royal Berkshire NHS Foundation Trust. email: **mandy.odell@royalberkshire.nhs.uk** The Critical Care Outreach service has conducted an annual Acute Inpatient Audit on all adult, non-obstetric patients in the Royal Berkshire and Battle Hospitals (RBBH) NHS Trusts, since July 2001. For more information please contact Mandy Odell, Consultant Nurse, Critical Care, Royal Berkshire NHS Foundation Trust. email: **mandy.odell@royalberkshire.nhs.uk** A patient transfer policy has been developed by Adele McNellie, Lead Nurse (Surgery) at Central Manchester Children's NHS Trust. The policy outlines the transfer procedure, contains a 'patient transfer document' and a 'patient transfer decision making matrix'. If you would like to receive a copy of the policy please contact Sarah Corcoran, Associate Director of Clinical Governance, Central Manchester and Manchester Children's University Hospitals NHS Trust. email: **sarah.corcoran@CMMC.nhs.uk**

Management and workload

Training courses	The NPSA Root Cause Analysis e-learning programme is an online training programme with support materials available to download and use. The programme has been designed to help busy NHS staff whose training must adapt to fit hectic schedules. Divided into six modules, the first four provide an overview of RCA for those who need to undertake an RCA of a patient safety incident. The last two modules are more specialised for anyone wanting to obtain a deeper understanding of the theory behind RCA. **www.npsa.nhs.uk/health/resources/root_cause_analysis**
Other initiatives, tools and good practice examples	*Releasing Time to Care: The productive ward* is an innovative and practical programme of work which helps to create a strong focus on the processes of care within the ward setting. The programme is user friendly, with step-by-step guidance provided through a series of modules, so improvements can be made at a pace that suits the ward and organisation. The ward team will learn simple improvement techniques that offer dramatic results in healthcare settings and, importantly, they will lead and control the improvements themselves. Developed by the NHS Institute in close collaboration with a range of NHS ward teams, Releasing Time to Care can be applied to any ward setting. **www.institute.nhs.uk/quality_and_value/productivity_series/productive_ward.html** The software IT system iBleep can be used to support the work of junior doctors working in teams and is now available as a free downloadable system to Trusts in England through NHS National Workforce Projects. Trusts should register their interest on the iBleep portal (**www.ibleep.net**). They will then be validated and given a user name and password to allow access to the portal. A prerequisite document is available at **www.healthcareworkforce.nhs.uk/wtd** The 'three buckets model' is a simple tool for individuals and teams to understand their own safety levels and has been devised by Professor James Reason. The self-review tool asks each individual (it could also apply to teams) to give themselves a score in relation to three factors – self, context and task. They score themselves either 'one' for low risk, 'two' for medium or 'three' for high risk. More information about the tool is available at **www.qshc.bmj.com/cgi/content/full/13/suppl_2/ii28**

Appendix 3
Multi-agency group membership

Professor Richard Thomson (Chair), Professor of Epidemiology and Public Health at the University of Newcastle upon Tyne (previously Director of Epidemiology and Research at the NPSA)

Kate Beaumont, Deterioration Project Lead, NPSA

Dr Mary Armitage, Royal College of Physicians

Dr Maureen Baker, Connecting for Health

Dr Anna Batchelor, Intensive Care Society

Jennifer Benjamin, Patient Safety Team, Department of Health

Maura Buchanan, Royal College of Nursing

Dr John Curran, Royal College of Anaesthetists

Dr Jane Eddleston, Clinical & Scientific Services, Manchester Royal Infirmary; Department of Health

Dr George Findlay, National Confidential Enquiry into Patient Outcome and Death

Dr David Gabbott, Resuscitation Council

Dr Kevin Gunning, Intensive Care Society

Dr Gill Hastings, The Health Foundation

Dr Ann McDonnell, Sheffield Hallam University

Mr Charlie McLaughlan, Royal College of Anaesthetists

Ros Moore, Department of Health

Mandy O'Dell, British Association of Critical Care Nurses

Dr Hugh Rogers, NHS Institute for Innovation and Improvement

Dr Kathy Rowan, Intensive Care National Audit and Research Centre

Dr Paul Rylance, Royal College of Physicians

Professor Gary Smith, Queen Alexandra Hospital, Portsmouth

Dr Tim Stokes, National Institute for Health and Clinical Excellence

Linda Watterson, Royal College of Nursing

Keith Young, Emergency Care Team, Department of Health

NPSA Membership
Vivienne Allan, Acting Director of Communications

Donna Forsyth, Patient Safety Manager

Dagmar Luettel, Research Associate

Joan Russell, Safer Practice Lead

Dr John Scarpello, Deputy Medical Director

Appendix 4
Search terms used for the literature review

A wide range of search terms was used for the literature review; the exact terms varied with the database and were employed singly or in combination:

Deterioration

Observation(s)

Vital signs

Fatal outcome

Death

Professional competence

Nursing records

Missed observations

Late observations

Workload

Nurse

Monitoring physiologic

Monitoring

Outcome

Patient transfer

Doctor-nurse communication

Assessment

Communication

Handover

Handoff

Inter-professional relations

Continuity of care

Record keeping

Documentation

Clinical errors and prevention

Shift reports

Transfer inter-hospital

Patient assessment

Malpractice

Nurse error

Clinical competence

Professional competence

On-call

On-call doctor

Late observations

Missed (near) observations

Delay (near) observations

Appendix 5

Data triangulation methodology (example)

	Root cause analysis	Interviews	Focus groups	Ethnographic analysis	Literature review
COMMUNICATIONS – written					
Incomplete and inadequate documentation	Observations and scores may have been done but were not documented	Fluid balance not well documented	Incomplete record keeping. Incomplete information on fluid and observation charts	EWS forms are not always fully completed	Staff may fail to record baseline or subsequent scores
	Documentation is illegible or unclear			The times when observations were taken and initials of staff were sometimes difficult to read	
COMMUNICATIONS – verbal					
Lack of/ inadequate communication (doctor-nurse)	Doctor(s) may not adequately inform nurses regarding patient's care	Poor communication between doctors and nurses	Communication between nurses and doctors difficult		
		Nurses do not communicate well, need to be clear and assertive	Nurses should be more assertive	Nurses may struggle to communicate in a manner that would convince the doctors of the urgency	Difficult for nurses to communicate the perceived urgency to medical staff
Lack of/ inadequate communication (nurse-nurse)	Nurses may not adequately inform each other regarding patient's care, specifically at handover	Information is lost at handovers	Too much information at handover, difficult to remember everything		Handovers might be poor, difficult for less experienced staff to understand, vital information could be lost
	No contact details available on ward; confusion over who to contact regarding outlying patient	No information available to know who to call	Confusion over who to contact regarding outlying patient		

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