4: Integrating Human Factors to improve the quality of incident investigation

In this Chapter

- The role of human factors in incident investigation
- How to Integrate Human Factors into the Investigation Process
- Further resources and reading.

The role of human factors in incident investigation

Investigating and learning when things go wrong with a patient's healthcare treatment is an essential part of improving patient safety. This chapter focuses on the importance of integrating human factors into incident investigation.

What human factors research tells us

In the last decade, approaches from other industries have been adapted and applied to investigate incidents, claims and complaints in healthcare (Reason, 1990; Vincent and Taylor-Adams et al., 2000; Woloshynowych, Rogers et al., 2005). In some healthcare organisations this work has improved the understanding that human error is most commonly a systems problem. It has also provided frameworks and resources for carrying out systematic incident investigation of patient safety incidents (Vincent, Taylor-Adams et al., 2000; National Patient Safety Agency, 2005-2012).

There is no doubt that widespread use of a standard root cause analysis (RCA) framework has greatly improved the quality of incident investigation in healthcare and staff are enthusiastic about its use. However, staff are not always successful in applying it due to their trust's culture, systems and approach to how RCA is conducted and resultant learning is disseminated (Wallace et al., 2006). For example, the authority and credibility of the lead investigator can affect their ability to engage others in the investigation process. In terms of organisational culture, research has shown that where multi-disciplinary team meetings are held to identify why things went wrong (contributory factors and root causes), medical consultants often dominate the discussion but nurses and junior doctors are sometimes reluctant to challenge senior consultants in an open forum (Wallace et al., 2006).

Excellence in root cause analysis depends upon leadership and the enthusiasm of individuals as well as supportive structures, processes and culture compatible with root cause analysis.' (Wallace et al.,2006).

More complex system issues such as the influence of culture, non-technical skills and behaviours of senior staff may also be side-lined in the investigation process as they may be difficult to quantify and provide evidence for having been "fixed."

Overall, more work needs to be done to place human factors at the heart of incident investigation and manage expectations on the speed with which some of these issues can be addressed.

What we have learnt from experience

Enhancing the focus on human factors in incident investigation will improve the quality of investigations and ensure that recommendations, once implemented, prevent a similar incident from recurring. Some innovative work is already being carried out in this area by healthcare organisations in the UK. Three case study examples are summarised below:

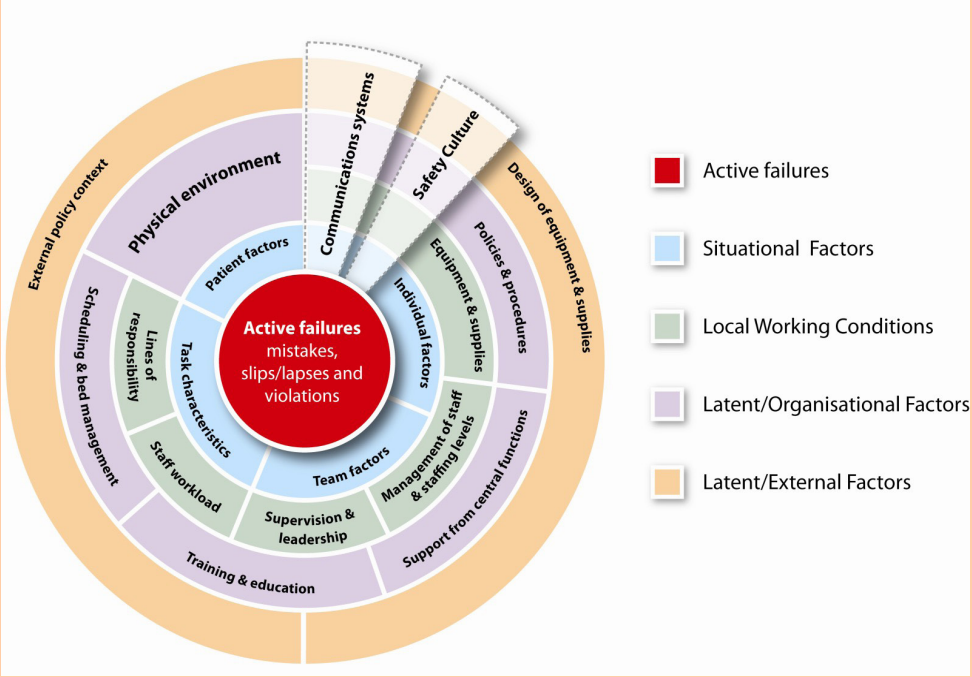
Case study 1: The Yorkshire Contributory Factors Framework

The Yorkshire Contributory Factors Framework (Lawton, McEachon et al., 2012) is a tool which integrates human factors into the investigation process. The following describes the development and piloting of the framework:

The Yorkshire Contributory Factors Framework

Lawton, McEachon et al., (2012) have developed an evidence-based and standardised list of contributory factors that can be used as a basis for understanding causation. Previous frameworks to understand factors that contribute to incidents (known as contributory factors) have the limitation that they have often been adapted from non-healthcare settings that are very different in their structure and function to the healthcare domain. Although these frameworks have a theoretical basis, they are not empirically-based. The Yorkshire contributory factors framework overcomes this issue because it was developed from a review of previous studies carried out in healthcare.

Figure 5: The Yorkshire Contributory Factors Framework



By reviewing ninety-five studies, representing 83 different datasets, Lawton and her research team showed that the overwhelming majority of contributory factors that were identified in the review (irrespective of hospital setting or methodology) were active failures or individual factors. Hence, healthcare is still focusing on the proximal causes of incidents and not drilling down to identify the underlying systems factors that increase the chances doctors, nurses and allied healthcare professionals will make errors that harm patients. Lawton, McEachon et al., (2012) states '…a focus on individual responsibility for errors is likely to be ineffective as an incident reduction strategy.'

The Yorkshire Contributory Factors Framework has been applied to the investigation of 9 related serious incidents within Bradford NHS Hospitals Acute Foundation Trust. Applying the framework improved the focus of the investigation on 'systems factors' or 'latent failures' rather than 'active errors'. Applying the framework also demonstrated the challenges of embedding human factors into incident investigation when working with colleagues who are not human factors experts.

Case study 2: After Action review at University College London NHS Hospitals Foundation Trust

Creating a culture where openness to learning and willingness to acknowledge lessons learnt and put changes into practice is still far from being the norm in healthcare organisations (Walker, Andrews et al., 2012). The Education Service at University College London NHS Hospitals Foundation Trust has addressed this problem by adapting a method originally developed in the US Army, After Action Review, for use in healthcare settings:

After Action Review

After Action Review (AAR) supports healthy team behaviours like listening and asking questions and uses the "free lessons" of everyday events, as well as serious incidents, to improve the safety and quality of patient care. It supports the creation of a 'culture of reflection' where staff learn why things did or did not go according to the way they planned and what they might do the same or differently next time. Central to the AAR process is the belief that lessons can be learnt and shared without the need to blame others.

Every AAR follows the same structure with the 'AAR conductor' (i.e. facilitator) getting agreement for the ground rules at the outset and ensuring everyone is clear about the specific purpose of the AAR. AAR uses the four questions shown in Table 3 to structure the analysis:

Table 3: After action review

The Four After Action Review Questions
1. What was expected?
2. What actually happened?
3. Why was there a difference?
4. What have we learnt?

By implementing AAR through a multi-professional training programme, the Trust has improved reflective learning when things go wrong: 53% of externally reported Serious Incidents last year had an AAR conducted (as well as the formal incident investigation). Integrating AAR early on in the incident investigation process helps to create collective insights and reminds teams that the purpose of investigation is to learn, not to blame.

'The culture of attaching blame to others for the problems which we encounter in everyday work is a 'comfort zone' which we all show varying degrees of reluctance to leave. To leave our default position of others being to blame means we have to risk the reality that we ourselves may be part of the "problem".' (Walker, Andrews et al., 2012).

Case study 3: Reviewing the quality of incident investigation locally

Our third case study highlights work carried out at NHS Bedfordshire and Luton Cluster.

Integrating human factors into investigation

The Quality Manager and Safeguarding Adults Lead at NHS Bedfordshire and Luton Cluster recently completed a MSc. thesis which evaluated how to integrate human factors into incident investigation (Saunders, 2012). The research adapted an investigators quality tool, originally developed in aviation, to examine the quality and the continuity of identifying human factors in the RCA process. The key findings showed that human factors were often not identified by the root cause analysis process. Mismatches were also identified between a contributing factor identified in the investigation and the recommendations, and action plans. That is to say, there was no logical flow between the underlying causes of the incident, the recommendations that were made and the action plans that had been developed (Saunders, 2012). Saunders' findings are supported by external human factors reviews of incident investigations which some healthcare organisations have commissioned to review the quality of local investigation processes.

How to Integrate Human Factors into the Investigation Process

Just as we need to design healthcare systems, processes and equipment to support delivery of safe care, the infra-structure, tools, and culture that support incident investigation largely determines the quality of the output. Given these findings, the implementation tips illustrate how to improve the integration of human factors into the investigation process.

Implementation tips

Executive and non-executive directors

Seek assurance that your organisation has a robust system in place for investigating and learning from incidents. The following assurance-seeking questions provide a useful framework for executive and non-executive directors:

i. Have staff in your organisation that take on the role of lead incident investigators received formal training in root cause analysis or a similar investigation technique?
ii. Is peer review between lead-investigators commonplace?
iii. Do lead investigators have protected time to carry out incident investigations or are they fitting it in around their 'day job'? (the latter shows there are problems with the infra-structure to support robust investigation).
iv. Does your organisation use a team approach to investigation (versus a single investigator)? Where a single investigator model is used, your organisation increases the risk that investigations will be based largely on the assumptions and interpretation of one person.
v. Ask your Risk Management team to review serious incident investigation reports from the last three years to identify:
    - The proportion of 'root causes' that identify underlying 'systems factors' versus the proportion that focus on 'active errors' and 'non-compliance.'
    - The percentage of recommendations have been implemented and sustained over time
    - The proportion of investigations where statements and perspectives from patients and carers were fed into the investigation
    - The number of near misses that had the potential to cause severe patient harm or death that have been thoroughly investigated using a structured incident investigation technique like RCA (if the proportion subject to thorough investigation is low this may show that your organisation does not have sufficient investigation capacity and/or that you are missing the opportunity to learn systems lessons from near misses)
    - The types of serious incidents or near misses with potentially severe harm which keep recurring. Recurrent incidents are indicative of weaknesses in the investigation process. They suggest that weak recommendations have been developed and/or that the implementation process has somehow failed.
vi. Think about how your Board seeks assurance that recommendations from incident investigations have been implemented and sustained? Do you rely solely on information presented in Board summary reports on incident investigations? If so, remember that executive walk rounds or informal 'coffee mornings' between executives/non-executives and clinical staff' provide an opportunity to cross check this information.

Implementation tips

Incident investigators

- When carrying out an investigation, check that your analysis does not stop at identifying active failures and non-compliance by healthcare professionals. Have you identified and described WHY errors and non-compliance occurred?
- Apply the Yorkshire Contributory Factors framework in your next investigation
- Remember that applying lessons from human factors can improve the quality of investigations. Consider the types of recommendations that you have made as a result of your investigation. Human factors research has shown that different types of barriers and recommendations are more or less effective (Trost and Nertney, 1985) whereas re-training staff, writing or amending a policy or telling people to do things differently do not provide long-term, robust solutions that will prevent an incident from recurring. All too often in healthcare investigations, recommendations are put forward that do not address the underlying cultural, workplace and equipment design, workload, teamwork and leadership issues. Consider asking a peer reviewer to cast fresh eyes on your recommendations with this in mind
- Don't forget to elicit the patient or carer's perspective on what went wrong and why.

Implementation tips

Risk Managers and/or Patient Safety Leads

- Review the last ten incident investigation reports. How many root causes are focused on active failures (i.e. errors and non-compliance committed by healthcare professionals in the direct provision of healthcare treatment)? How many address 'systems factors' that conspired to create the error traps which healthcare professionals fell into?
- Now read through the recommendations from the last ten incident investigation reports. Do the recommendations focus on writing or amending a policy, re-training a member of staff or reminding groups of staff that their behaviour is unsafe? If the majority of recommendations fall into these three categories, the chances are that the incident will recur because the recommendations focus on solutions which human factors research tells us are the least robust or failsafe
- Does your organisation use a serious incident investigation recommendation action tracker where all of the key findings and recommendations from investigations are collated in one document? By locating all of the key findings and recommendations into a single source document, you will simplify the system in place locally for tracking what recommendations have been implemented and which have not
- Carry out a review of the quality and comprehensiveness of local incident investigations. Make sure that whoever leads this work is independent.

Further reading and resources

Useful incident investigation references and books

1. Vincent C, Taylor-Adams S, et al. (2000). How to investigate and analyse clinical incidents: clinical risk unit and association of litigation and risk management protocol. BMJ. 18;320(7237):777-81
2. Lawton R, McEachan RR et al. (2012). Development of an evidence-based framework of factors contributing to patient safety incidents in hospital setting: a systematic review. BMJ Quality and Safety. 21(5):369-80.

Useful websites

1. The National Patient Safety Agency's root cause analysis tools and templates are available at: www.nrls.npsa.nhs.uk
2. Cranfield accident investigation centre: www.cranfield.ac.uk/soe/departments/airtransport/csaic/page13461.html.

Human factors resources

1. Dekker S. 2006. The field guide to understanding human error. Ashgate Publishing
2. The CHFG's report on Never Events in the NHS 'Never?' is available at www.chfg.org

5: Understanding the human factors of non-compliance

In this Chapter

- Learning from healthcare staff non-compliance with policies and procedures
- Understanding organisational drift
- Further resources and reading.

Learning from healthcare staff non-compliance with policies and procedures

What human factors research tells us

Human factors research across a number of industries has shown that the more prescriptive rules workers have imposed on them, the less likely they are to comply (Reason et al.,1998; Lawton, 1998). Humans are also naturally adaptive and tend to improvise, which makes some levels of non-compliance inevitable (Amalberti et al., 2005; 2006).

In healthcare, the response when non-compliance occurs is all too often disciplinary action. Other high technology industries, like commercial aviation, nuclear power and off-shore oil and gas production have carried out numerous human factors projects to understand the causes of procedural non-compliance (Health and Safety Executive, 1995; Federal Aviation Authority, 2007; Institute of Petroleum, 2003; Reason, 1997; Lawton, 1998; Phipps et al., 2008).

A range of individual, team and organisational factors lead to procedural non-compliance (Carthey, 2011) (see Table 4)

Table 4: Factors that increase non-compliance

Factors that lead to non-compliance with policies and procedures
1. Perceived low likelihood of detection
2. Lack of awareness/understanding of policies and procedures
3. Misperception or lack of recognition of risk
4. Self-perceived authority to violate (ignore the rules)
5. Time pressure/pressure to get the job done
6. Copying behaviour (i.e. learn to do the procedure from a colleague who is non-compliant)
7. Lack of leadership
8. Lack of end-user engagement when policies and procedures are written.
9. Policy and procedure overload (for example, confusion over which procedure applies when)
10. Ambiguous or conflicting messages in the policy/procedure
11. Lack of training and reinforcement of key policy messages over time.
12. No sanctions imposed for non-compliance
13. Lack of monitoring systems to check procedural compliance
14. Policies and procedures are inaccessible
15. Out of date procedures/policies
16. Mismatch between the policy/procedure and how the job is actually done.

Can the application of human factors improve current practice?

Just as in the development of medical devices, applying tools like task analysis, workload assessments, walk-throughs and simulation etc. during design and development helps to produce policies and procedures that are simple and easy to follow.

In the oil and gas production industry, levels of compliance have been improved by using non-compliance workshops as a forum to openly discuss procedural violations with maintenance engineers. The workshops are used by managers to provide feedback on incidents that have involved non-compliance. They also support open communication between managers and engineers about whether procedures are easy to understand and are usable.

Where procedures are unworkable in practice, the feedback from the maintenance engineers is used to simplify or amend them. No sanctions are imposed on the maintenance engineers who participate in the workshops. They are carried out in the spirit of learning and improving, thus providing important feedback mechanism to maintenance engineers about the potential safety risks of non-compliance and for managers about the design and usability of procedures.

What we have learnt from experience?

A recent human factors study in healthcare has identified the factors that contribute to procedural non-compliance (Carthey et. al 2011). These factors include:

- Volume, i.e. the total number of procedures
- Length and complexity of procedures (i.e. total number of pages and navigability)
- Naming and accessibility
- Multiple different procedures on the same topic
- Trivial procedures (i.e. procedures that are written as a knee jerk response to an issue. Some examples identified were the Wearing of Crocs in Theatres policy and the Managing adverse weather conditions procedure)
- Conflicting requirements
- Poor version control.

The complexity of healthcare procedures was clearly illustrated in this study which showed that a patient admitted to hospital for emergency treatment for a fractured neck of femur would be treated using 75 different procedures and guidelines! One hospital had a 122-page "Medicines Policy" in which Operating Theatre staff who were interviewed could "never find the controlled drugs section".

The following page shows an example of good practice from one healthcare organisation that have carried out a human factors analysis of procedural non-compliance and developed an action plan for improvement:

Using human factors methods to improve policy compliance

One London acute Trust applied human factors analysis to understand non-compliance with policies and procedures. The work involved a human factors specialist carrying out an aggregate analysis of claims, complaints and incident report data to identify the frequency with which non-compliance was a contributory factor and which healthcare policies and procedures had high levels of non-compliance. Task analysis and interviews with a cross-section of healthcare staff were also carried out to understand the challenges they faced when accessing and understanding policies and procedures. The aggregate analysis findings acted as an impetus for the Executive Board to invest in work to change the way that policies and procedures were developed, implemented and monitored. Search terms on the Trust's intranet site were changed so that they matched the expectations of healthcare teams and the process for writing and approving policies was simplified. The organisation's culture and approach to managing non-compliance also improved. When the study started, writing a policy or procedure was the knee jerk response to a problem. As a result of the study, senior managers realised that this was ineffective and actually increased the likelihood of non-compliance.

Remember, if healthcare professionals can see the need for a policy or guideline, if the way they are written shows a practical understanding of the 'real world' and if they are easy to access and follow, staff are more likely to comply with them (Carthey et al., 2011).

Implementation tips

Risk Managers and/or Patient Safety Leads

- Openly discuss with your healthcare team the challenges they face when accessing and using healthcare procedures. Such discussions provide valuable intelligence about how workable procedures are in the real world
- Review a sample of complaints, incidents and claims to identify the frequency with which non-compliance contributes to these events. Having baseline data on the frequency and nature of non-compliance in your own organisation will help to convince senior managers and senior clinicians to change current practice. It will also mean you can measure improvement
- Engage a human factors professional to apply task analysis, walk-throughs etc... when developing healthcare procedures
- Consider holding non-compliance workshops, like those used with maintenance engineers in the oil and gas industry, to learn about the challenges people face when implementing policies and procedures and to feedback lessons learnt from incidents, claims and complaints
- Use Patient Safety executive walk rounds as an opportunity to discuss procedural non-compliance with healthcare teams. Ask if the procedure is workable in practice. If not, find out how it needs to be revised to make it workable in the 'real world.'
- Raise awareness amongst Human Resources and Workforce teams that non-compliance is a 'systems problem.' Remember that all too often in healthcare organisations, staff are disciplined for not following policies and procedures. As part of the drive to develop an open and just culture, it is important to understand the reasons for non-compliance. Where procedures were inaccessible and/or unworkable in the 'real world' it may not be appropriate to impose sanctions against individuals.