Introduction:

Patient safety is a high priority in healthcare and much time, effort and money is being invested into studying how it can be improved upon. Around 10% of patients admitted to NHS hospitals every year experience some kind of health care related harm. Estimates show that half of these incidents could be prevented. The Department of Health’s Patient Safety Research Portfolio (PSRP) is a national drive to study errors made in healthcare, measure them and find ways of preventing them in the future.

This briefing paper is based on work undertaken by a team of researchers from Coventry University and University of Birmingham, and was led by Professor Louise Wallace, Director of Research at the Applied Research Centre Health & Lifestyles Interventions at Coventry University. The study, first published in 2006, looked at the impact of national training for root cause analysis (RCA) of patient safety incidents that was provided by the National Patient Safety Agency (NPSA) for NHS staff. It studied the training programme over a nine-month period from January to September 2005. The study is being highlighted now as part of a new drive to promote all the many pieces of research into patient safety carried out by the PSRP.

This briefing paper is aimed at healthcare professionals working in the UK and abroad, patients and carers using NHS services, academics and health service managers.

Key Messages:

- Training in root cause analysis of patient safety incidents is worthwhile and encourages NHS staff to conduct systematic investigations into patient safety incidents

- Staff are enthusiastic about root cause analysis (RCA) but not always successful in applying it because of their trust’s culture, systems, approach to the conduct of RCA and how learning from RCA is disseminated

- Further skills development and organisational support is needed to achieve continued improvement in practice and to sustain organisational learning

- Trusts should put in place an organised approach to cascade training through NHS organisations, and to periodic refreshing of such systems by introducing new expertise in RCA.

- If RCA is to become a real force for improving patient safety, staff have to be convinced that organisational learning is achieved from the process.

- There should be greater emphasis on systems for learning across trusts that share similar services and between healthcare providers within a local area with facilitation by NPSA patient safety managers.
**Background:**
There is a growing trend for greater scrutiny of healthcare, NHS organisations and the staff who work in them.

Patient safety, preventing medical errors and reporting of adverse events are all a high priority for the government.

A drive to tackle these issues began shortly after the publication of a report by the Chief Medical Officer Sir Liam Donaldson in 2000 that looked into adverse events in the NHS.

It found that 400 people die or are seriously injured every year because of an adverse event involving a medical device and 10,000 people a year have a serious adverse reaction to drugs.

Other estimates say there are around 850,000 adverse events a year in NHS hospitals with a resulting cost of £2billion in additional hospital stays. This also leads to clinical negligence claims that cost the NHS around £400million a year.

As well as setting up the National Patient Safety Agency (NPSA) in 2001, the government launched a large scale research programme to:

- explore the size and nature of the problem
- understand the factors causing harm
- develop interventions to reduce errors
- assess how effective have the attempts to reduce errors been
- implement ways of guaranteeing change in people and organisations.

In other high-risk industries besides healthcare, methods of investigation that use human factors are sometimes grouped together under the title of root cause analysis (RCA) as a way of investigating and learning from safety incidents.

This method aims to avoid personal blame of healthcare staff involved in incidents and to focus on the system’s problems such as aspects of care pathways, managerial practice, competence and working practices of staff, and the use of equipment and physical environment.

This method was adopted by the NPSA in 2001 in England and Wales following the CMO’s report and a three day training programme was launched in 2003, which trained over 7,000 people over two years.

The NPSA has identified RCA as a key tool in improving patient safety and is keen to improve the effectiveness of RCA training.

**Aims of the Study:**

The study’s main aims were to find out:

- the extent of motivation and increased knowledge of RCA amongst delegates at the end of the RCA training course
- the extent to which this motivation and knowledge was sustained over time (minimum of 6 months)

- how the knowledge of RCA had been used practically within the delegates’ organisation
- the extent to which the delegates had interacted with other clinical and managerial colleagues to disseminate their knowledge and enthusiasm for RCA.

**About the Study:**
The researchers used several methods for their research including:

- a survey of staff, using questionnaires carried out at the end of the third day of the course and six months later
- examining eight case study sites where the researchers visited each site and conducted semi-structured interviews with risk managers, patient safety leads, and at least one member of staff who had conducted a root cause analysis
- the NPSA head of investigations critically analysing 10 exemplar root cause analysis cases against a template, derived from the 8 exemplar case study sites.

**Practical findings:**
The researchers started from the point that root cause analysis (RCA) methods require healthcare staff to respond to reported incidents by:

- undertaking a systematic process of investigation
- looking at factual reporting of events and timelines
- analysing contributory factors
- identifying possible causal links and system vulnerabilities
- formulating recommendations that aim to prevent it happening again which can be shared with other similar health organisations and regulatory bodies and formalised into guidance and changes in work routines.

The RCA three-day training had several objectives including giving delegates an understanding of the theory underpinning RCA; improving delegates' attitudes towards a ‘systems’ based approach to patient safety incidents; providing delegates with the skills to carry out an effective high quality RCA; providing them with the tools and information to enable them to cascade RCA training within their organisations; and developing learning networks across and within organisations to develop and implement solutions aimed at reducing future patient safety incidents.

**Staff survey**
A survey of staff from various types of NHS trusts was carried out using questionnaires developed from a brief review of research, from consultation with safety experts, and with the NPSA.

The researchers obtained responses from 374 people at the end of their training course and responses from 350 people six months afterwards. Participants were risk managers who were often also clinicians, clinicians with an interest in patient safety, or non-clinical staff with risk management responsibilities.
They were asked about:

- their role in risk management/investigations
- decisions to use RCA
- beliefs and intentions about RCA using a psychological model called the Theory of Planned Behaviour
- detailed test of knowledge of RCA.

**Experience**

The researchers found that many (79.6%) staff had conducted a patient safety investigation prior to doing the training course and 30.7% had conducted an RCA.

Six months later, the percentage of people who had conducted an RCA almost doubled to 58.3%.

Knowledge test scores from the survey showed that the course was giving participants an accurate understanding of key concepts such as types of error, barriers of error, and defining violation errors.

However, tests using knowledge as applied to specific scenarios were less promising and in one scenario in which the specific type of error had to be identified, only 42.5% of people did so correctly, while analysis of care and service delivery problems were only judged correctly by 51% of participants.

The researchers also found that the correct result of a case study scenario was given by only 49.5% of participants who gave a non blame/supportive outcome. Almost half (47.1%) of participants suggested punitive (counseling and/or disciplinary) actions should result, but this was incorrect and suggested, said the researchers, that participants were reflecting organisational cultures of their own NHS trust.

**Attitudes and confidence**

Overall satisfaction with the training was high and the vast majority (85.2%) of staff said the RCA training was quite or very helpful at the time of the course and 72.9% said so six months later.

The roll out of RCA within trusts seemed to rely on two models – internal cascade (passing on of knowledge via internal training by those who had attended the NPSA course) or reliance on the NPSA’s three day training and related programmes.

People taking part in the survey reported that their trusts expected to train, on average, around 15-30 staff with rising numbers over the following year.

More than 80% of staff were confident about applying RCA at the time of the course and six months later, but only half were confident to train others. At the time of the training course, only a fifth said they were confident they could pass on RCA training to others and this rose to about a third six months later.

Staff were increasingly confident that using RCA would make a difference at their trust, shown by the fact that 46% said at the time of the course that it would reduce patient safety incidents in their trust, but this rose to 62% who thought it would when asked six months later.

Implementation was a more difficult issue and at the time of the course, 23.2% of staff felt it would be easy to implement RCA as standard practice at their trust and this only rose to 43% six months later.

**Barriers**

All staff said they experienced barriers to implementing RCA including:

- lack of time to do RCA properly and for staff to attend in-trust cascade RCA training
- difficulty in getting people to agree to lead on an RCA
- conflict between improving patient safety by RCA and meeting performance targets
- no adequate system in place to cascade RCA training
- the trust did not implement actions from the RCA
- conflicting or absence of policy directives within the trust about the investigation and disciplinary process.

**Outcomes**

Staff were asked about the outcomes of RCAs and of the 59% who said they had conducted an RCA since the course, 87.6% said the outcomes and learning were reported within the trust.

Only a third, however, were aware that these outcomes had been reported to external bodies such as their strategic health authority.

Even fewer (6.2%) believed outcomes had been reported to the NPSA’s National Reporting and Learning System.

**Case study sites**

Eight case study sites were chosen by consultation and nomination via the NPSA, strategic health authorities and trust risk management leads.

The researchers visited each of the eight sites and conducted semi-structured interviews with risk managers, RCA leads, and at least one member of staff who had conducted an RCA. The case studies were designed to address the following questions:

How well did NHS staff apply the approach, as taught by the NPSA, and what was the influence on:

- organisational structures and processes for risk management and for risk incident management and investigation?
- organisational culture and individual/organisational/multi-organisational learning?
- how fit for purpose were example RCA investigations in sites that were regarded as likely to show effective application of the NPSA’s RCA approach?

Seven trusts provided 10 examples of RCA investigations, which were critically reviewed against an RCA template. Two trusts submitted cases that were excellent examples of application of RCA as taught by the NPSA, while three
trusts gave examples with partial use of RCA, and considerable good practice, and two submitted cases that did not conform to the RCA approach.

Good practice was apparent in the use of a wide range of techniques, use of external experts and group facilitation methods, the identification of Care/Service Delivery Problems or issues, contributory factors and root causes.

The researchers found there were some weaknesses, including the most complete RCAs, that required more focus on use of Care/Service Delivery Problems or issues, contributory factors and root causes, because these are integral to understanding the causes and possible remedies and preventive actions.

They concluded that there should be greater emphasis on the use of best practice guidance available nationally (electronically) from the NPSA during training and after training support/cascade.

Another way to help motivate staff to use RCA to a high standard would be for feedback on completed RCAs by the NPSA to be given via patient safety managers or national channels.

The researchers’ interviews with staff showed that the NPSA was felt to be a credible organisation and people felt it had produced well regarded training and guidance.

All of the sites showed enthusiasm for RCA, but how successful they were in applying it was varied, depending upon the influence of the trust’s culture, systems, and approach to RCA.

Learning across trusts and externally was very limited and there was dissatisfaction about the low perceived input from patient safety managers and strategic health authorities.

Some staff said their organisation struggled with the concept of public and patient involvement in risk management and in RCA in particular.

The researchers found that some new in-house short courses were being undertaken in parallel to trust-based cascade training.
Summary of main findings:

- Large numbers of staff (85.2%) who had the training rated it highly as ‘quite’ or ‘very’ helpful.
- Most staff achieved a good knowledge of root cause analysis from the training and were actively involved in conducting it later.
- 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.
- Learning happens mostly within trusts and systems for sharing and learning outside of trusts are almost non-existent.
- Numbers of people who have conducted a root cause analysis almost doubled from 30% to 59% six months after doing the RCA training programme.
- Feedback from strategic health authorities on root cause analysis carried out within trusts is poor.
- Staff who underwent RCA training had difficulties in implementing it back at their trusts because of problems passing the knowledge on and undeveloped systems for sharing learning.

Conclusions, recommendations and implications for practice and policy:

- The RCA training was highly successful, achieved good results in knowledge of the conduct of RCA and inspired confidence in participants.
- The difficulties of implementation in trusts highlights the need for support to trusts after the course and continuing development of skills in applying RCA.
- There should be accreditation of ongoing RCA continuous professional development and the NPSA should focus effort on building resources to support trust staff in cascading RCA practice and ensuring the quality of training within trusts is at least as good as that provided directly by the NPSA.
- Because some new in-house short courses were being undertaken in parallel to trust-based cascade training, new models of ongoing training for those who attended the original RCA networked training, and the use of alternative models of roll out to other staff should be formally evaluated.
- Learning of RCA would be improved by people taking part in model anonymised RCAs to build their competence and using problem-based learning approaches.
- The NPSA should disseminate widely real examples of RCAs and how they are implemented to build skill in knowledge, overcome organisational barriers and demonstrate the impact they have on safety.
- The NPSA has developed a one and two day RCA training programme (both generic and a targeted Mental Health programme) which should be evaluated.

Further information:
The full report, this research summary and details of other Patient Safety Research Portfolio work can be seen at http://www.pcpoh.bham.ac.uk/publichealth/psrp/commissioned.shtml

About the Patient Safety Research Portfolio:
The Patient Safety Research Portfolio (PSRP) was created in 2001 as a programme to promote research into patient safety. It followed a report published by chief medical officer Sir Liam Donaldson in 2000 that looked at learning from adverse events in the NHS. The PSRP is funded by the Policy Research Programme at the Department of Health and reports directly to the CMO. The programme has also commissioned research on behalf of the National Patient Safety Agency (NPSA).

It funds research aimed at reducing errors that lead to bad outcomes for patients by:
- measuring the types and frequency of error
- analysing root causes to identify problems and how lessons can be learned
- specifying and testing interventions
- making sure that useful findings from research are distributed widely across the country

The programme is based at the University of Birmingham’s Department of Public Health and Epidemiology and is directed by Professor Richard Lilford. The PSRP team has a history of building capacity in the area of patient safety and is currently involved in evaluating The Health Foundation’s Safer Patients Initiative and has recently published a series of papers on methods for patient safety research. The views expressed in this publication are those of the authors and not necessarily those of the PSRP, the Department of Health or the NPSA.

For further information about the PSRP visit our website at http://www.pcpoh.bham.ac.uk/publichealth/psrp/ or contact:

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