



**World Health
Organization**

Patient Safety

A World Alliance for Safer Health Care

Introduction to Patient Safety Research

Presentation 18 - Translating Evidence: Health Technology Assessment Review



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3: Overview

■ Objective

- To conduct a health technology assessment review of techniques in accident investigation in high-risk industries and of critical incidents in healthcare.
- To develop and pilot guidelines for the analysis of critical incidents in healthcare.

■ Methods

- Rigorous search of electronic databases identified 138 papers for appraisal
- From 138 papers, 6 techniques from other high risk industries identified as clearly definable approaches to incident investigation and analysis.

■ Results

- All techniques potentially applicable in any discipline related to healthcare.
 - Most techniques used interviewing and primary document review.
 - All techniques included papers that identified clinical issues and some attempt to assess underlying errors, causes and contributory factors.
- Extent and sophistication of the various attempts varied widely.
 - Most studies had little or no information on training of investigators, how the data was extracted or on quality assurance for data collection and analysis.
 - Most papers had little or no discussion of implementation of any changes as a result of the investigations.

■ Conclusions

- There is good potential for further development and wider utilization of techniques and a need for validation and evaluation of existing methods.



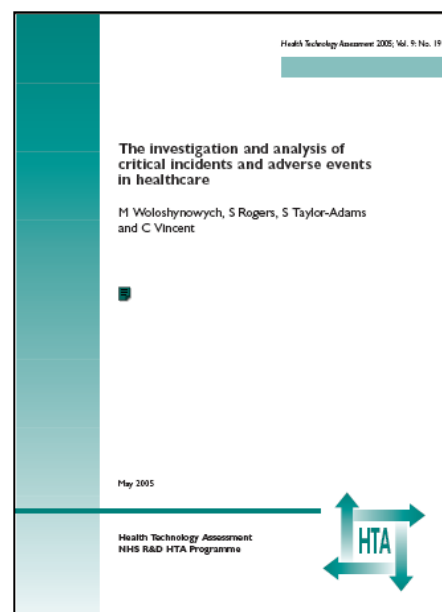
4: Introduction: Study Details

■ Full Reference

- Woloshynowych M, Rogers S, Taylor-Adams S, Vincent C. The investigation and analysis of critical incidents and adverse events in healthcare. Health Technology Assessment, 2005, Volume 9: number 19

[Link to Abstract \(HTML\)](#)

[Link to Full Text \(PDF\)](#)





5: Introduction: Patient Safety Research Team

- **Lead researcher - Prof. Charles Vincent, BA, MPhil, PhD**
 - Head of Clinical Safety Research, Imperial Centre for Patient Safety and Service Quality
 - Imperial College London in London, UK
 - Field of expertise: patient safety research
- **Other team members**
 - Dr. Maria Woloshynowych
 - Dr. Steve Rogers
 - Dr. Sally Taylor-Adams



6: Background: Opening Points

- **In other high-risk industries, there is a tradition of learning from accidents and near misses**
 - There are well-documented techniques of investigation and analysis of critical incidents or adverse events
 - Forms the cornerstone of safety analysis and improvement
- **Development of similar techniques in health care are still in their infancy**
 - Learning within healthcare has been fragmented and uncertain
 - However, sufficient work has accumulated within the healthcare sector to warrant a review of methods of investigation and analysis



7: Background: Study Rationale

- **Prior to the study, limited methodologies in healthcare for investigating incidents**
 - No clear framework for training and best practices
- **Wanted to bring together the various techniques used to investigate and analyse adverse events and critical incidents**
 - *"We wanted a full account of all the other methodologies used within and outside healthcare and to assess which worked best.*
 - *We also wanted to extend the earlier protocol for more targeted application in primary care and mental health."*



8: Background: Setting Up a Research Team

- **Assembled a team of collaborators with a range of expertise**
 - Expert in clinical risk management and patient safety
 - Human factors expert with experience in other industries
 - Clinician who had experience in case analysis and conducting systematic reviews
 - Researcher with systematic review training
- **Needed collaborators to test the newly developed guides in additional specialities, particularly mental health and primary care**

9: Methods: Study Objectives

■ Objectives

- To carry out a review of published and unpublished work analyzing methods of:
 - Accident investigation in high-risk industries
 - Critical incidents in healthcare
- To develop and pilot test guidelines for the analysis of critical incidents in healthcare for the hospital sector, mental health and primary care

■ Research questions

- What techniques of analysis of critical incidents and adverse events exist?
- How can these techniques be related to the development of guidelines for healthcare?
- How effective are developed guidelines for health care?



10: Methods: Study Design

- **Design: health technology assessment review**
 - *"It wasn't appropriate to apply a strict systematic review method as commonly used for randomized control trials to methods in incident investigation and analysis."*
- **A formal appraisal instrument was designed, piloted and modified until acceptable criteria were achieved**
 - Twelve techniques from other high risk industries were reviewed in detail and provided a conceptual framework for the healthcare review and appraisal process



11: Methods: Extent of Review

- Initial searches on electronic and other databases identified 1950 potentially relevant papers
 - After screening abstracts, 562 papers obtained for further review
- Of these, 138 papers selected for formal appraisal, with an additional 114 selected for useful background information
- Data sources included:
 - Literature on file in the Clinical Risk Unit, University College London
 - Work by known experts in the field of accident investigation and analysis
 - Electronic databases including PsychINFO and MEDLINE
 - Websites for accident investigation reports



12: Methods: Data Collection

- **Appraisal identified six techniques as representing clearly definable approaches to incident investigation and analysis**
 - Australian Incident Monitoring System
 - Critical Incident Technique
 - Significant Event Auditing
 - Root Cause Analysis
 - Organisational Accident Causation Model
 - Comparison with Standards approach
- **All relevant papers reviewed for each of the six techniques**
 - Up to 10 example papers per technique



13: Results: Key Findings

- **All healthcare techniques had the potential to be applied in any specialty or discipline related to healthcare.**
 - Most techniques used a variety of outcomes including near misses.
 - Most techniques used interviewing and primary document review to investigate incidents
 - All techniques included papers that identified clinical issues and some attempt to assess underlying errors, causes and contributory factors.



14: Results: Key Findings (2)

- **However, the extent and sophistication of the various attempts varied widely.**
 - Only a third referred to an established model of accident causation
 - Most studies had little or no information on the training of investigators, how data was extracted or quality assurance
 - Some variation in level of expertise and training required to undertake the investigation, though all required some expertise
- **Most papers had little or no discussion of implementation of any changes as a result of the investigations.**
 - A quarter of studies gave some description of the implementation of changes, though few addressed evaluation of changes



15: Conclusion: Main Points

- **While much valuable work has been accomplished, there is considerable potential for further development of techniques**
 - Validation and evaluation of existing methods of analysis of critical incidents and adverse events in health care to enable versatility and more effective use of limited resources
 - Further exploration of techniques used in high-risk industries, with interviews and observation of actual investigations
- **Existing healthcare techniques would benefit from formal evaluation of their outcomes and effectiveness**
 - Studies should examine depth of investigation and analysis, adequacy and feasibility of recommendations and cost effectiveness
 - Examining implementation of recommendations is a key issue



- **Accident investigation is a complex task that requires significant investment in order to provide sufficient resources and training**
 - **Manuals and descriptions of the methods of investigation and analysis need to be developed**
- **More attention needs to be paid to recommendations for change and implementation of change**
- **Investigators of clinical incidents should think in terms of a "toolbox" of approaches, with specific techniques used for different purposes and at different stages**



17: Conclusion: Study Impact

- **Academic impact**

- *"This was relatively moderate as reflected in requests for reprints and invitations to present on European Masters programmes as well as use and citation of this project in others' work."*

- **Practice impact**

- Requests for reprints and permission to use the tools from our current website (Clinical Safety Research Unit)

- **Policy impact**

- *"Possibly reasonably high as Dr. Taylor Adams went on to be involved with the National Patient Safety Agency and developed the materials and work on the website for the Root Cause Analysis tools."*



18: Conclusion: Practical Considerations

- **Study duration**
 - Approximately 18 months
- **Cost**
 - About £120,000 in 2002
- **Additional resources**
 - Computer with access to electronic databases
 - Input from clinical experts to help evaluate the tools/guides
- **Required competencies**
 - Experience/understanding of the systematic review process
 - Knowledge of the safety literature
 - Ideally, experience of conducting case analysis/investigation and analysis of incidents
- **Ethical approval**
 - Not needed as this was a review of the literature



19: Author Reflections: Lessons and Advice

- **If one thing in the study could be done differently...**
 - *"Include more administrative support to help with diagrams and assist with writing up the work."*
 - *If we had more resources, we could have reviewed more papers linked to each type of approach, where these were present.*
 - *Produce separate guides for the three different specialities at the end: mental health, acute care and primary care/general practice.*
- **Message for future researchers**
 - *"To be aware of the difficulty of applying methods traditionally used for randomised control trials to the subject of patient safety, where terms have changed over the years and are not used consistently."*



20: Author Reflections: Ideas for Future Research

- **Valuable to further explore the techniques used in high-risk industries, particularly interviews and direct observation**
 - Depth of investigation and analysis
 - Adequacy and feasibility of recommendations
 - Cost-effectiveness
 - Implementation of recommendations
- **Existing investigative techniques would benefit from formal evaluation of their outcomes and effectiveness in healthcare**



21: Additional References

- **Chalmers I & Altman DG. Systematic Reviews. BMJ publishing 1995**
- **NHS Centre for Reviews and Dissemination (2001) Undertaking Systematic Reviews of Research on Effectiveness: CRD Report 4. The University of York NHS Centre for Reviews and Disseminations, York.**
- **Oxman AD. Systematic Reviews: Checklists for review articles, BMJ 1994;309:648-51**