



# An assessment of quality costs within electronic adverse incident reporting and recording systems

Assessment of  
quality costs

## A case study

Kerry Walsh and Jiju Antony

*Centre for Research in Six Sigma and Process Excellence (CRISSPE),  
Strathclyde Institute for Operations Management, Strathclyde University,  
Glasgow, UK*

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### Abstract

**Purpose** – There are three main objectives of the research presented in this paper: to examine the challenges of using an electronic adverse incident recording and reporting system; to assess the method of using a prevention appraisal and failure model; and to identify the benefits of using quality costs in conjunction with incident reporting systems.

**Design/methodology/approach** – Action diary, documentation and triangulation are used to obtain an understanding of the challenges and critical success factors in using quality costing within an adverse incident recording and reporting system.

**Findings** – The paper provides healthcare professionals with the critical success factors for developing quality costing into an electronic adverse incident recording and reporting system. This approach would provide clinicians, managers and directors with information on patient safety issues following the effective use of data from an electronic adverse incident reporting and recording system.

**Originality/value** – This paper makes an attempt of using a prevention, appraisal and failure model (PAF) within a quality-costing framework in relation to improving patient safety within an electronic adverse incident reporting and recording system.

**Keywords** Quality, Safety, Patients, Online reporting, Cost accounting

**Paper type** Research paper

### Introduction

Quality measurement is a challenging subject for all organisations especially in healthcare. There has been strong historical emphasis on measuring and containing quality costs in industry in order to provide a mechanism to monitor and focus on continuous quality improvement (Feigenbaum, 1991). Feigenbaum (1991) argues that quality is determined by the customer (in health this is the patient); not by management or the organisation itself. Oakland and Porter (1994) extend this definition by arguing that quality is meeting customers' requirements.

Deming (1986) strengthened the focus on customers' requirements, as he perceived that "quality should be aimed at the needs of the customer, present and future". Quality then is an essential strategic measurement that should not be mistreated by any corporation in order to attain positioning in response to today's dynamic and changing technologies. Wilkinson and Willmott (1995) and Oakland (1993) argue that for any organisation to be effective, each part must work properly together. Oakland (1993) extends this by arguing that errors have an opportunity to multiply and "failure to



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meet the requirements in one part or area creates problems elsewhere, leading to yet more errors”.

Patient safety incidents are defined as any unintended event caused by health care that either did or could have led to patient harm (Vincent *et al.*, 2001; Brennan *et al.*, 1991; Wilson *et al.*, 1995).

Parisi (1994) argues that quality measurement is an important step to raising the importance of patient safety, by applying the degree of adverse incidents and the detection of quality costs occurring across a health care environment. Taken together this provides a potential framework to make sustained measured strategic changes to patient safety and quality.

Burrell and Ledolter (1999) argue that an organisation must pay to achieve quality, but the organisation also pays for lack of quality. Burrell and Ledolter (1999) emphasise that management should be concerned with the total amount spent for the cost of achieving quality and also the cost for not taking action. Quality cost is a management technique that provides management with a mechanism to assist quality programmes and quality improvement activities. (Campanella, 1990). This measured approach, according to Dale and Plunkett (1999), depends on the purpose of the quality cost programme and the audience for the results of the study. Juran (1988) supports this approach by arguing that there is a need to collect data, identify and prevent the most common type of errors.

Campanella (1999) emphasises that the main goal of any quality cost system is to facilitate quality improvement activities with the aim to drive down or eliminate quality-related problems. He further reflected that this would lead to operating cost reduction activities across the organisation. The purpose of quality costing is to:

- attack and minimise on failure costs as much as possible to bring them down to zero;
- invest in appropriate prevention activities;
- bring down appraisal costs accordingly; and
- bring about continuous quality improvement and redirect prevention efforts through continuous monitoring of quality costs.

Similarly a challenge facing health care today is to define quality (Katz and Green, 1992). There are many definitions of quality. The Institute of Medicine (1994) defines quality of care as the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge (Lohr, 1990; Cohen and De Back, 1999).

Accidents, mistakes and errors can only be prevented if there is sufficient information to understand the process and bring about change. Emslie (2006) reflects in *Governance Matters* that, according to John Stepe, a former senior auditor with the National Audit Office, the National Patient Safety report in data collection in relation to level of harm has major limitations. He argues that it is:

[...] nothing more than an exercise in accounting. There's lots of tables and charts of number that summaries basic data, but nothing seems to have moved on. There's no information at all on root causes of things that go wrong. There's very little therefore that can be used for learning. When you read the report you realise that it simply adds nothing to patient safety.

Vincent (2007) argues that:

[...] organisations must move towards active measurement and improvement programmes on a scale commensurate with the human and economic cost of unsafe, poor quality care.

### Cost of harm in healthcare

There has been limited acknowledgement and recognition of the level of harm to patients in the UK until the Department of Health (2000) published its document, *An Organisation with a Memory*. This important document focused on the significance of identifying the level of incident activity and the importance of learning from adverse incidents in order to improve patient safety.

The document also highlighted that the National Health Service was failing to learn from adverse incidents and pointed out that health had limited and fragmented systems, which compounded the problem. It is recognised that health's failure to learn from mistakes, with the constant risk to replicate the same mistake again and again (Milligan and Robinson, 2003; Wilson, 2002). Bates *et al.* (1997) studied two teaching hospitals and detected that 2 per cent of hospital admissions had experienced a preventable adverse drug event, which had been estimated to increase the costs of \$4,700 per admission or equal to \$2.8 million per annum for a 700-bed teaching hospital. Classen and Kilbridge (2002) state that:

[...] controversy about the exact size of the medical error problem continues, but there is little debate about the enormous opportunity for improvement in the safety and reliability of health care.

The research carried out by Rigby *et al.* (1999) in Australia reflected that adverse incidents within healthcare, rather than the patients' disease process may place a greater burden on society. Wilson *et al.* (1995) argued that the possible cost could be around \$900 per annum in Australia. Barraclough (2001) reflects that the incidence of international adverse events is ranged between 3.7 per cent and 45.8 per cent of all admissions. McNeill *et al.* (2005) reflect that the Kohn *et al.* (2000) publication of the Institute of Medicine (IOM), *To Err Is Human*, has highlighted the level of effort required to develop new systematic approaches to improve patient safety. The report stated that "errors are responsible for an immense burden of patient injury, suffering and death." The report also informed the American public that 44,000-98,000 patients a year in hospital in the USA were dying, with over a million injured, due to medical error (Kohn *et al.*, 2000; Leape and Berwick, 2005; Comarow, 2005; Naylor, 2002).

Dale (2003) argues that the success of a costing system will depend on how well the system matches and integrates with other systems in the organisation. Duncalf and Dale (1985) reflect that quality cost reporting systems have not been widely incorporated all aspects of information. Research in the USA highlighted that over 770,000 people suffer from an adverse incident or die each year in hospitals from adverse drug events (Classen *et al.*, 1997; Cullen *et al.*, 1995). The cost associated depends on the size of the hospital which has been estimated as \$5.6 million per annum (Bates *et al.*, 1995, 1997). The Harvard Medical Practice Study (Brennan *et al.*, 1991) found that the adverse event of 3.7 per cent in New York hospitals of which 13.6 per cent resulted in death.

The Department of Health (2000) has estimated the negligence cost of adverse incidents to be running at approximately £400 million a year, with an estimated liability of around £2.4 billion for existing and future claims. The report also highlighted that hospital-acquired infection was estimated about 15 per cent of which could be avoided with an estimated cost to the National Health Service nearly £1.0 billion a year.

### Reporting adverse incident systems and quality data

The House of Commons Committee of Public Accounts (2006) identified that the National Reporting and Learning system has on average received 60,000 adverse incident reports a month. It criticised the National Patient Safety Agency that, despite being given an annual budget of around £15 million, which by 2004-2005 had increased to £17 million, “has yet to demonstrate that it is using this information and knowledge effectively to change healthcare practices rather than simply collecting statistics.” The National Audit Office (2005) report had previously highlighted that “there is a need to improve evaluation and sharing of lessons and solutions by all organisations with a stake in patient safety. There is also no clear system for monitoring that lessons are learned at local level”.

The NHS Quality Improvement Scotland (2006) report reviewed incident and near-miss reporting systems across Scotland. The report highlighted that all NHS Boards in Scotland had systems, either paper or web-based, which were supported by varying degrees of sophistication to record, aggregate and report on data gathered. The report found that “the scope of incident reporting systems varied from Board to Board,” with risk matrices being used in every NHS Board in Scotland and aggregated report data to produce management reports. However, the report highlighted that “little of the datasets currently used are directly related to safety.”

Chittister and Haines (1993) has argued that computer software (which electronic adverse reporting and recording systems are) has, in the majority of cases, been developed in an *ad hoc* process. He also reflected that “risk identification and management process has been by and large *ad hoc* also”. The National Patient Safety Agency (2005) argued that incident reporting systems are not comprehensive and the importance of improving the quality of reports. The Department of Health (2006) reflects on the key barriers to incident reporting by noting that:

- The poor data quality of incident reports, many of which contain inaccurate or incomplete about the patient harm;
- In many cases, poor engagement from senior clinicians to use the reporting systems;
- Insufficient involvement of local NHS organisations in reviewing and acting upon analysis of their own incident reports; and
- Slow rate of feedback of identified trends and patterns in incident reports to local NHS organisations, compounded by difficulties in effectively managing a large national database of incident reports.

The Department of Health (2006) depressingly argued that there is a lack of confidence in the monitoring process, lack of prioritisation and lack of evidence of outcomes within patient safety. The House of Commons Committee of Public Accounts (2006) highlighted the need for more to be done to calculate the costs of adverse incidents by stating that “more information on the cost-effectiveness of solutions would enable trusts to prioritise scarce resources more effectively.”

**Quality costing measurement**

Quality costing measurement is essential for helping organisations to reduce costs by identifying the excessive cost of poor quality, waste and non-value added activities (Dale and Wan, 2002). Fox (1995) argued that organisations have little knowledge of their total quality costs. This information is of great value by monitoring quality cost by trends, set improvement targets, deciding which quality costs need to be reduced and where more investment in prevention could produce savings. Vincent (2007) emphasises that:

[...] if healthcare incident reports are to be of real value they should be reviewed by clinicians and ideally, by people who can tease out the human factors and organisation issues.

It is important, according to Fox (1995), that the cost incurred as a result of errors or failures are a measure of achieving quality: “the lower the costs, the better and the quality.”

Juran and Gryna (1999) argue that the success of any quality improvement needs high-level management and leadership support. Quality costing provides vital information for management to be aware of the size of the problem and areas for potential improvement. Neely *et al.* (2003) consider quality costing as part of the organisation’s performance measurement system. A measure of quality costs helps to identify major opportunities for the organisation to address the cost of poor quality (Campanella, 1999). Phimister *et al.* (2000) reflect that there can be improvements to patient care through the identification of risks and that there are benefits such as delegation of safety responsibility, increased safety awareness with “the creation of the collection and analysis of pattern observation and trend analysis over time.”

Campanella (1999) argued that the main goal of any quality cost system is to facilitate quality improvement activities with the clear aim to drive down or eliminate quality related problems. Campanella’s (1999) principle of using quality costs is to:

- attack and reduce failure costs and potentially bring them down to zero;
- invest on appropriate prevention activities;
- bring down appraisal costs accordingly; and
- instigate continuous quality improvements and redirect prevention efforts through constant evaluation of quality costs.

**Prevention appraisal and failure model**

The prevention appraisal and failure model approach was used to identify the areas of quality improvement in relation to prevention, appraisal and failure (PAF). This model was used to identify the “hidden costs” “indirect costs” and “unbudgeted” costs from various activities associated with a quality cost system (Dale and Plunkett, 1999). Feigenbaum (1991) introduced the PAF model during the 1950s, which was defined in manufacturing. According to Fox (1995), this can be equally applicable to a service organisation. Campanella (1999), based on Feigenbaum’s (1951, 1991) work, states that quality costs are the measure of the costs with the achievement or non-achievement of the product or service. Thus, according to Oakland (1993), quality costs can be summarised as follows.

*Prevention costs*

Oakland (1993) defines prevention costs that are associated with the design, implementation and maintenance of the whole management system. These prevention

costs, as defined by Oakland (1993), are planned and are incurred before actual operation within the organisation. These prevention costs are incurred in order to prevent poor quality in products or services, e.g. costs of product review, quality planning, costs invested in quality improvement projects, cost associated with education and training. In health examples of prevention costs would be multi-disciplinary care plans, development and maintenance of training programmes and the creation and maintenance of adverse incident recording and reporting systems to support improving patient care.

#### *Appraisal costs*

Oakland (1993) defines appraisal costs as costs related with customers (patients in health) with the evaluation of services to assure conformance with specified requirements. These appraisal costs can be associated with measuring the service and are associated with evaluating or auditing systems and processes. Examples are costs of process auditing, measuring and testing of equipment and the cost associated stock evaluation of parts and material. In health this could be a clinical audit that evaluates the quality of care, the organisation's performance against national standards in order to assure conformance to quality and performance requirements. Adverse incident reporting and recording systems in health also support the organisation's ability to monitor and measure clinical and managerial activity in the pursuit of quality and patient safety.

#### *Failure costs*

Oakland (1993) defines failure costs as costs that occur when the results of work have failed to meet required standards. These failure costs can result from products or services not conforming to customer/user needs. In health this could be seen as having the wrong operation, operating on the wrong side, increasing length of stay and repeated investigations. Failure costs are divided into categories of internal and external failure cost. Internal costs, as described by Oakland (1993), can be associated with doing unnecessary work resulting from errors. In health this could be associated with repeated operations, poor clinical handover resulting in fragmented communications between multidisciplinary teams, or significant adverse incident reviews to establish the causes of organisational failure.

External failure costs, as defined by Oakland (1993), are costs which can occur when the product or services fail to meet quality standards, but are not detected until the customer has observed these at a later date. In health this could be seen as handling, investigating patients' complaints, investigating and processing claims for litigation. Oakland (1993) emphasises that internal and external failure can have an impact on the organisation's reputation due to the "cost of getting it wrong".

Dale and Plunkett (1999) support the prevention-appraisal-failure model by supporting ownership at a lower level, especially at departmental level.

Cameron and Kurrle (2007) reflect that clinicians need to use all available information such as patient's environment, policies, guidelines, supervision, aids, medication and the patient's diagnosis in order to improve patient care. Cameron and Kurrle (2007) state that, "economic analysis will be required to guide implementation". Ehsani *et al.* (2006) support this focus as adverse events have been found to be associated with higher costs, longer length of stay and death.

### Why quality costing within adverse incident reporting systems

Enloe *et al.* (2005) argue that patient falls are a significant problem in the hospital environment. Stevens *et al.* (2006) reflect that the clinical and economic costs of falls from injuries are very high. Gillespie *et al.* (2003) have stressed the view that it is important to review the effectiveness of interventions as most of the studies have been conducted in the community. Oliver *et al.* (2007) reflect that there is limited evidence of the effectiveness of interventions in hospital (Todd and Skelton, 2004; Cameron and Kurrle, 2007). The National Audit Office (2005) reported that a fractured neck of femur due to a fall in hospital costs £10,000.

The National Patient Safety Agency (2007), the third report from the Patient Safety Observatory, points out the human quality cost of falling which can include “distress, pain, injury, loss of confidence and loss of independence, as well as impact on relatives”. The estimated conservative overall cost of staff and for treating falls to the National Health Service, according to the National Patient Safety Agency (2007), is estimated at \$15 million every year. The National Patient Safety Agency (2007) report states that there are limitations to the national data collection in which “unit cost estimates of inpatient falls and fractures are not available”.

### Assessment of quality costing in a NHS board area in Scotland

An electronic adverse incident reporting and recording system was fully implemented in April 2005 across four acute hospital sites within one NHS board area in Scotland out of 15 health authorities in Scotland, and has around 5,900 direct clinical staff and 3,800 non-clinical support staff. These four hospitals provide healthcare to a population of around 367,000. More than 5,800 staff provide a service to the local population between two general hospitals.

The purpose of the introduction of an electronic adverse incident reporting and recording system was to replace a paper system that was both time-consuming and inefficient in raising the awareness of patient safety issues. The Executive Medical Director expressed concern that the organisation was unable to establish the level of adverse incidents and near misses being recorded. The data were being collected on separate databases and recorded against a paper system before the introduction of the electronic adverse incident reporting and recording system.

### Method

The organisational research study involved dealing with individuals in social and professional groups across four hospital sites. Action research was used to study the needs and problems associated with the implementation of the adverse incident recording system. The action research used multiple research methods such as maintaining a research diary, which supported the data collection and interpretation of the organisation’s environment. Committee minutes, reports and questionnaire were used to triangulate information, as supported by Leedy and Ormrod (2005) who defined action research as,

A type of applied research that focuses on finding a solution to a local problem in a local setting.

A prevention appraisal and failure model was applied to a patient’s adverse incident in order to determine the level of injury, the organisations prevention and appraisal

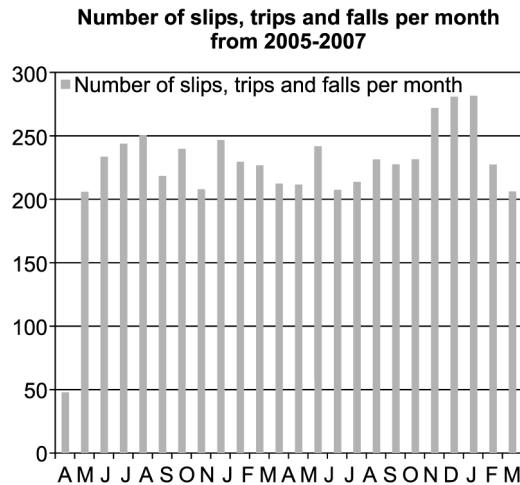
clinical and managerial approaches and the failure and quality costs incurred. The prevention appraisal and failure model approach, according to Dale and Plunkett (1999), is the most suitable approach to measure quality costs for an organisation as it supports the measurement all individual and organisations activity.

The prevention appraisal and failure model takes into consideration the organisations approach to the activity and resource required to manage the patient's complications and individual care needs. Information was obtained from the electronic adverse incident recording and reporting system to detect the level of falls across four acute hospitals.

**Design**

A quality costing and a prevention-appraisal-failure model approach was used to assess an individual patient who had sustained a fall resulting in fracture. This incident had been recorded on the organisation's electronic adverse incident recording and reporting system, within one of the four hospitals. Ehsani *et al.* (2006) reinforce this approach as estimating that the in-hospital cost of adverse events must take into account more closely the resources used. Over 11,773 adverse incidents and near misses were recorded from April 2005 to March 2007. The number of slips, trips and falls were identified per month as a patient safety issue across the four acute sites, as shown in Figure 1. During this period the top five categories, slips, trips and falls were the highest recorded class of harm (Tables I and II).

The potential causal factors which lead to patient slips, trips and falls could be the patient's age, medication, a history of recurrent falls or a gait abnormality, balance or both, cognitive impairment, muscle strength, conditions such as stroke leading to new gait abnormality (Rubenstein and Josephson, 2002; Tinetti, 2003; Chang *et al.*, 2004; Gillespie *et al.*, 2003; Ganz *et al.*, 2007.)



**Figure 1.**  
Slips, trips and falls per month across four sites

**Source:** Electronic Adverse Incident Recording and Reporting System



On further examination of the data it was shown that patient slip, trips and falls are a major concern across the four hospital sites as shown in Table III.

There are clear differences between the four hospitals, which may reflect the different number of beds, and specialities, which each hospital provides for the local community. It is not clear if under-reporting is evident which would be a critical success factor within the level of actual falls occurring.

Hospital 1 is a general hospital, with 350 beds which provides medical, surgical services on an in-patient, day case and outpatient basis. The hospital also provides wide services including vascular surgery, ophthalmology and audiology.

Hospital 2 is a hospital, with 275 beds and provides area wide Obstetrics/Neo-natal services, young disabled/rehabilitation services. There are facilities for the Rehabilitation Centre that is recognised as one of the leading centres in the country. The hospital provides a number of long stay care of the elderly.

Hospital 3 is a general hospital with 564 beds, provides a full range of services and paediatric care and is also the main Accident and Emergency centre.

Hospital 4 is a local hospital, with 166 beds for the care and rehabilitation of the elderly. It provides a wide range of vascular, orthopaedic and Stroke Consultant-led rehabilitation and has 20 beds for stroke patients requiring varying degrees of rehabilitation.

Category	2005-2006	%
Slips, trips and falls	2,558	83
Medication- administrative error	168	5
Maternal/delivery incidents	148	5
Security related incidents	123	4
Other accidents that may result in personal injury	115	3
Totals	3,112	100

**Table I.**  
Analysis of clinical and nonclinical top adverse incidents (2005-2006)

Category	2006-2007	%
Slips, trips and falls	2,826	84
Medication – administrative error	179	5
Maternity/delivery incidents	133	4
Radiology related	132	4
Other accidents that may result in personal injury	110	3
Totals	3,380	100

**Table II.**  
Analysis of clinical and nonclinical top adverse incidents (2006-2007)

Slips trips and falls by hospital	Bed no.	Falls	%
Hospital 1	350	564	22
Hospital 2	275	402	16
Hospital 3	564	1,173	46
Hospital 4	166	419	16
Total	1,365	2,558	100

**Table III.**  
Slips trips and falls by hospital (2005-2006)

**Type of falls across four hospitals (2005-2006)**

The electronic data could be categorised in a number of areas as shown in Figure 2.

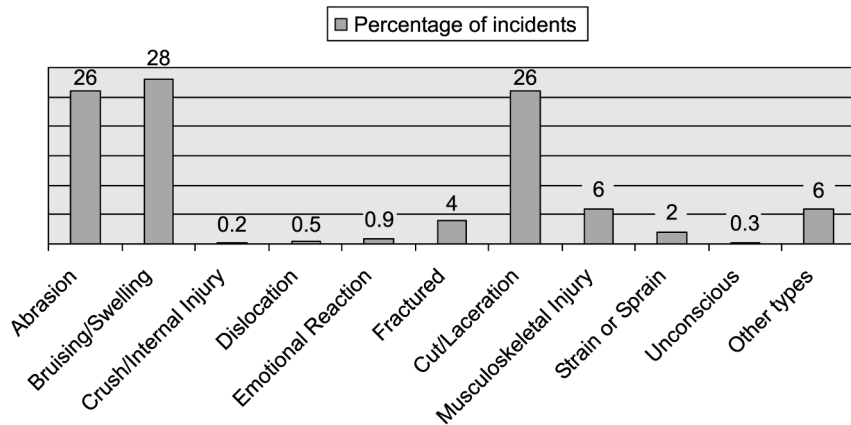
The level of harm was further explored in relation to slips, trips and falls and it was noted that the two highest levels of injury were: abrasion 168 (26 per cent), bruising and swelling 185 (28 per cent), cut/lacerations 167 (25 per cent), musculoskeletal 38 (5 per cent) and fractured or chipped bones 27 (4.2 per cent) as shown in Figure 2. The authors looked at the potential cost of fractures within the organisation due to the personal injury for the patient and potential cost to the organisation using a prevention appraisal and failure model.

**An application of PAF quality costing model**

The patient’s names are withheld in accordance with the *Nursing and Midwifery Regulations* (2002). For this article the patient will be addressed as Mr X.

Mr X was admitted for rehabilitation and geriatric assessment following general malaise. He was on the ward for elderly care for seven days for further investigations when Mr X was found lying on the floor. He was apparently transferring from his wheelchair on to the toilet when he fell. Following the incident Mr X complained of a painful hip. The patient was assisted back to bed and it was noted by the nursing staff that the patient had sustained a laceration to his left foot. A clean dressing was applied and following a medical assessment X-ray confirmed a fractured left neck of femur. The patient remained in hospital on an orthopaedic ward for a further two weeks following internal fixation of a fractured left neck of femur. Mr X was then transferred to a rehabilitation ward for a further one week to maximise mobility and independence. A PAF model was applied to a geriatric and orthopaedic ward by following the patient’s journey through the health system.

**Types of falls across 4 hospitals**



**Figure 2.**  
Slips trips and falls across  
four hospital sites

**Source:** Electronic Adverse Incident Recording and Reporting System from 2005-2006

*PAF model*

A PAF model was applied to this patient’s adverse incident in order to determine the level of injury, the organisation’s prevention and appraisal, clinical and managerial approaches, and the failure/quality costs incurred. This can be demonstrated as shown in Figure 3, in which there is a clear imbalance between internal and external activity in relation to prevention, and failure activity in relation to the patient’s overall care. Oliver *et al.* (2005) reflect that patients who fall are more likely to have longer lengths of stay, which increases the quality cost of the patient’s healthcare.

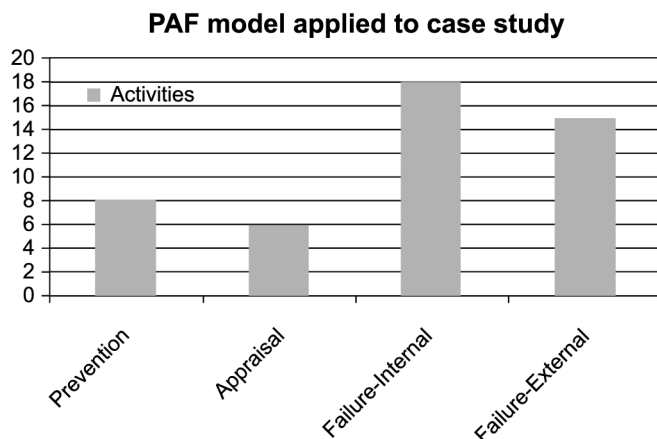
Healey and Oliver’s (2006) research in preventing falls and injury in hospitals which was highlighted in the National Patient Safety Agency (2007), Patient Safety Observatory report (2007) indicate that falls, “can result in patients needing extra healthcare, social care or residential care after discharge from hospital, with fractured neck of femur particularly likely to result in discharge to nursing home care”.

The PAF Model takes into consideration the organisations and clinical response to the patient’s individual needs and the key resource required to manage the patient’s complications. The ratio between PAF is shown in Figure 3.

The authors attempted to detect elements reflected in the patient’s care in order to evaluate how quality costs could be categorise by using a PAF model as shown in Table IV.

The estimated quality costs were allocated to each clinical, managerial activity in order to estimate the total quality costs for one patient experience. This information was provided by the organisation’s finance department in order to try to estimate the quality costs per unit activity. The researchers noted that many of the failure elements are not quantified due to the current systems not being able to provide this information.

The geriatric assessment in-patient day costs associated with drugs, medical, management, nursing, capital charges and accountants were estimated at £234. The number of days for Mr X’s geriatric and rehabilitation was 14 days, which equated to £3,276. The number of days for in-patient orthopaedic treatment and care, which included drugs, medical, management, nursing, theatre staff, capital charges and accountants, were estimated at £584. It was therefore calculated on 14 days the costs



**Figure 3.**  
Prevention appraisal and failure model to case study

**Table IV.**  
Examples of elements of the organisations approach patient care using the prevention appraisal and failure model

Prevention (investment)	Appraisal (investment)	Failure/internal (losses)	Failure/external (losses)
Training in lifting and handling	Nursing and medical assessment/reports	Increased laundry	Managing the complaint process
Development of quality management system	Risk assessment investigation of how patient fall happened	Distress to the patient	Increased district nurse involvement
Review of significant adverse incidents	Geriatric assessment	Increased length of stay	Legal liability because of poor quality
Monitoring/evaluating of adverse incident recording and reporting system	Nursing assessment	Wound inspection to prevent infection	Loss of local community reputation
Nursing development	Medical assessment	Increased dressings	Increased media attention
Nursing assessment and care management of patient	Preparation for peer reviews against specific local and national standards	Theatre equipment and laundry	Damaged to organisation's reputation
Medical assessment and management of patient	Quality audits	Increase theatre and staff resource allocation	Increase documentation to general practitioner
Falls prevention programme		Specialised equipment	Unable to meet waiting list targets due to loss of bed availability
		Increase physiotherapy	Increased community care support
		Increased theatre time	Increase general practitioner time
		Chest infection – antibiotics	Setting up and maintaining home care
		Increase in medication, i.e. analgesia	Setting up and maintaining meals on wheels
		IVIs, antibiotics	Increased and monitoring of patients medication
		Pressure sores and urinary tract infection	Increased Social worker involvement and workload
		Increased laboratory investigations	Transport to Day hospital and support
		Blood transfusion	
		IVI fluids and nutrition	
		Dietetic and occupational therapist involvement	

were estimated at £8,176. The total quality costs associated with Mr's X overall care and treatment was estimated at £11,452 as shown in Table V.

On this basis the estimated quality costs associated with 12 patient fractures of neck of femurs could be £137,424 to the organisation, and not forgetting the emotional distress to the patient and family. This is also not taking into consideration the potential claims raised against the organisation.

### Implementation of quality costing into adverse incident recording system

A quality costing approach integrated into electronic adverse incident recording and reporting system needs key skills in clinical and managerial knowledge in relation to organisational process and patient care mapping as supported by Deming (2002). It requires healthcare organisations to address a number of critical success factors such as organisational change, effective implementation of adverse incident recording and overcoming cultural barriers of reporting, combined with a fair blame culture with new standardised and consistent methodology (Roden and Dale, 2000).

There needs to be clear organisational leadership from both clinical leaders from the board room to the patient's bedside in order to fully achieve all the benefits of combining incident reporting and quality costs in the pursuit of patient care and reduce the level of harm within the organisation's culture, as described by Dale and Wan (2002). This approach of introducing and maintaining quality costing integrated within adverse incident reporting requires full and consistent commitment from the NHS board, with clear staff involvement. Directors and senior management must be committed to providing incentives for the collection of quality costs and increasing adverse incident reporting in order to ensure that the data collected are appropriate across all levels of the organisation (Dale and Plunkett, 1999; Campanella, 1999).

All organisational strategies must be adopted and interlinked, which supports the purpose of quality costing approach in order to identify problems related to patient, individual and organisational process that indirectly or directly cause harm to patients and raise quality costs (Campanella, 1999). There needs to be a new approach of using all relevant information across the organisation from the patient's bedside to the board room to identify high risk patient incidents and high costs which require a redirection of resources and patient safety performance objectives.

### Conclusion

There is an urgent requirement to shift the emphasis from reactive failure to prevention in order for healthcare to be more focused on proactive clinical and managerial activities in relation to patient safety. An electronic adverse incidents recording and reporting system is only a quality management tool to identify patient safety issues. This would support more management and clinical focus on local measurement and quality improvement at the patient bedside. This would reduce the

Specialist care	Cost per day (£)	Total no. days	Total cost (£)
Geriatric and rehabilitation care	234	14	3,276
Orthopaedic, theatre and medical management	584	14	8,176
Total quality costs			11,452

**Table V.**  
Quality costs for  
individual fall resulting  
in a fractured neck of  
femur

costs of failure, improve patient flow, manage limited resources effectively and thereby improve patient safety in a proactive manner. It is highly desirable to have a revised, modified and measured approach in order to understand the level of harm by using an integrated quality measurement within an electronic adverse incident recording and reporting system.

Professional staff and managers need to be trained in quality costing and methods to measure adverse incident data and patient safety issues. Medical staff need to be engaged in the earlier phases of the design, implementation and assessment of quality costs against each specific trigger across different specialities. There is an urgent requirement to have a national electronic adverse incident reporting and recording specification in order that all locally developed or commercial systems are able to report against the same categories. There is a requirement to have a national data set of safety-related taxonomies categorised.

Quality costs need to be designed into all departments such as claims, complaints and adverse incident systems, so that all patient safety data are integrated and the level of harm detected. Quality improvement activity is then specifically targeted against individual or specific trends in relation to adverse incidents activity. The costs of patient harm and trend activity need to be a standing item at all clinical and management meetings in order to co-ordinate prevention activity and improve patient care and quality.

Adverse incident recording and reporting needs to be able to measure different process within each adverse incident risk assessment. This will benefit local assessment and root cause analysis in order to detect the likelihood and consequence of individual adverse incidents. This research demonstrated how difficult it was to quality cost all activity related to each adverse incident. The Finance Department spent over a week estimating the costs associated with this case study. The costs associated with estimated time of the patient's stay in hospital should be included in the assessment following an adverse incident.

There needs to be close collaboration and integration of information systems in relation to patient safety between clinical governance, risk management, performance management, claims, complaints, accounting and electronic adverse incident recording and reporting systems in order to ensure that data are meaningful and organisational learning can be embedded, in order to raise the awareness of patient safety and the costs of harm.

There needs to be a change of emphasis of not collecting adverse incident data for data's sake, but to link quality costing measurement within the electronic adverse incident recording and reporting system, in order to support the systematic assessment of human and organisational error. This would support managers and clinicians at all levels to direct vital key resources in order to address and improve specific quality and patient safety issues. Electronic adverse incidents reporting and recording systems can support the collection, recording and analysis of patient safety issues. To provide maximum potential to directors, clinicians, managers, patients and their carers a designed commercial system needs to include quality costs in order to enable the data to follow the patients' journey and highlight patient safety issues. These patient safety issues and associated quality costing could be transferred to clinical governance, risk awareness, planning, performance, and inform strategies to save money by prioritising scarce resources and improve patient safety.

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### Corresponding author

Jiju Antony can be contacted at [jiju.antony@strath.ac.uk](mailto:jiju.antony@strath.ac.uk)

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