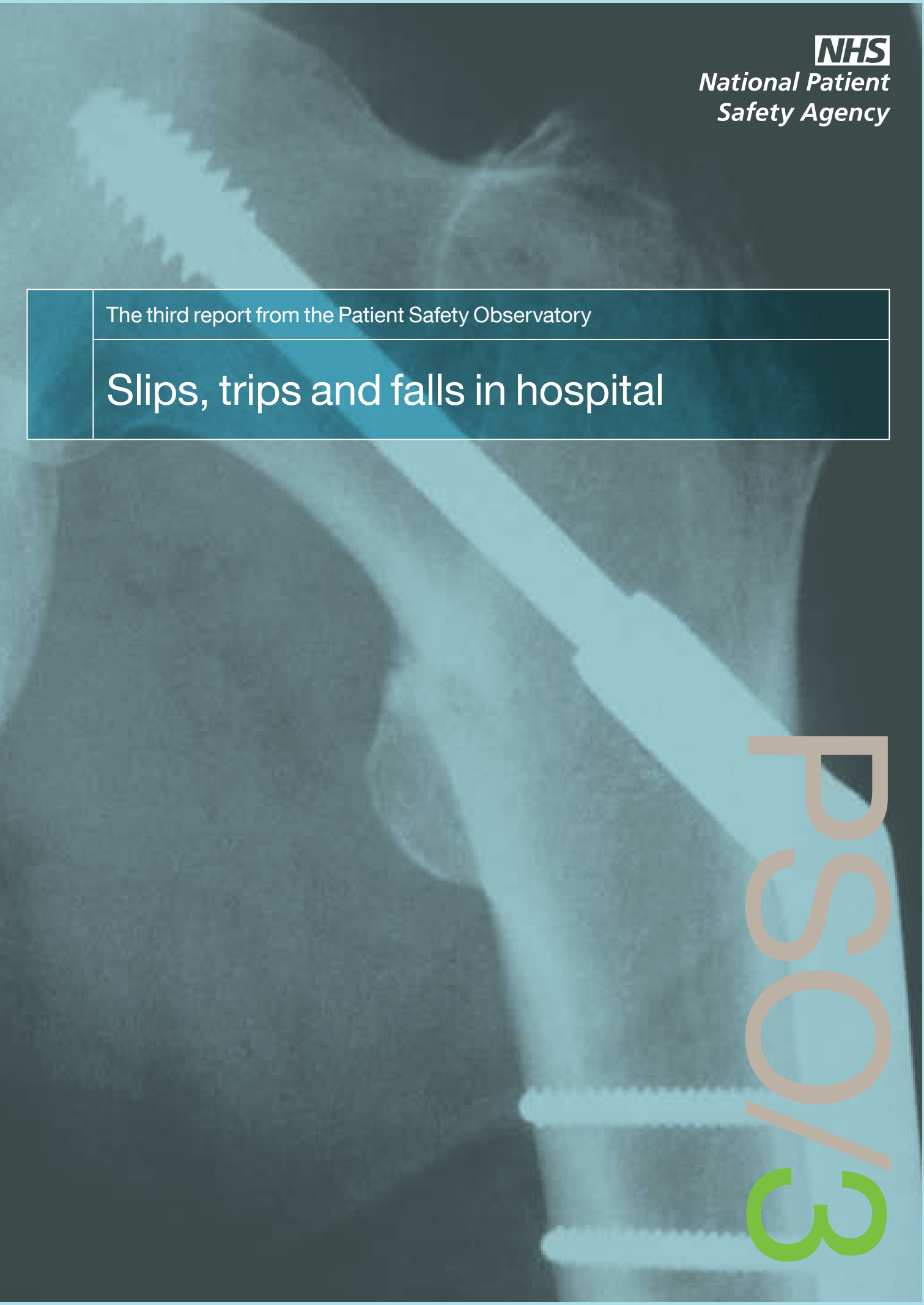


NHS
National Patient
Safety Agency

The third report from the Patient Safety Observatory

Slips, trips and falls in hospital

PSO/3

This report was written by Frances Healey, Patient Safety Manager, and Sarah Scobie, Head of Observatory. Analysis was conducted by Ben Glampson, Information Analyst, Frances Healey and Alison Pryce, Senior Statistician, and additional research was undertaken by Nikki Joule, Independent Researcher, and Micky Willmott, Research Associate.

The third report from the Patient Safety Observatory

Slips, trips and falls in hospital

The third report from the Patient Safety Observatory

Acknowledgements

The National Patient Safety Agency (NPSA) would like to thank all the organisations and individuals who made this report possible.

These include:

- patients who have shared their experiences;
- frontline staff who have reported falls;
- risk managers who have connected their systems to transmit these reports to the NPSA's National Reporting and Learning System (NRLS);
- the members of the expert reference group which includes patient organisations, frontline clinical staff, falls experts and organisations working to reduce harm from falls (see appendix 1);
- the NHS organisations who shared their good practice in preventing falls;
- organisations who shared their data on falls with the Patient Safety Observatory.

The third report from the Patient Safety Observatory

Foreword

There will always be a risk of falls in hospital given the nature of the patients that are admitted, and the injuries that may be sustained are not trivial. However, there is much that can be done to reduce the risk of falls and minimise harm, whilst at the same time properly allowing patients freedom and mobilisation during their stay in hospital.

Some of the reports that the NPSA receives via its NRLS relate to new problems and it is important that we identify these. However, many of the challenges that face us in improving safety for patients are long-standing, and this is the case with falls in hospital.

Patient falls account for almost two-fifths of the patient safety incidents reported to the NRLS. This report draws upon information from a sample of 200,000 reports of falls, along with information from other data sources, such as clinical negligence claims, reporting to other systems and the research literature. Furthermore, the report brings together resources and case studies for implementing evidence-based interventions to prevent falls, and to reduce harm to patients in the event of a fall.

The NPSA estimates that a thousand patients sustain a fracture as a result of falls in hospitals in England and Wales each year, and some patients die as a result of falling.

This report looks to improve understanding of the scale and impact of falls within the NHS, and should energise staff, from the frontline to chief executives, to renew efforts to prevent falls, by directing them to some of the excellent resources on falls prevention which are available.

Professor Richard Thomson, Director of Epidemiology and Research, National Patient Safety Agency

The third report from the Patient Safety Observatory

Contents

The third report from the Patient Safety Observatory

Executive summary

A patient falling is the most common patient safety incident reported to the National Patient Safety Agency (NPSA) from inpatient services:

- Over 200,000 falls were reported to the NPSA's National Reporting and Learning System (NRLS) in the 12 months from September 2005 to August 2006, with reports of falls coming from 98 per cent of organisations that provide inpatient services.
- 26 falls were reported to the NPSA during the year, which appear to have resulted in the patients' death, and further deaths are likely to have occurred following hip fractures.
- The NPSA estimates that there are over 530 patients every year who fracture a hip following a fall in hospital, and a further 440 patients who sustain other fractures.
- In an average 800-bed acute hospital trust, there will be around 24 falls every week, and over 1,260 falls every year. Associated healthcare costs are estimated at a minimum of £92,000 per year for the average acute trust.

Although the majority of falls are reported to result in no harm, even falls without injury can be upsetting and lead to loss of confidence, increased length of stay and an increased likelihood of discharge to residential or nursing home care.

This report analyses the largest dataset of falls in hospital in the world, and includes a synopsis of research evidence on preventing falls, with examples of practical ways of implementing effective interventions that can reduce the risk of a patient falling.

NHS organisations' falls prevention policies need to be balanced with rehabilitating patients and their right to make their own decisions about the risks they are prepared to take. Achieving zero falls is not realistic, because rehabilitation always involves risk.

This report includes excellent examples of policies from NHS hospitals that have reduced the number of falls and injuries. However, some NHS organisations do not have a falls prevention policy or are placing too much emphasis on completing falls risk scores, rather than preventing falls. In particular, some organisations are not using a range of both clinical and environmental interventions; research shows that applying multifaceted interventions has the greatest effect.

Further, reports of incidents to the NRLS suggest the care of patients after a fall could be improved in some NHS organisations.

This advice is aimed at:

- chief executives and senior management teams to highlight the impact of falls, and how strategic leadership can reduce the chance of patients falling;
- nursing directors, medical directors, clinical governance leads, therapy leads and estates leads for action to develop, review and implement falls prevention policies based on evidence from research;
- falls co-ordinators so that hospital and community efforts to prevent falls are co-ordinated and integrated;
- frontline nursing staff, doctors and allied health professionals to help them put evidence on preventing falls into practice;
- risk management teams to support local reporting and learning from incidents.

This report is supported by a safer practice notice on the safe and effective use of bedrails.

To coincide with the report, **www.saferhealthcare.org.uk** are launching an evidence-based web resource on falls in order to support the sharing of local learning and promote evidence based practice.

Recommendations

The NPSA is recommending that each patient at risk of falling should receive multifaceted clinical and environmental interventions that could reduce the risk. Doing this could reduce the number of falls by up to 18 per cent. To achieve this, the NPSA is recommending that NHS organisations:

1 make sure that the circumstances of falls are described completely and meaningfully on local incident forms;

2 analyse and use reports of falls to learn about contributing factors, from ward to board level;

3 create a falls prevention group with the right members to act on both clinical and environmental risk factors;

4 base falls prevention policies on the evidence described in this report;

5 if using a falls risk score, understand to what degree it under- or over-predicts the chances of a patient falling;

6 have appropriate guidance for staff on how to observe, investigate, care for and treat patients who have fallen.

Key messages resulting from the analysis are shown at the start of each section of this report.

The third report from the Patient Safety Observatory

Introduction

Patient falls have both human and financial costs. For individual patients, the consequences range from distress and loss of confidence, to injuries that can cause pain and suffering, loss of independence and, occasionally, death.

Patients' relatives and hospital staff can feel anxiety and guilt. The costs for NHS organisations include additional treatment, increased lengths of stay, complaints and, in some cases, litigation.

This report examines research evidence and information on falls in hospital, including over 200,000 incident reports from acute and community hospitals, and mental health units.

It aims to improve NHS organisations' understanding of the scale and consequences of patients falling in hospital; identify areas where efforts to reduce falls and injury are needed most; and direct NHS staff to some of the excellent evidence-based resources for preventing falls, including case studies of how these can be used in practice.

Preventing patients from falling is a particular challenge in hospital settings because patients' safety has to be balanced against their right to make their own decisions about the risks they are prepared to take, and their dignity and privacy.

Rehabilitation always involves risks, and a patient who is not permitted to walk without staff may become a patient who is *unable* to walk without staff.

Although this report concentrates on falls in hospital settings, initiatives to prevent falls in the community need to be linked to those in hospital settings, as emphasised by the requirement for integrated falls services within the National Service Frameworks for Older People in England[1] and Wales[2].

A patient who has been identified as being at a high risk of falling in the community, and who has received the interventions recommended by National Institute for Health and Clinical Excellence (NICE) guidance,[3] will be less vulnerable to falling if they are later admitted to hospital, and a patient admitted to hospital, or attending accident and emergency (A&E) after having a fall, needs to access services which can reduce the risk of them falling again in the community.[4]

This is the third report from the NPSA's Patient Safety Observatory. The Patient Safety Observatory was set up to examine and prioritise patient safety issues in order to support the NHS in making healthcare safer. It draws on a wide range of data and other information, including the NPSA's NRLS.

Further information on the NRLS and the NPSA is provided in appendix 2 and can also be found at **www.npsa.nhs.uk**

The third report from the Patient Safety Observatory

Falls in hospital

Key messages

Numbers, outcomes and cost of falls:

- more falls are reported to the NRLS than any other type of patient safety incident;
- NHS organisations can benchmark their falls rates against similar NHS organisations;
- rates are highest in community hospitals;
- although most falls are reported as causing no or low harm, some falls result in significant injury and death, and can lead to additional healthcare costs or litigation;
- the most commonly recorded injuries are grazes, cuts and bruises;
- NRLS data suggest 530 patients may fracture their neck of femur in hospital each year, and 26 deaths have been reported related to falls during one year;
- the immediate annual healthcare cost of treating falls is over £15 million for England and Wales, and in an average acute hospital trust is estimated at £92,000.

This report includes analysis of slips, trips and falls in hospital reported to the NRLS over a 12-month period from 1 September 2005 to 31 August 2006. There is also information from research papers and other sources such as the published literature, clinical negligence claims, hospital activity data and reporting to other systems. The word 'falls' is used to refer to the slips, trips and falls incident category in the NRLS.

When someone falls, it is rarely easy to be sure if it was a simple slip or trip, or whether they were dizzy and fainted or collapsed. Falls are therefore defined as, 'an event whereby an individual comes to rest on the ground or another lower level, with or without loss of consciousness.' [5]

During this 12-month period, 206,350 reports of falls were sent to the NRLS from inpatient settings in 472 NHS organisations. This represents 98 per cent of the 480 NHS organisations providing inpatient care in England and Wales at that time. The report includes incidents from acute hospitals, community hospitals and mental health inpatient units, but does not include residential locations outside hospitals such as social care settings, clients' own homes, or residential care settings for patients with learning disabilities. This is believed to be the largest dataset on the circumstances of falls ever analysed, and highlights the scale of the challenge for NHS organisations.

Examples of falls from the NRLS

"Whilst playing football with staff in the sports hall, tripped and apparently sprained her right ankle..."

"Patient went to sit down but misjudged his position, missed the chair and ended up sat on the floor."

"The client was walking to the dining room, his gait was shuffling and he stumbled and fell onto his knees."

"Heard a noise, staff went immediately to check. Found a client on the floor in the toilet, unresponsive, having seizure."

"Patient attended the phlebotomist this morning after a visit to his GP. He fainted for 20 seconds while having his blood taken. He became cold and clammy, and slid from his chair... Once he came round insisted on leaving the department..."

The size of the challenge

Research evidence and hospital admission statistics suggest that hospital patients are at a greater risk of falling than people in the community.[3]

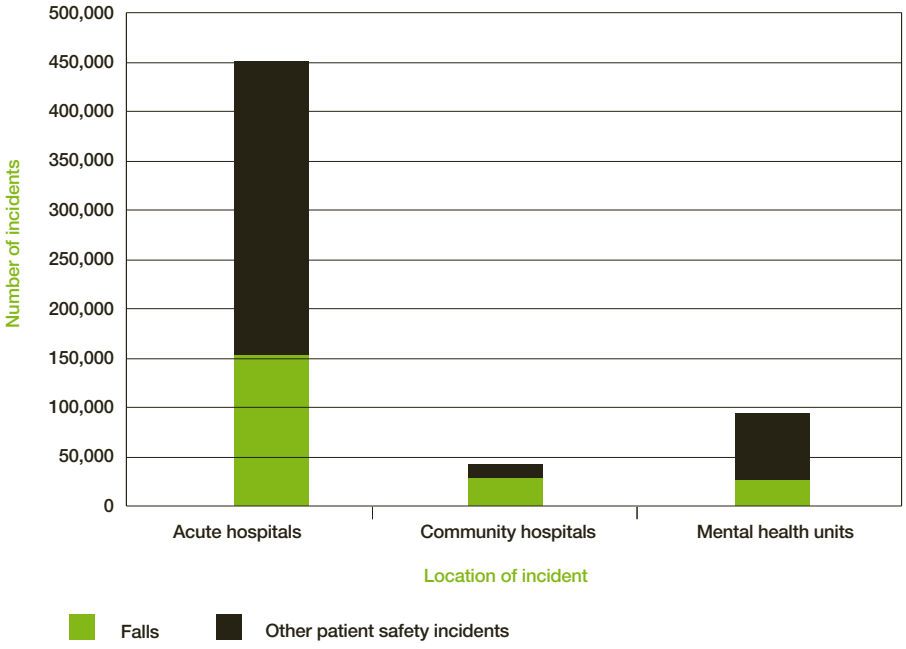
Older people are more vulnerable to falls, and patients over 65 occupy more than two-thirds of hospital beds.[1] Patients who have fallen once are at a higher risk of falling again[6,7] and over 200,000 people every year are admitted to hospital for treatment after a fall.[3] During 2004–05, there were over 46,000 admissions for fractured neck of femur alone.[8]

Hospital patients may undergo surgery that affects their mobility or memory, and they may need sedation, pain relief, anaesthetic or other medication, which increases the risk of falling.[6] Delirium increases the risk of falling and is particularly likely to affect patients on medical wards.[9] Patients with dementia are more likely than those without memory problems to require hospital admission,[10] and are at least twice as vulnerable to falls.[11]

Patients in hospital have to rapidly adapt to changes in their strength and mobility, both as they become ill and as they recover.

Falls have been reported to the NRLS from all types of locations where healthcare is provided to inpatients. Falls comprise a third of all types of patient safety incidents reported from acute hospitals, two-thirds of all types of patient safety incidents reported from community hospitals, and slightly less than a quarter of all types of patient safety incidents reported from mental health units (chart 1).

Chart 1: falls in hospital as a proportion of all patient safety incidents

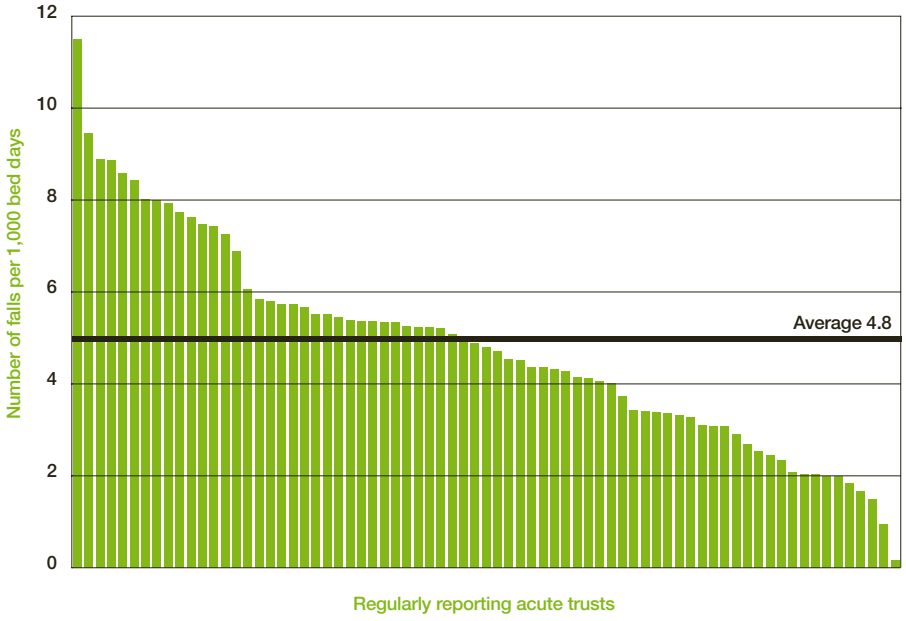


Source: Incidents in hospital locations reported to the NRLS between September 2005 and August 2006.

NRLS data also show that 94 per cent of all falls in acute hospitals, 88 per cent of all falls in community hospitals, and 85 per cent of all falls in mental health units occur in inpatient areas. The remaining falls occur mainly in therapy departments, outpatient and day services areas, corridors, car parks and hospital grounds.

Acute hospitals report the most falls, and this is because they have many more beds than community hospitals or mental health units in England and Wales. To understand how many falls are reported in the context of hospital activity, falls per 1,000 occupied bed days is a useful measure. This has been calculated for acute hospitals, community hospitals and mental health units reporting regularly to the NRLS (charts 2, 3 and 4).

Chart 2: reported falls per 1,000 bed days from regularly reporting acute trusts



Source: The rate of reporting and the number of NHS organisations reporting to the NRLS has increased over time. Trusts were therefore included if they reported consistently (defined as 100 or more reports every month based on incident date) between December 2005 and May 2006. Seventy-three acute organisations were regular reporters and are included in the chart above. Occupied days taken from hospital episode statistics 2004–05.

Reported falls rates in acute hospitals range from almost zero to over 10 falls per 1,000 bed days, with an average of 4.8 falls reported for every 1,000 bed days.

Where trusts have very low numbers of falls, this is likely to indicate that there are data quality or reporting problems, and so the average figure is likely to be an underestimate. High reporters may have particularly vulnerable patients because of the age profile of their community or because they provide specialist care to patients more vulnerable to falls, or the rates may reflect conscientious reporting.

The average rate of 4.8 falls per 1,000 bed days would be equivalent to around 1,260 falls reported each year in an 800-bed acute hospital trust.

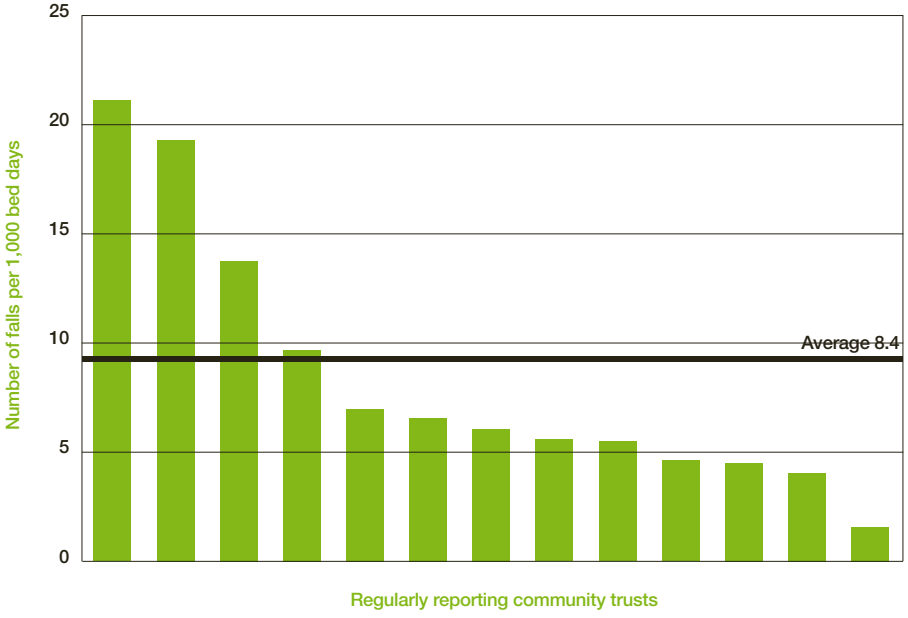
In the international literature, acute hospitals have reported from five falls per 1,000 bed days in general wards, and up to 18 falls per 1,000 bed days in specialist units with patients more vulnerable to falling.[12] The reporting rates found by the NRLS are broadly similar to the rates reported from general wards in other countries, although, as with other incident types, there is likely to be under-reporting.[13]

Reported falls per 1,000 bed days from regularly reporting community hospitals are shown in chart 3.

This shows a range of reported falls from over 20 per 1,000 bed days, to less than one, with an average rate of 8.4 falls per 1,000 bed days. This would represent 105 falls per year in a 40-bed community hospital. However, this needs to be regarded with caution as only 13 NHS organisations with community hospitals reported regularly to the NRLS every month.

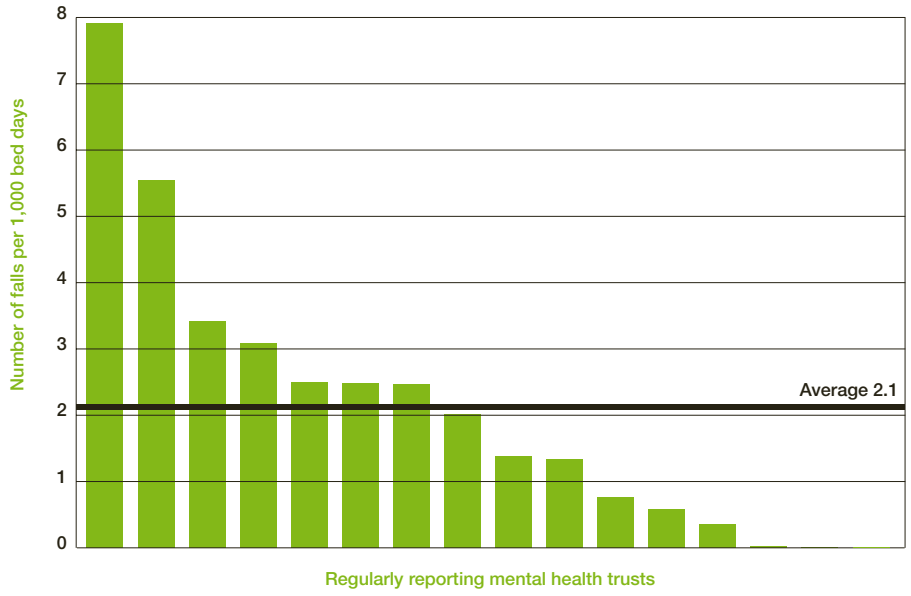
There are no clear equivalents to community hospitals in the international literature reviewed by the NPSA, but community hospital patients are usually older and less mobile[1] than acute hospital patients and may therefore be more vulnerable to falls.

Chart 3: reported falls per 1,000 bed days from regularly reporting community hospitals (primary care organisations)



Source: The rate of reporting and the number of NHS organisations reporting to the NRLS has increased over time. Trusts were therefore included if they reported consistently (defined as 50 or more reports every month based on incident date) between December 2005 and May 2006. Thirteen community hospitals were regular reporters and are included in the chart above. Occupied days taken from hospital episode statistics 2004–05.

Chart 4: reported falls per 1,000 bed days from regularly reporting mental health trusts



Source: The rate of reporting and the number of NHS organisations reporting to the NRLS has increased over time. Trusts were therefore included if they reported consistently (defined as 50 or more reports every month based on incident date) between December 2005 and May 2006. Sixteen mental health organisations were regular reporters and are included in the chart above. Occupied days taken from hospital episode statistics 2004–05.

Reported falls per 1,000 bed days from regularly reporting mental health units are shown in chart 4.

This shows a range of reported falls from almost eight per 1,000 bed days, to less than one, with an average rate of 2.1 falls per 1,000 bed days. This would represent around 135 falls per year in a 200-bed mental health unit.

However, this needs to be regarded with caution as only 16 mental health services reported regularly to the NRLS every month. Mental health units can be very different from each other: some care only for working age adults at low risk of falls; others specialise in the care of older people with mental health needs; and there are many other complex combinations of services and clients.

No published overall rate of falls for mental health units was located, but rates of falls within settings providing mental healthcare for older people are believed to be from 13 to 25 falls per 1,000 bed days.[14] However, most mental health units will be providing care to younger, fully mobile patients, so a lower overall rate of falls would be expected in reports to the NRLS.

Benchmarking your own reporting rates

Because NHS organisations vary in size and activity, calculating reported falls per 1,000 bed days is the best way to benchmark with the reported rates from other NHS organisations.

To do local calculations comparable with the NRLS calculations:

- X = the total number of all patient falls reported in your hospital/unit in the most recent year for which data are available. Include falls in day units and outpatients.
- Y = the total number of occupied bed days in your hospital/unit in the most recent year for which data are available, divided by 1,000. Your organisation's statistics team should be able to provide this.

X divided by Y gives you the number of falls per 1,000 occupied bed days.

Remember that reported rates of falls will be affected by reporting requirements and practice. Actual rates of falls will be affected by differences in local populations served by hospitals, and differences between services and treatments provided by hospitals. Hospitals with higher than average reported rates of falls may have better reporting, or care for more vulnerable patients.

The impact of falls

Definitions and examples of the degree of harm used within the NRLS are shown in table 1, with the degree of harm caused by falls reported to the NRLS from hospital settings shown in table 2.

Table 1: NPSA definitions of severity for patient safety incidents

Term	Definition adapted to falls	Examples from reports to the NRLS
No harm	Where no harm came to the patient.	*"No apparent harm."* *"No complaints of pain, no visible bruising."*
Low harm	Where the fall resulted in harm that required first aid, minor treatment, extra observation or medication.	*"Patient says he has a sore bottom…"* *"Shaken and upset."* *"…graze on right hand."* *"Small cut on finger."*
Moderate harm	Where the fall resulted in harm that was likely to require outpatient treatment, admission to hospital, surgery or a longer stay in hospital.	*"Sustained fracture to left wrist."* *"…one inch laceration over left eye, taken to A&E for suturing."* *"Fractured pubic rami, put on 48 hours bedrest."*
Severe harm	Where permanent harm, such as brain damage or disability, was likely to result from the fall.	*"….following an x-ray, a fractured neck of femur was confirmed."* *Note: up to 90 per cent of older patients who fracture their neck of femur fail to recover their previous level of mobility or independence.*[12]
Death	Where death was the direct result of the fall.	*"Patient heard to fall from commode hitting her head on the floor as she fell…bleeding from back of head... fully responsive but computerised tomography (CT) scan requested together with 15 minute neuro obs.* *"Gradually Glasgow Coma Scale lowered ...patient intubated and sedated and transferred to intensive care unit (ICU) following scan. Patient died later the same day."*

Table 2: Degree of harm from falls by location

Degree of harm		Location			All locations
		Acute hospitals	Community hospitals	Mental health units	
No harm	N	101,199	17,760	14,458	133,417
	%	66.5	63.0	55.4	64.7
Low	N	44,806	9,139	10,199	64,144
	%	29.5	32.4	39.1	31.1
Moderate	N	5,008	1,172	1,326	7,506
	%	3.3	4.2	5.1	3.6
Severe	N	1,022	123	85	1,230
	%	0.7	0.4	0.3	0.6
Death	N	21	1	4	26
	%	<0.1	<0.1	<0.1	<0.1
All falls	N	**152,056**	**28,195**	**26,072**	**206,323**

Source: Incidents in hospital locations reported to the NRLS between September 2005 and August 2006. Incidents reported as resulting in death have been reviewed to correct for mis-coding of severity, or location: 16 incidents have been excluded which were fatal collapses, not falls; eight incidents were mis-coded (reports clearly indicate the patient survived); and, in three cases, the fall resulting in death occurred outside hospital care.

To support an analysis of degree of harm, keyword searches were performed on NRLS data in order to estimate the frequency of types of injury from falls (see appendix 3 for detailed methodology).

Over all three settings, the majority of reported falls (65 per cent) resulted in no harm. However, even a fall without injury can be upsetting, and lead to loss of confidence,[16] increased length of stay, and an increased likelihood of discharge to residential or nursing home care.[16] The proportion of falls resulting in no harm reported to the NRLS from acute hospitals (67 per cent) is similar to the proportion recorded in the international literature.[17]

The proportion of falls in community hospitals and mental health units that resulted in no harm is lower than in acute settings. It is not clear whether this reflects differences in grading of severity, or patient factors. For example, patients in community hospitals will tend to be older,[1] and therefore more vulnerable to injury than acute hospital patients,[18] and patients with dementia may be more likely to be harmed because reflexes to prevent injury, such as putting out a hand to break the fall, are likely to be impaired.[19]

Over all settings, a further 31 per cent of reported falls resulted in low harm. These generally involved bumps, bruises, minor cuts and grazes, or patients who, although physically unharmed, were shaken or upset.

Keyword searches estimate these reports include around 11,800 reports of lacerations or skin tears. These were mainly injuries requiring a dressing (low harm) but a small proportion required extra treatment such as sutures (moderate harm).

Moderate harm was reported in three to five per cent of falls. Keyword searches estimate these reports included 442 fractures likely to cause moderate harm, predominantly wrist fractures. These are particularly likely to occur in patients with osteoporosis.[20] These numbers are likely to be an underestimate, since some reports of falls may be submitted before the patient has had an x-ray to check for any fractures.

The severe harm category included falls where the severity had been incorrectly coded by reporting organisations, particularly when an aspect of the injury had been severe, although long term disability was unlikely, for example:

"…had a severe nosebleed…"
"…severe bruising on buttocks…"

In order to assess the number of severe harm incidents more accurately, keyword searches of the NRLS were used. These estimate that 530 patients were reported to have a confirmed fracture of their neck of femur. Again, these numbers are likely to be an underestimate as reports may be submitted before the patient has had an x-ray.

Fractured neck of femur is particularly likely to result in long term disability or loss of independent living,[16] therefore most fractured neck of femurs are likely to fall within the NPSA's definition of severe harm.

The NRLS data include 26 reports of falls that appear to have directly resulted in death. These were predominantly from head injuries (17 deaths) or following fractured neck of femur (seven deaths). Reports are usually submitted promptly to the NRLS after a fall has occurred, and there are likely to have been further deaths that occurred days or weeks after the related fall.

Mortality subsequent to fractured neck of femur is estimated at 18 per cent, including deaths from underlying illness as well as deaths at least partly attributable to the fracture.[21] This suggests that around 95 further deaths may have occurred following the estimated 530 fractured neck of femurs reported to the NRLS.

The Health and Safety Executive (HSE) receive reports of falls in hospital that are fatal or lead to major harm involving an environmental hazard.* In the year 2004–05, 321 patients accidentally falling were reported to the HSE: six of these falls were fatal.

Around five per cent of falls occurring outside hospital are thought to result in fractures.[3] Data from the NRLS and HSE suggest fractures occur in fewer than one per cent of reported falls in hospital, even allowing for potential underestimation.

The lower rate of fractures in hospital may relate to reporting bias in the community, where falls resulting in fractures are much more likely to need healthcare and therefore be known to researchers, whilst falls without injury may go unreported by the people who fell. In hospital settings, all falls are likely to be known to staff, whether or not the patient was injured.

* HSE's specific requirements on the severity and circumstances in which a fall requires reporting to them can be found at **www.hse.gov.uk/pubns/hsis1.pdf**

The cost of falls

The human cost of falling includes distress, pain, injury, loss of confidence and loss of independence, as well as impact on relatives and carers. Understanding the financial cost of falls in hospitals is also important.

Using conservative estimates for the cost of staff and for treating particular injuries, along with NRLS data, the direct healthcare cost of falls in hospital can be estimated (table 3). The overall direct healthcare cost to the NHS is estimated at £15 million every year. This represents a cost of £92,000 a year for an 800-bed acute hospital trust. Unit cost estimates of inpatient falls and fractures are not available, so these estimates are based on information on costs of patients admitted for falls or fractures.

In addition to these immediate costs, there are additional costs that are more difficult to quantify. Patients who fall are likely to have longer lengths of stay,[19] but this may be because they are usually more ill and less mobile than patients who do not fall.

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.[16] This can involve substantial and long term costs. Minor injuries like bruises and grazes can develop into leg ulcers requiring prolonged and expensive treatment.

Falls in community hospitals and mental health units can also involve the cost of transporting and escorting the patient to A&E departments for investigation and treatment.

A small proportion of falls also result in litigation against trusts. During 2005, the NHS Litigation Authority (NHSLA) received notification of 102 claims of clinical negligence relating to patients falling in hospital settings. These claims sought a total of over £3 million in costs and compensation.†

A discussion of the potential cost savings through falls prevention strategies is included following the review of evidence and good practice on page 55.

†These figures relate to notification of claims, not the number of claims which were upheld or the sums actually paid out.

Table 3: cost of falls per incident, for all reported incidents and for a hospital trust

Harm category or injury	Basis for estimate	Cost/ incident	Reported incidents, England and Wales		800-bed acute hospital trust	
			Number	Estimated cost	Number incidents/ year+	Costs/ year
No harm incidents	One hour staff time for helping/hoisting patient into bed, reassuring patient, contacting relatives, checking for injury, observations and completing incident form and notes.	£41	133,448	£5,471,368	839	£34,393
Low harm incidents	As no harm, plus first aid (0.5 hours), plus cost of dressings – average £5.	£65.50	64,145	£4,201,498	372	£24,374
	X-ray costs for no and low harm incidents.	£80	945	£75,600	6	£462
Moderate and severe harm incidents excluding fractures or head injuries	As low harm, plus lowest estimated unit cost of injury* which would have been managed in A&E, without admitting patient (e.g. sprains, dislocations, fractures that do not need surgery, open wounds): £324 to £446.	£324	7,859	£2,546,316	45	£14,605
Fractures, excluding hip fractures	Reference costs range from £1,089 to £3,489 (average taken).	£2,289	442	£801,150	2	£5,204
Hip fractures	Reference costs range from £3,358 to £4,603 (average taken).	£3,981	530	£2,109,665	3	£12,897
Total				**£15,205,597**	**1,267**	**£91,935**

Source: NRLS incidents reported. *From systematic review of falls in hospital.[19] +Presented as whole numbers, but exact figure used to estimate costs.

The third report from the Patient Safety Observatory

Causes and circumstances of falls

Key messages

Why patients fall:	What patients were doing when they fell:
• most falls are the result of a combination of factors; • poor mobility and confusion are often contributing factors; • environmental hazards such as wet floors or steps are identified in only a small proportion of patient falls.	• most falls occur whilst patients are walking; • patients are particularly likely to fall whilst using the toilet or commode; • falls from trolleys may be more likely to lead to serious injury and litigation.
Patients most vulnerable to falls:	**Learning from the circumstances of falls:**
• older patients, particularly those aged over 80; • relative to the proportion of men and women in hospital, there are more reported falls of men than women.	• this can help NHS organisations to direct their resources to where they are most needed; • some reports of falls are too brief to support local or national learning.
When patients are most likely to fall:	**Recommendations for NHS organisations:**
• weekdays, when there are more patients in hospital; • mid-morning, when patients are most likely to be active; • fewer falls occur at mealtimes and in the early hours of the morning.	• make sure that the circumstances of falls are described completely and meaningfully on local incident forms; • analyse and use reports of falls to learn from ward to board level.
Staff witnessing patient falls:	
• only a minority of falls are witnessed by staff; • even when a member of staff witnesses a fall, they are unlikely to be able to stop the patient from falling.	

Why patients fall

Over 400 risk factors for falls have been identified[3] and many different risk classifications exist.[7] An example of risk classification is shown in table 4.

Falls can sometimes happen because of a single factor, for example, tripping or fainting affecting an otherwise fit and healthy person. However, most falls, particularly in older people, are due to a combination of several factors, and the interaction between factors is crucial. For example:

"The patient stood [up] from her chair at the bedside and fell… twisted her right ankle… wearing inappropriate footwear. Diabetic, has hypotension, was admitted following fall at home… normally uses nurse call bell but when checked after fall had low blood sugar, this probably made her momentarily forgetful…"

Hospital patients are a different population to community patients, as they are much more likely to be affected by acute illness, delirium, dementia and cardiovascular problems. The risk factors that appear to be most significant in hospital patients are:[6]

- walking unsteadily;
- being confused and agitated;
- being incontinent or needing to use the toilet frequently;
- having fallen before;
- taking sedatives or sleeping tablets.

Delirium, brain injury and dementia can cause confusion. Dementia increases the risk of falling because patients find it difficult to recognise environmental hazards, find it hard to save themselves when they become off-balance, and may be unaware of any limitations to their own mobility. Dementia is also associated with changes in walking patterns and low blood pressure on standing.[19]

Table 4: types of risk factors

		Examples
Intrinsic factors	Personality and lifestyle	Activities, attitudes to risk, independence and receptiveness to advice.
	Age-related changes	Changes in mobility, strength, flexibility and eyesight that occur even in healthy old age.
	Illness and injury	Stroke, arthritis, dementia, cardiac disease, acquired brain injury, delirium, Parkinson's disease, dehydration, disordered blood chemistry and hypoglycaemic episodes in diabetes.
Extrinsic factors	Medication	Sleeping tablets, sedation, painkillers, medication that causes low blood pressure, medication with Parkinsonian side effects, alcohol and street drugs.
	Environment	Lighting, wet floors, loose carpets, cables, steps, footwear, distances and spaces.

The factors that contribute to falls reported to the NRLS are shown in chart 5. These factors are based on the assessment carried out by staff who made the report. This may be affected by their knowledge of the causes of falls, the patient's condition, and the patient's account of the fall.

The contributory factors are recorded as unknown in 17 per cent of reports. This may be inevitable given the complex causes of most falls; often they are not witnessed or the patient is unable to account for how they fell. For example:

"Patient informed staff that he had fallen in the bathroom. No witnesses to the fall. Could not explain how he came to fall but doesn't think he slipped or fainted…"

The majority of identified contributory factors relate to patient factors (69 per cent), as would be expected from the literature on risk factors for falls.

The free text of 600 incidents reported to the NRLS (200 from each care setting) was reviewed for details on the nature of contributing factors. Reports tend not to give detail about the patient's condition, but the main risk factors for falls in hospital identified in the literature (walking unsteadily, being confused and agitated, being incontinent, having fallen before, and taking sedatives or sleeping tablets) are found in the free text of reports to the NRLS, for example:

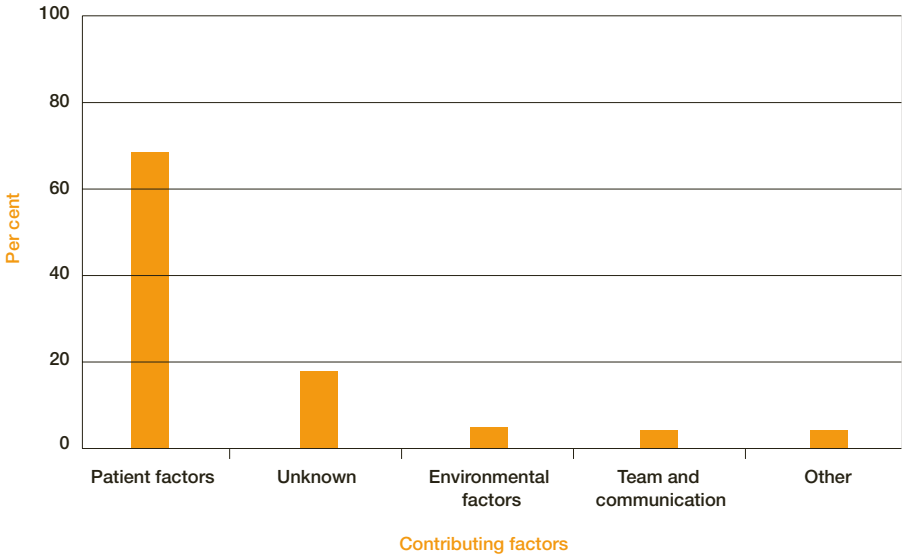
"...tried to mobilise without his frame or assistance."

"...went to stand up but cannot bear weight."

"Patient had been agitated and wandering most of the day. Suffers from dementia…"

"….she had been slightly incontinent of urine on way to toilet and slipped on urine."

Chart 5: factors contributing to falls, where reported



Source: Incidents in hospital locations reported to the NRLS between September 2005 and August 2006, where contributing factors were entered (25,414 incidents; 12.3 per cent of total). Single incidents may have multiple contributing factors.

"Patient with history of previous falls. Confused."

"…had recently had night sedation."

Environmental factors are less likely to be the main cause when a patient is in poor health, with poor mobility. A study suggesting that 50 per cent of falls in institutional settings could be attributed to environmental factors22 is often cited23. However, this study took place in an environment where all residents were not only independent in self-care, but "able to do simple housekeeping" and, therefore, are unlike typical hospital patients. In data from the NRLS, environmental factors were identified in five per cent of reports, either as a single risk factor or combined with patient factors:

"Patient slipped on wet corridor… cleaner had left warning cones on area…"

"Patient has poor balance, co-ordination and cognitive abilities.... Room is too small with too much equipment in it for service delivery…"

Reports to the NRLS of patients slipping on wet floors are rare (six out of 600 reports) and usually relate to patients slipping on their own urine. Footwear is only mentioned in reports to the NRLS when it is a specific problem, for example:

"Patient found in his room sitting on floor against wall. Only one slipper on."

"Had dressings on both feet. No slippers."

In the sample of reviewed incidents, clinical equipment was rarely mentioned as contributing to a patient falling (two out of 600 reports). In one report, a patient's walking frame became tangled in her oxygen supply and, in another, a patient tripped over the lead of his blood pressure monitor.

Patients most vulnerable to falls

Evidence shows that as people in the community grow older, the risk of falling increases,[3] with 30 per cent of people aged over 65, and 50 per cent of people aged over 80, falling at least once a year.[24]

People are not only more vulnerable to falling as they grow older, but are also increasingly vulnerable to injury, including injury to skin and soft tissue, and osteoporotic fractures.[3]

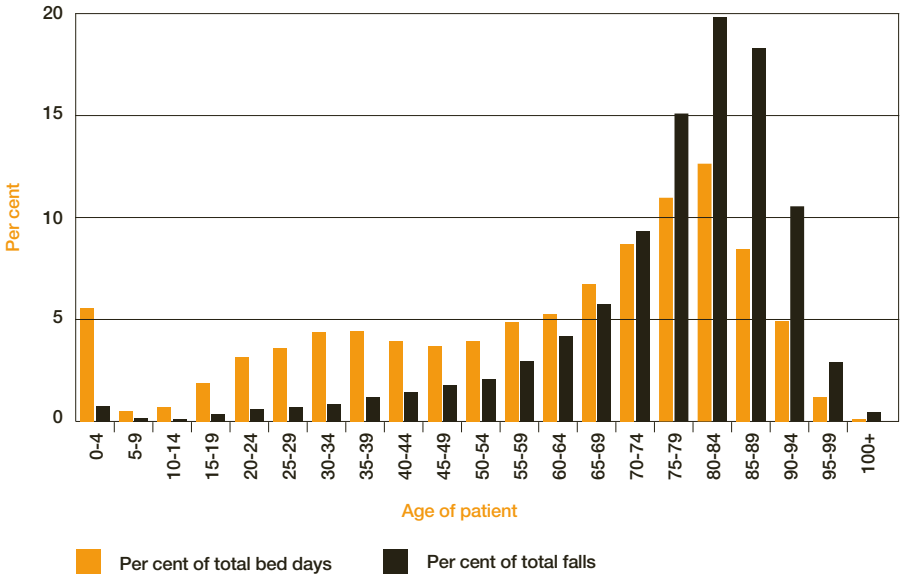
The age of patients who have fallen in hospitals compared with the proportion of bed days occupied by each age group is shown in chart 6. This clearly illustrates that older patients in hospitals are at a greater risk of falling, not only in terms of overall numbers, but also in comparison with the numbers of bed days they occupy.

The gender of patients affected by a fall is shown in chart 7. NRLS data appear to show that more men than women fall in acute hospitals, both in overall numbers and compared to the bed days they occupy; men occupy only 44 per cent of beds, but 51 per cent of people who fall in acute hospitals are men.

Community hospitals show a similar pattern; men occupy 40 per cent of community hospital beds, but 47 per cent of people who fall in community hospitals are men. In mental health settings, 52 per cent of people who fall are men.

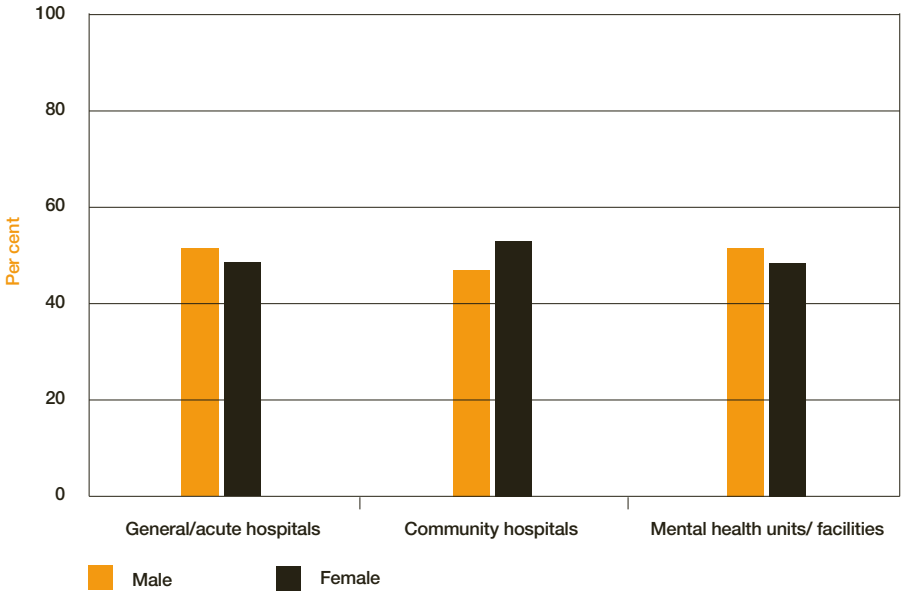
The reasons why more men fall in hospital than women are unclear; the literature on falls does not provide an explanation since this gender difference does not appear to have been previously identified.

Chart 6: age of patients who fell compared to age of all patients



Source: falls in hospital locations reported to the NRLS between January 2006 and August 2006, where age is reported and within a valid range (108,360 incidents; 52.5 per cent of total). Hospital episode statistics on occupied bed days from 2004–05.

Chart 7: gender of patients who fell, where known



Source: falls in hospital locations reported to the NRLS between January 2006 and August 2006, where gender known (108,420 incidents; 52.5 per cent of total).

When patients are most likely to fall

In the literature, the pattern of hospital falls by time of day is inconsistent.[16] Some UK studies suggest most falls happen in the daytime, particularly at times when patients are most active.[25,26]

Times of reported falls could be influenced by variations in patients' abilities and activities, including variations in alertness, or by staff workload, breaks and shift patterns, basic routines such as mealtimes, and clinical routines such as medication rounds and surgery schedules, or by staff forgetting the exact time a fall occurred by the time they report it. The time of day when NRLS reports indicate patients fell is shown in chart 8.

There are slightly fewer reported falls at weekends, probably because of lower bed occupancy at weekends, and because patients attending as outpatients or day patients usually do so during weekday daytime hours.

The pattern of falls by time of day remains consistent between weekends and weekdays, and across weekdays. Falls rates begin to rise around 9am and peak in the period between 10am and 12noon. This is the period when patients are most likely to be active. Staffing levels are usually highest during this period, but workload may also be high. Many nursing activities will involve caring for one patient behind closed curtains or doors, which makes observing other patients more difficult. For example:

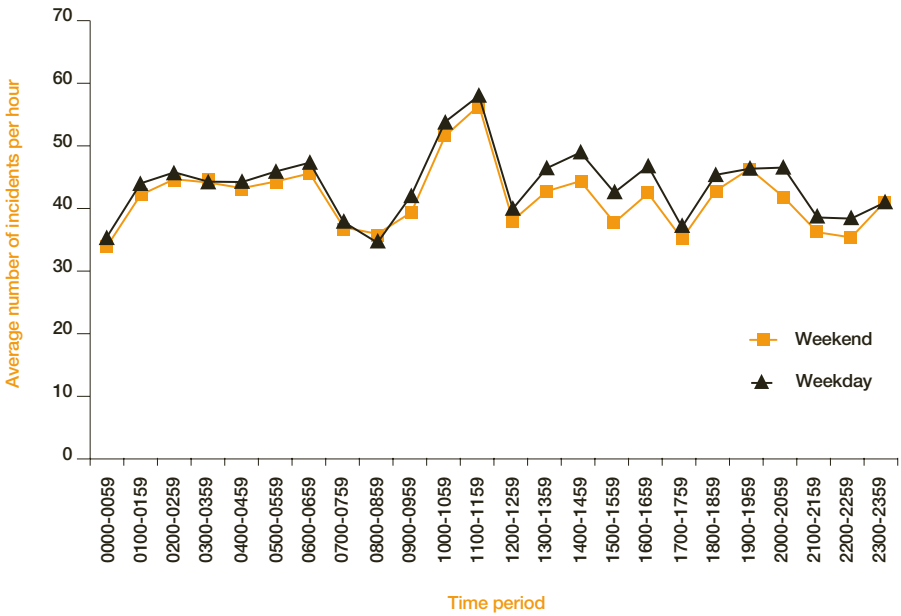
"Myself and Health Care Assistant were behind the curtains of bed 21, bed-bathing patient. When the curtains were pulled back, I saw [another] patient sitting on the floor…"

The number of falls dips at around 8am, 12noon and 5pm, which coincides with mealtimes. This may be because patients spend mealtimes sitting still. Activities that are more likely to result in a fall are compressed into periods outside mealtimes. For example:

"Patient was seated at the breakfast table, after breakfast he got up from the table and fell to the floor…"

There are fewer falls during the night, with the fewest falls occurring between midnight and 1am. This is likely to be because most patients will have settled into a period of deep sleep.

Chart 8: falls by time of day



Source: Falls in hospital locations reported to the NRLS between September 2005 and August 2006, where time and date of incident was not unrealistic or missing (174,261 incidents; 85 per cent of incidents).

Staff witnessing patient falls

The literature review suggests very few hospital falls are witnessed by staff.[19] Falls that are not witnessed by staff are not linked to inappropriate care.

As shown on page 51, it is difficult to stop a patient from falling even if an individual member of staff is assigned to closely observe them. Except in units like intensive care, the number of patients will always exceed the number of staff, and patients' beds are usually arranged in a series of bays and single rooms, with only one or two rooms in the line of sight.

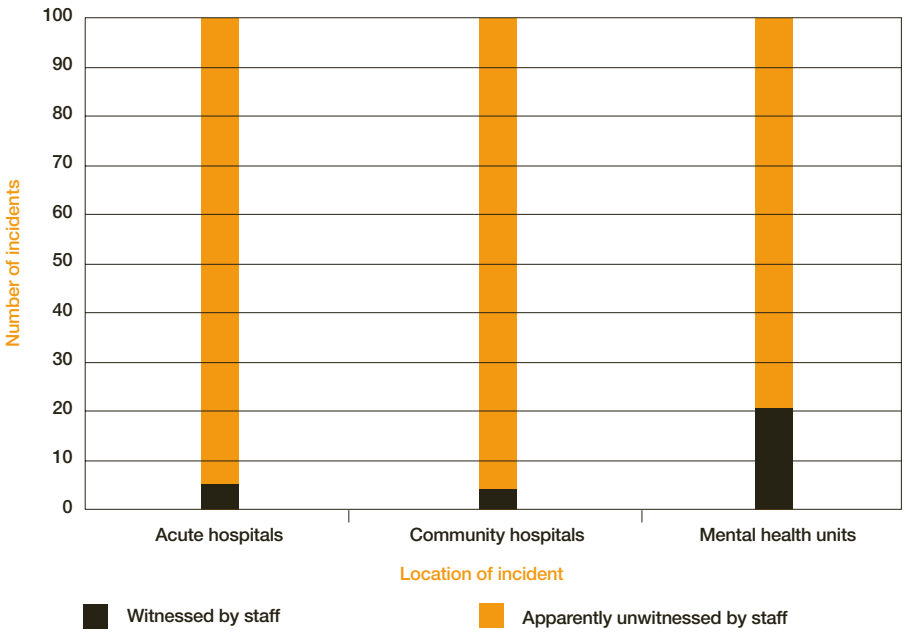
Reports to the NRLS do not always say if staff witnessed a patient falling, but this can usually be deduced from text descriptions. For example, falls where staff say that they found the patient on the floor, or heard the patient fall, can be assumed to have occurred out of their sight. Indications of whether or not falls were witnessed by staff are shown in chart 9.

Only four per cent of falls in community hospitals and five per cent of falls in acute hospitals appear to have been witnessed by staff. The proportion of witnessed falls in mental health hospitals was higher at 21 per cent; a statistically significant difference.

There are likely to be many occasions when staff have seen that a patient is about to fall and stepped in to prevent an accident, but this would not be reported to the NRLS. Furthermore, if a member of staff does see a patient falling, they are not always able to intervene. For example:

"Whilst being assisted to use the toilet, patient stood and then began to go down to her knees. Due to her weight, staff were unable to prevent this…"

Chart 9: patient falls witnessed by staff



Source: Review of random samples of 600 incidents; 200 from each care setting.

The higher proportion of witnessed falls in mental health units may be because patients are less likely to co-operate with staff who are trying to prevent them falling. For example:

"…agitated and wanting to self mobilise without her zimmer, pushing off any attempt by staff to assist her…"

What patients were doing when they fell

There is limited literature on what hospital patients were doing when they fell, perhaps because it is difficult to be sure if falls are not witnessed and the patient cannot explain what happened.

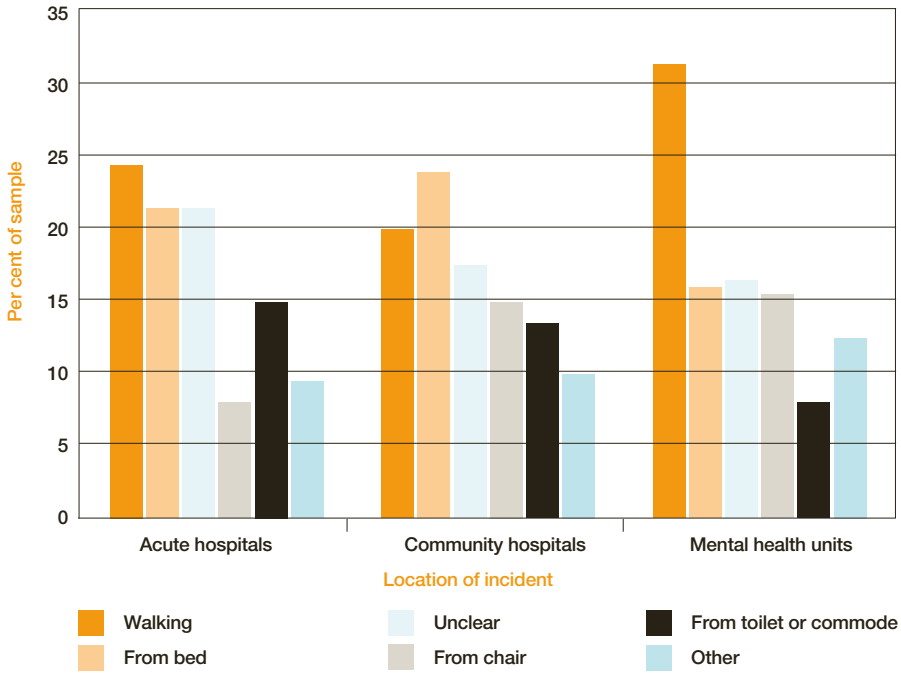
The literature suggests that patients who have fallen are usually found near their beds or chairs, because patients who are mobile and fit enough to walk further are less likely to fall.[16]

A published analysis of NHSLA data on falls leading to litigation between 1998 and 2004, mainly from acute hospitals, found 24 per cent occurred whilst the patient was mobilising, 23 per cent were falls from beds, 14 per cent were falls from a toilet or commode, 11 per cent from trolleys, five per cent from chairs, and three per cent in bathrooms, with 20 per cent in unclear or other circumstances.[27]

The free text descriptions of 600 falls reported to the NRLS were examined in detail for indications of what the patient appeared to have been doing at the time of the fall, and the findings are shown in chart 10. The differences between settings were not statistically significant.

Although the majority of falls were not witnessed by staff, most free text does give a reasonable indication of the circumstances of the fall. In some cases, patients could give an account of what they were doing, or the fall was seen by another patient or visitor. Patients had often been seen shortly before they fell, or were found in circumstances that indicated what they had been doing when they fell.

Chart 10: what patients were doing when they fell



Source: Review of random samples of 600 incidents; 200 from each location.

Falls that apparently occurred whilst the patient was walking accounted for 25 per cent of falls in acute hospitals, 20 per cent of falls in community hospitals, and 32 per cent of falls in mental health units. In acute and community hospital settings, these tended to be patients with mobility problems taking short journeys. For example:

"Patient was walking using zimmer and fell by bed."

In mental health settings, patients who are constantly wandering tend to be those that fall. For example:

"…had been pottering as usual, was heard to fall in the lounge, found on the floor near the window... assisted to a chair but she did not remain seated and continued walking around in her usual way."

Falls from beds made up 22 per cent of reported falls in acute hospitals, 24 per cent of falls in community hospitals, and 16 per cent of falls in mental health units. More information on falls involving beds, bedrails and injury can be found on page 58.

Falls from chairs, or while rising from a chair, made up eight per cent of falls reported from acute hospitals, 15 per cent of falls in community hospitals, and 16 per cent of falls in mental health units. There are only occasional references to patients sliding out of their chairs, with most falls from chairs appearing to follow an attempt to stand. For example:

"Patient attempted to stand, overbalanced and slid to the floor."

Falls whilst the patient was using the toilet or commode made up 15 per cent of reported falls in acute hospitals, 14 per cent of falls in community hospitals, and eight per cent of falls in mental health units.

Given the fairly small part of each day patients are probably using the toilet, this is a high proportion of the overall number of falls. Hospital toilets are usually adapted for safety with grab rails, accessible call bells and non-slip flooring, but the tasks involved may carry a high risk of falls for patients with impaired mobility. For example, changes of direction to close the door and sit down, bending to loosen clothing and letting go of grab rails or walking aids whilst fastening zips.

However, remaining with patients to protect them from falling is not necessarily the answer, as most patients want to be left in private. Suggestions on ways to improve safety in toilet areas can be found on page 45.

Less than two per cent of falls occurred in bathrooms or shower rooms even though stepping out of the bath or shower whilst wet carries a high risk of falling. Patients who are mobile enough to use the bath or shower independently are unlikely to be at high risk of falls, whilst less mobile patients are likely to be assisted by staff and wheeled into showers or hoisted in and out of baths.

In all settings, a proportion of reports were unclear on the exact circumstances of falls. Some were too brief or uninformative, but others were unclear because the fall had not been witnessed and the patient could not explain what had happened. For example:

"…found sitting on floor between his bed and his chair, unsure how he got there."

Although the 26 fatal falls reported to the NRLS are too few to allow comparative analysis, they appear to have occurred in similar circumstances to other falls.

The difference between a no harm fall and a fatal fall appears more likely to relate to the patient's vulnerability to injury, and the effect of co-existing illness, than on how or where they fell. Falls that resulted in fractured neck of femur reported to the NRLS also appear to have occurred in similar circumstances to other falls. Osteoporosis is likely to be a key factor in whether or not a fall results in a fracture.[3]

Reports of falls to the HSE in 2004–05 from acute trusts and to the NHSLA in 2005 were also analysed to determine circumstances of falls, and were compared with data from the NRLS (table 5). The majority of the NHLSA claims are from acute trusts (96 out of 102 claims; 93 per cent).

Overall, they suggest a similar picture of circumstances, but falls from trolleys account for a higher proportion of falls from the NHSLA claims database (10 per cent compared with less than one per cent in the NRLS data). These are not falls whilst trolleys are being moved, but falls whilst the patient is lying on a trolley during investigation or treatment. The higher proportion of falls from trolleys in the NHSLA data may be because the height of trolleys means these falls are more likely to result in serious injury, and therefore litigation.

Table 5: circumstances of falls – litigation claims and reports to the HSE

Circumstances of fall		Data sources		
		NRLS (acute hospitals; sample of 200 incidents)	NHSLA (NHS trusts; notified during 2005)	HSE (reports from public hospitals; notified during 2004/05)
In bathroom	N	7	3	13
	%	3.5	2.9	4
From bed	N	43	24	60
	%	21.5	23.5	18.7
From chair/wheelchair	N	16	5	23
	%	8	4.9	7.2
From trolley/table	N	0	13	2
	%	0	12.7	0.6
Whilst walking/ standing	N	49	13	122
	%	24.5	12.7	38
From toilet/commode	N	30	10	29
	%	15	9.8	9
Unclear	N	43	29	58
	%	21.5	28.4	18.1
Other	N	12	5	14
	%	6	4.9	4.4
Total		**200**	**102**	**321**

Source: Random sample of 200 incidents from the NRLS; all patient falls claims notified to NHSLA in 2005; all member of the public falls in public hospitals from height or slips/trips notified to the HSE 2004–05 with falls affecting hospital visitors excluded so far as data permits (49 exclusions), and non-accidental falls (e.g. suicide attempt) excluded.

Learning from the circumstances of falls

Falls are reported from every area providing patient care. Understanding the circumstances can help NHS organisations target their efforts and resources to the most vulnerable patients, to the areas where most falls occur, and at the times they are most needed.

Many of the reports to the NRLS analysed gave useful accounts of how the patient fell, although they vary in how fully they describe the circumstances of the fall, the patient's condition, and the environment. However, some gave very brief accounts, for example:

"Patient fell."

"Patient found on floor."

Just over 10 per cent of incidents (21,247; 10.3 per cent) had a description of 30 characters or less, and there were 1,154 incidents alone with the text:

"Pt fall".

These brief reports have almost no value for local learning. They make it difficult for national analysis and, therefore, an understanding of the full impact of contributing factors such as footwear or bedrail use.

Improvements to the free text of incident reports would increase the opportunities for informing both local and national analysis and learning. Suggested information to be included in incident reports is in table 6.

Table 6: suggested information to include when reporting falls

Examples of information		Reason for collecting this information
Reporting factors	Witnessed/not witnessed	Make a clear distinction between what was seen or heard, and the patient's account of what happened.
	Outcome of investigations recorded	When patients are reported as having x-rays or other investigations after a fall, the results of the x-ray or other investigation should be included in the report.
	Type of injury	Should be specific, e.g. 'fractured tibia' not 'broken leg'.
Environmental factors	Buzzer/bell available within reach before fall	Highlight whether there is an issue about accessing call bells.
	If a fall from bed, whether bedrails were in use	Help assess how bedrail use is affecting falls or injury.
	Floor wet/dry/talcum powder	Reflect on cleaning regime and need for non-slip surfaces.
	Footwear	If problems with missing or unsuitable footwear are highlighted, organisations could develop systems for providing alternatives.
	Walking aid in use/in reach	May highlight bedside storage issues or access to walking aids for patients admitted in the evenings or at the weekend.
Patient factors	Mental state	Identify those patients most vulnerable to falls because of sedation, dementia or delirium.
	First fall this admission or repeat fall	To balance resources between preventing initial falls and secondary prevention.
	Days since admission	To ensure timescales for assessment and preventing falls are tailored to when falls are most likely to occur.
	Medication affecting risk of falls	Sedative and psychotropic medication, or medication with drowsiness as a side effect, may contribute to falls.

Whatever information is recorded, NHS organisations need to make sure reports from their local risk management systems are analysed in order to understand where, when and why their patients are most vulnerable to falls, and whether changes in care can reduce falls and injury over time.

Reports of falls should be considered with aggregate or individual root cause analysis[28] of the falls with the most serious consequences, the results of audits, and complaints or litigation arising from patient falls. Investigations should also consider whether problems with medical equipment could have contributed to the fall (for example, walking frames, commodes or wheelchairs which were faulty or used incorrectly). If medical equipment is suspected of contributing to the fall, it should be reported to the Medicines and Healthcare products Regulatory Agency (MHRA).[29]

Environmental audits and risk assessments may be particularly important for identifying environmental risk factors less likely to have been identified in reports of individual falls, such as spaces between beds, walking routes to toilets, lighting and grab rails. NHS organisations should report falls to the HSE in certain circumstances involving serious harm and environmental hazards.[30]

Local data, local learning – example

Risk leads in Sheffield Teaching Hospitals NHS Foundation Trust had concerns about the quality of the free text descriptions in reports on falls.

Initially, they gave out laminated prompt sheets with incident forms, asking staff to note key information such as mental state, footwear, whether the floor was wet or dry, and whether bedrails were in use. This was well received by ward staff – a call for pilot wards resulted in the majority of the hospital volunteering – and some staff submitted reports with much clearer and more consistent information. Some staff used this to do detailed reviews of the pattern of falls on their wards.

However, many staff still included detail which belongs in the notes, wrote unclear information and did not include key data.

The trust is changing the prompt sheet so that it explains what does and does not need to be included. It will also encourage the ward sisters, who initially review the incident forms, to go back to staff if information is missing.

Inevitably, decisions about the detail that is needed will remain subjective and reflect the severity of the incident. When the standard of reports improves, the information will mainly be used for trend analysis, for example, 100 reports will be analysed to look at the footwear worn in falls. Data on factors such as bedrail use may be added as an extra field in the database.

The trust hopes to improve clarity between what staff saw and what appears to have happened, outlaw ambiguous terminology like ‘bedrails in situ’ and produce clearer records that can be used in litigation cases or complaints.

Contact the trust’s clinical risk manager,
Sarah Williamson: **Sarah.Williamson@sth.nhs.uk**

The third report from the Patient Safety Observatory

What can be done to prevent falls and reduce injury

Key messages

Falls risk scores and assessment:

- falls risk scores are not an essential part of falls prevention policies;
- checking directly for modifiable risk factors may be more effective;
- even the better falls risk scores will under- or over-predict patient falls;
- a proportion of NHS organisations are using un-validated falls risk scores;
- any falls risk score needs to be tested in the hospital where it is used;
- if falls risk scores are used, there also needs to be a second stage of assessment looking for modifiable risk factors.

Wristbands, symbols and observation:

- some hospitals give patients at high risk of falls special wristbands or bedside symbols, but there is no evidence that they reduce the number of falls;
- extra wristbands with different colours may introduce new risks;
- one-to-one observation may not always be feasible or effective in preventing falls.

Using multifaceted interventions:

- these are interventions linked to the risk factors that can be modified in individual patients;
- they may reduce the number of falls in hospital by 18 per cent;
- it is less clear whether they are as effective for patients with dementia.

Patients' views on interventions to prevent falls:

- patients' views must be taken into account in planning interventions to reduce harm from falls in order to balance dignity and independence with risk of harm.

The environment:

- improvements to lighting, flooring, trip hazards, ward design and furniture may reduce the risk of falls;
- there is no clear evidence that a particular type of flooring reduces injuries.

Cost benefits of preventing falls:

- the financial cost of falls prevention policies in hospitals is not known, but successful programmes have been introduced with limited resources;
- multifaceted interventions could produce an 18 per cent reduction in the number of falls, with estimated cost savings of £16,560 in an average acute hospital. Savings from reviewing less effective interventions could also reviewed.

Technology to prevent falls and injury:

- there is not enough evidence to recommend the use of hip protectors in hospitals;
- there is not enough evidence to recommend the use of alarm devices.

After a fall:

- falls can be a symptom of underlying illness;
- early detection and treatment of injuries is needed;
- observations and checks for injury after a fall appear to vary between NHS organisations;
- unless a first fall leads to a review, including medical assessment, the patient is likely to fall again.

Preventing falls and reducing injury

Preventing older people from falling has been the subject of systematic reviews[31,32] and NICE guidance.[3] However, effective interventions in community settings cannot simply be transferred to hospital settings.

This is because hospital patients are not typical of people living in the community: they are more likely to be affected by acute illness, dementia, delirium, cardiovascular disease, impaired mobility and medication that can increase the risk of falling.

Some effective community interventions cannot be transferred to a hospital setting, for example, identifying and modifying hazards in the home, or undertaking long term exercise programmes. Therefore, the evidence base for preventing falls and injuries in hospital needs separate consideration.‡

The Department of Health's Injury Prevention Unit commissioned a systematic literature review and meta-analysis of falls and injury prevention in hospitals and care homes.[19] A condensed version has also been published.[33] The review looked at the evidence relating to reducing falls and injury for all patients, and then looked further at how these findings applied to patients with dementia.

The review aimed to establish best practice, to avoid resources being wasted on interventions unlikely to work, and to identify priority areas for future research.

‡ Some units within hospitals will provide long term care or rehabilitation for patients with exceptional physical or mental health needs, with lengths of stay and home-like environments that may mean community approaches to falls prevention are more relevant to them than hospital studies.

The NPSA also carried out a survey of NHS organisations' falls prevention policies through the Nurse Director's Association in England, and through Welsh networks. Forty-two organisations providing inpatient care responded: 35 had falls prevention policies; five did not; and two had draft or pilot policies. This was a voluntary survey, so the organisations are not a representative sample.

This chapter brings together the evidence from the NPSA survey of NHS organisations' falls prevention policies with other systematic reviews, current policy in NHS organisations, and examples from the NRLS and NHS organisations of putting interventions based on research evidence into practice.

The reasons why patients fall are complex and influenced by physical illness, mental health problems, medication and age-related issues, as well as the environment. Consequently, efforts to reduce falls and injury will need to involve a wide range of staff and, in particular, those working in nursing, medical, therapy, pharmacy, management and facilities services.

They need to work with patients and their carers to strike the right balance between preventing falls and independence, privacy, dignity and rehabilitation. This chapter highlights gaps in current policy and practice, and directs NHS organisations to resources that could help them put the evidence into practice.

General information on falls prevention in hospitals:

find out more

Systematic reviews of falls prevention in hospitals	**Academic reviews:** Oliver D et al. Strategies to prevent falls and fractures in hospitals and care homes and effect of cognitive impairment: systematic review and meta-analyses. *British Medical Journal*. 2006; Dec 8 [e-pub ahead of print]. Available at: **www.bmj.com/cgi/rapidpdf/bmj.39049.706493.55v1** Protocol for forthcoming Cochrane review. Interventions for preventing falls in older people in residential care facilities and hospitals. Available at: **www.mrw.interscience.wiley.com/cochrane** **Easy reading summaries of academic reviews:** Oliver D, Healey F. Preventing falls and injury in hospitals: the evidence for intervention. *Healthcare Risk Report.* 2006; June: 12-14
International resources	Prevention of Falls Network Europe (ProFaNE). Available at:**www.profane.eu.org/** Queensland Government. *Falls prevention best practice guidelines for public hospitals*. (2003). Available at: **www.health.qld.gov.au/fallsprevention/** Registered Nurses Association of Ontario. *Prevention of fall injuries in the older adult.* (2002). Available at: **www.clinicalevidence.com**
saferhealthcare policy exchange site	saferhealthcare are developing a policy exchange site. See **www.saferhealthcare.org.uk** for further details.
saferhealthcare falls in hospitals topic area	saferhealthcare are developing a topic area on falls. See **www.saferhealthcare.org.uk** for further details.
Integrating falls prevention across boundaries	NICE guidance on the assessment and prevention of falls in older people living in the community or care homes. Available at: **www.nice.org.uk/guidance/CG21** **Systematic reviews of community falls prevention:** Chang J et al. Interventions for the prevention of falls in older adults: systematic review and meta-analysis of randomised clinical trials. *British Medical Journal*. 2004; 328: 680. Available at: **www.bmj.com/cgi/content/full/328/7441/680** American Geriatrics Society, British Geriatrics Society, American Academy of Orthopaedic Surgeons. Guideline for the prevention of falls in older persons. *J American Geriatrics Society*. 2001; 49: 664-72. Available at: **www.nelh.nhs.uk** Gillespie LD et al. Interventions for preventing falls in the elderly. (Cochrane Review). Cochrane Library. 2003; 2. Available at: **www.nelh.nhs.uk** **Department of Health publications:** *A Recipe for Care – Not a Single Ingredient.* 2007. *National Service Framework for Older People.* 2001. *Developing integrated falls services for older people (NSF Standard 6) – a web-based resource.* 2007. *How can we help older people not fall again? Implementing the Older People's NSF Falls Standard: support for commissioning good services.* 2003. *National Service Framework for Older People: report of progress and future challenges.* 2003. *A new ambition for old age: Next steps in implementing the National Service Framework for Older People: A resource document.* 2006 *Preventing accidental injury: priorities for action. Report to the Chief Medical Officer.* 2002. All available at: **www.dh.gov.uk/Publications AndStatistics/Publications/fs/en** **Welsh Assembly Government publications:** *National Service Framework for Older People in Wales.* 2006.

Falls risk scores and assessment

Falls risk scores are paper-based tools which give a numerical value to various risk factors. These are added together to predict whether the patient is at a low, medium, high or very high risk of falling.

Falls risk scores have been the subject of systematic literature reviews.[6,7,34] The reviews note that there are many papers describing these tools, but only five tools§ have been tested for how they under- or over-predict falls, and only two (Morse and Stratify, see page 39) have been tested with different groups of patients outside the original research studies.

Patient groups are not the same in different countries and different hospitals, and they also change over time, so that even tools that had been tested in one hospital would not necessarily predict falls as well in a different hospital. The reviews also note that most tools would identify around half of hospital patients as being at high risk of falling, with even higher proportions in high-risk specialties.

Even the best of the falls risk scores under-predicted and over-predicted falls, and this has important implications in terms of mis-directing resources when tools incorrectly identify patients as high risk, and through missing patients who are identified as low risk but go on to fall. The reviews also note that falls risk scores are designed to predict falls, which is not the same thing as successfully preventing them.

§ The Innes, Morse, STRATIFY, Downton, and Schmidt tools

Examples of the range of falls risk scores tools

One study found that completing falls risk scores took between four and seven minutes per patient;[35] if applied to every admission, this represents a considerable amount of nursing time.

Falls risk scores are often called risk assessment tools. However, having a total score does not in itself lead to interventions. Falls risk scores may include risk factors that cannot be modified, for example, being aged over 80, and do not always include key risk factors that could be modified, for example, treatment with sedative medication. Therefore, if a risk score is used, a further assessment that identifies and treats those risk factors that can be modified is still required.

The most recent review[6] concluded that the focus should shift to directly identifying and treating those risk factors that can be modified.

Around a quarter of the policies that the NPSA surveyed were based, as the literature review recommends, on directly identifying and treating modifiable risk factors, without using a falls risk score. Around a quarter were using a falls risk score that had been validated by published evidence on how well it under-or over-predicted falls happening.

Around half appeared to be using falls risk scores that had not been validated. These appear to have been locally devised, or partly based on published tools but with local additions or changes that would affect validity.

It is possible to locally validate risk scores through a combination of audit and reports of falls, but the policies gave no indication that this had been done.

Although this was a small and unrepresentative snapshot, it was worrying to find organisations apparently using falls risk scores that had not been validated, which would mean they did not know if they were under- or over-predicting the chances of patients falling.

Most policies that included falls risk scores also recognised the need for a further assessment which takes into account a range of modifiable risk factors and the individual patient's needs and wishes.

In other policies, falls risk scores led to a section on interventions, but which was actually, and appropriately, further assessment, for example, checking patients' lying and standing blood pressure.

However, some used a falls risk score to directly prescribe interventions, for example, a policy which stated that if patients were above a certain numerical score, staff should stay inside the toilet with them and their bed should be moved next to the nurses' station. A 'one size fits all' approach is unlikely to be appropriate, as two patients with the same score may be at risk of falling for very different reasons, and have different wishes and needs.

It is possible to conclude from some reports to the NRLS that calculating a patient's risk score is sometimes seen as an end in itself, rather than a prompt to investigate possible interventions. For example:

"Risk assessment on admission was 16. Risk assessment on review is now 17."

"Risk score recalculated."

"Risk score repeated, remains high."

Less frequently, reports to the NRLS suggest calculating a patient's risk score is used to override, rather than support, professional judgement, for example, concerning a patient who has just fallen:

"….no action required as his risk score remains low."

How to locally validate falls risk scores

Direct assessment of modifiable risk factors linked to interventions may be more effective than using falls risk scores. However, if NHS organisations are already using a falls risk score, they need to understand how well it over-predicts and under-predicts falls in their hospital.

Even validated tools will not work in the same way in every hospital, and using a falls risk score which has been locally devised or adapted would be very hard to justify if no attempt had been made to see how accurately the falls risk score identified patients at risk.

Falls risk scores need to be tested in real life, based on how ward staff usually complete them, rather than on how they are completed by specialists. NHS organisations need to check a representative sample of falls risk scores in patients' records and compare these with numbers of patients who actually fell, in a grid like the one below:

	Patients who did fall	**Patients who did not fall**
Patients predicted as being at low risk of falls	*Patients in this box were incorrectly identified as low risk, and missed out on falls prevention.*	*Patients in this box were correctly predicted as low risk.*
Patients predicted as being at high risk of falls	*Patients in this box were correctly predicted as high risk, but their falls were not successfully prevented.*	*Some patients in this box may have had their falls successfully prevented, but high numbers here would suggest your falls risk score is over-predicting falls risk in your patients, which could be wasting resources.*

Papers giving more detail on validating falls risk scores can be seen in the 'find out more' section on page 39.

Falls risk scores:

the real life issues

"All that glitters is not gold," warns David Oliver who, despite being the author of STRATIFY, one of the most commonly used and valued tools, is now increasingly sceptical about its use in practice. "There is no doubt many organisations and frontline staff value the tool, and introducing a tool has perhaps been a chance to inspire staff to look at falls differently. But, on a bad day, I am more inclined to say, 'Don't bother. I don't believe it any more'."

He points out that, to be truly useful in practice, a tool needs to work in the setting in which it is to be used, however well it may have worked in a high quality study. It must perform better than the professional judgement of the staff if it is to be a substitute for that judgement. A major danger of using a falls risk score is that staff feel they can relax, secure in the knowledge that at last 'something is being done' – but is it?

"The ability of these tools to correctly classify patients who will fall, and patients who will not, is not good enough. This means that falls interventions can be targeted poorly and staff time, which could have been better used elsewhere, is spent in completing a tool. Potentially, therefore, use of these tools can result in false assurance, poorly targeted interventions and opportunity costs. Few of the successful hospital falls prevention studies used a risk score; this finding, above all others, casts doubt on their usefulness." Dr Oliver concludes: "The search for the holy grail of a risk assessment tool that anyone can use and does its job sufficiently well is one that should now cease."

Contact details: Dr David Oliver, **david.oliver@reading.ac.uk**

The All Wales Falls Group was set up to try to standardise what was being done across Wales to prevent falls. Julie Rix, NPSA Patient Safety Manager, says: "The impression was that everyone was doing something slightly different – each organisation adopted a different falls risk score and then made local changes to it. Overall, the impression was that using these tools was not reducing the number of falls. We wanted to prevent patients falling, not predict patients falling, and adding up the numbers was a turn-off for many staff."

The group looked at the research and produced checklists covering a range of interventions for preventing falls. These did not include numbers, just factors linked to an action. The group has not said that risk assessments should not be carried out, but that there should be a different focus. The tool is now short and simple: at only one page long, staff are more likely to have the time to complete the form. It assesses every aspect of an individual patient and their environment.

The assessments are one part of a framework that includes environmental audits and links between hospital and community initiatives. The framework will be consulted on across Wales. Julie says: "There is a great deal that can be done at a local level that doesn't require investment. However, this needs to be balanced and supported with organisational-wide investment and support in falls prevention work."

If you would like to find out more about the All Wales Falls Group, please contact Julie Rix, Patient Safety Manager, NPSA **julie.rix@npsa.nhs.uk**

Falls risk scores and assessment:

find out more

Systematic reviews of falls risk scores	**Academic reviews:** Oliver D et al. Risk factors and risk assessment tools for falls in hospital inpatients: a systematic review. *Age and Ageing*. 2004; 33: 122-130 Perell KL et al. Falls risk assessment measures: an analytic review. *Journals of Gerontology*. 2001; 56: 761-766 Myers H. Hospital falls risk assessment tools: a critique of the literature. *International Journal of Nursing Practice*. 2003; 9: 223-235 **Easy reading summaries of academic reviews:** Morse JM. The safety of safety research: the case of patient fall research. *Canadian Journal of Nursing Research*. 2006; 38: 74-88 Oliver D. Assessing the risk of falls in hospitals: time for a rethink? *Canadian Journal of Nursing Research*. 2006; 38: 89-94 (these studies also explain how to locally assess how tools under- or over-predict falls) All available at: **www.nelh.nhs.uk**
Randomised controlled trials (RCTs) of directly targeted assessment without risk score	Healey F et al. Using targeted risk factor reduction to prevent falls in older hospital inpatients. A randomised controlled trial. *Age and Ageing*. 2004; 33: 390-395. Haines TP et al. Effectiveness of targeted falls prevention programmes in a subacute setting. A randomised controlled trial. *British Medical Journal*. 2004; 328: 676-679 All available at: **www.nelh.nhs.uk**
Falls risk scores validated outside original study population	**STRATIFY:** Oliver D et al. Development and evaluation of evidence based risk assessment tool (STRATIFY) to predict which elderly inpatients will fall: case-control and cohort studies. *British Medical Journal*. 1997; 315: 1049-1053. Available at: **www.bmj.com/cgi/content/full/315/7115/1049** **MORSE:** Original in book form and difficult to access but recap in: Morse JM. *Morse Fall Scale*. The Pennsylvania State University. Available at: **www.nelh.nhs.uk** accession number and update 1997039199 19970101
saferhealthcare policy exchange site	saferhealthcare are developing a policy exchange site. See **www.saferhealthcare.org.uk** for more details.

Using multifaceted interventions

The literature review found reasonable evidence that using multifaceted interventions** was an effective way to reduce the number of patient falls by 18 per cent.

However, the literature review did not find enough evidence to say whether the numbers of injuries were also reduced. This could be because not all falls result in injury, and therefore changes in numbers of falls were statistically significant, whilst numbers of injuries were too small for statistical significance, or because the interventions were more successful in preventing the kind of falls that did not result in injury.

Although all the studies included some patients with dementia, it was not clear if the interventions were as effective for them as for other patients.

The interventions within the studies varied. From hospital studies where falls were reduced,[36,37,38] interventions should include:

- reviewing medication associated with a risk of falls;
- detecting and treating causes of delirium;
- detecting and treating cardiovascular illness;
- detecting and treating or managing incontinence or urgency;
- detecting and treating osteoporosis;
- detecting and treating eyesight problems and having the right glasses;
- providing safer footwear;
- physiotherapy, exercise and access to walking aids.

Environmental interventions also included in the studies were:

- improvements to floor cleaning, spillages, lighting and call bells;
- increasing the range of beds and chairs to suit different needs;
- using bedrails if the benefit outweighed the risks.

Interventions should be developed by a team that includes nurses, physicians, psychiatrists, physiotherapists, occupational therapists and pharmacists. Managers and facilities staff should also have a key role in providing a safer environment.

The literature review highlighted that there is little evidence that, on their own, either a review of medication or exercise can reduce falls, although they may be effective as part of multifaceted interventions. The review found one hospital where a reduction in bedrail use was associated with an increase in falls. An individual review of bedrail risks and benefits was included in one hospital's study of multifaceted interventions.

The survey of falls policies in NHS organisations by the NPSA showed that most organisations offered a range of interventions, although the actual interventions varied. Some policies were limited to the interventions that nurses can carry out, rather than also involving doctors and therapists. A minority of policies listed only actions that could be seen as good practice for any patient, for example, keeping the nurse call bell within reach. There were greater differences in the way NHS organisations implement their policies. For example, most policies suggest patients should be advised on safer footwear, but few had systems for providing safe footwear if no relatives or friends could provide it.

Some policies had good links between preventing falls and related policies, and in particular manual handling, preventing pressure ulcers and nutrition. These links appear helpful in that they are patient-centred, for example, adapting a care plan to prevent falls from bed to include the right mattress for pressure relief, and recognising that prolonged fasting periods and malnutrition could increase patients' vulnerability to falls.

There are some good examples of multifaceted interventions in reports to the NRLS. For example:

"Bedrails placed in situ after risk assessment... Close monitoring actioned. Falls care plan updated. Medical and physio review requested."

**Terminology varies in the literature. These might also be called targeted risk factor reduction, individually tailored multi-factorial interventions, assessment and modification of risk factors, multi-strategy approach, multi-dimensional approach, or multi-disciplinary risk factor screening and intervention.

Implementing a range of interventions:

the real life issues

One of the largest RCTs[38] of implementing multifaceted interventions took place over six elderly medicine wards and two community hospitals in York, and achieved a statistically significant reduction in the number of falls.

A team of nurses, doctors, physiotherapists and managers designed the trial. The aim was to change the perception that falls are normal.

The trial involved staff routinely looking for reversible risk factors for falls, and doing something about them, structured through a core care plan. Assessments were made as straightforward as possible, for example, they would stand at the end of the bed and hold up a pen and ask the patient: "What am I holding?". This indicated if there were any major eyesight problems.

The care plan gave the names of types of medication that might cause falls, so checking for them was easier. Urine was tested on the ward to find possible urinary tract infections, which could affect mobility and cause confusion. Blood pressure was checked with both the patient lying down and standing up. There was a yellow sticker to put inside patients' notes that alerted doctors if a patient had fallen. These stand out at ward rounds, and the consultants can then advise the junior doctors on how to deal with falls.

Inappropriate footwear was a big problem: many patients were wearing loose or 'sloppy' slippers and some had very unsafe footwear. Sometimes, slippers had become wet or soiled, and patients had to rely on hospital-provided foam disposable slippers which tear and hang off the feet. The trial secured a small budget to buy some proper fitting slippers in a range of sizes, for giving to patients when there are no relatives to bring suitable footwear in. These were kept in a cupboard to which the staff had easy access – they didn't have to fill out a form or make a requisition. The slippers cost less than £4 and were cheaper than the disposable foam slippers. A repeat audit found a big reduction in unsuitable footwear.

The physiotherapists had found that nurses tended to tidy the walking aids into one corner where the patients couldn't reach them. Staff made sure that patients who could safely use a walking aid on their own had one labelled with their name on it and kept within easy reach. More comfortable chairs were bought and patients were less restless.

Matron for Elderly Services, Angela Cockram, says: "It wasn't rocket science – it was about doing the basic things properly and consistently."

Contact details: Angela Cockram, Matron for Elderly Services (**angela.cockram@york.nhs.uk**); or Vicki Adams, Professional Clinical Manager for Elderly Physiotherapy Services (**victoria.adams@york.nhs.uk**).

Example of an individually targeted falls care plan

(Based on the York randomised controlled trial[38])

History of falls before admission?	Yes	Name: Mrs A Patient
Fall since admission?	No	DOB: 17.2.1923
Tries to walk alone but unsteady/unsafe?	Yes	NHS No: ABC1234567
Patient or relatives anxious about falls?	Yes	
If yes to any of the questions above, complete falls care plan		

Falls prevention care plan

GOAL: To reduce likelihood of falls whilst maintaining dignity and independence	**State action taken:**
Call. Ensure call bell explained and in reach. Consider alternatives for patients unable to recall use of call bell, e.g. brass bell, move bed in sight of nurses' station.	Call bell in reach but may forget, will probably call her daughter's name instead – moved to Bay 3 within earshot of nurses' station.
Eyesight. Ensure eyesight is checked; wearing glasses if worn; able to identify pen/key from bed length away? If eyesight too poor to identify objects, ask doctor to review. Ensure glasses/ hearing aid are worn or within reach.	Glasses broken in fall at home – family have ordered replacement and hope to collect 7/3. Has fair distance vision without them. Have suggested they order spare pair too.
Bed and bedrails. Assess the need for bedrails (refer to policy). If likely to fall from bed, ensure the bed is at the lowest possible height unless this would reduce mobility or independence. Consider use of special low bed.	Bedrails not appropriate as mobilises alone, even though unsteady, and might be confused enough to climb over. Bed set at right height for safe move from sitting to standing.

Medication. Check for medication associated with falls risk, e.g. anti-depressants, sleeping tablets, sedation, anti-psychotics. Ask doctor to review (do not stop abruptly).	On temazepam 10mg nocte for some years – to review at ward round.
MDT. Ensure medical staff, physiotherapist, OT, social worker, etc aware of the patient's risk, frequency, nature, seriousness of falls (local protocol or pathway would cover expected actions by MDT members, e.g. mini-mental, osteoporosis check, mobility aid review).	SHO aware. Physio referral sent 3/2/07. OT referral sent 3/2/07. Noted on discharge plan.
Footwear. Check footwear for secure fit, non-slip sole, no trailing laces. Ask relatives to supply safer replacement or supply new slippers from ward store. Consider slipper socks in bed for patients at risk of falling at night.	Backless slippers – not safe. Daughter cannot get replacement until Saturday. Provided with new slippers from ward store.
Place. Nurse in most appropriate place on ward for their needs, e.g. close to nurses' station, close to toilet, quietest area (considering other patients' needs as well).	In Bay 3 nearest toilet and within earshot of nurses' station.
Lighting. Consider lighting best for patient, e.g. bedside lamp left on overnight, night light in toilet.	Will have overhead lamp on low overnight.
Urinalysis. Perform urinalysis. Send MSU if positive to blood, nitrates or protein.	Nitrates+++ protein++ blood trace MSU sent 3/2/07.
Toilet. Does the risk of falls appear to be associated with patient's need to use toilet? If so, a routine of frequent toilet visits may be helpful in preventing falls.	Currently frequency/urgency – will offer toilet every hour whilst awake.
L&S BP. Check L&S BP and record. If deficit exists, inform doctor, advise patient on slow movement from sitting/lying to standing, consider anti-embolism stockings.	See TPR chart – no deficit.
Inform. Provide falls leaflet to patient/ family, engage them in care plan, check contact wishes in event of fall.	Patient and daughter have leaflet and care plan explained. Contact wishes entered by NOK number.
Print name: B NURSE	Signature: B.Nurse Date: 3/2/07

Implementing multifaceted interventions:

find out more

Successful RCTs	Fonda D et al. Reducing serious fall related injuries in hospital. *Medical Journal of Australia*. 2006; 184; 379-382 Haines TP et al. Effectiveness of targeted falls prevention programmes in a subacute setting. A randomised controlled trial. *British Medical Journal*. 2004; 328: 676-679 Healey F et al. Using targeted risk factor reduction to prevent falls in older hospital inpatients. A randomised controlled trial. *Age Ageing*. 2004; 33: 390-395 All available at: **www.nelh.nhs.uk**
Medication review	Glass J et al. Sedative hypnotics in older people with insomnia: meta-analysis of risks and benefits. *British Medical Journal*. 2005; 331: 1169. Leipzig RM et al. Drugs and falls in older people: a systematic review and meta-analysis: I. Psychotropic drugs. *Journal of the American Geriatrics Society*. 1999; 47: 30-39 Leipzig RM et al. Drugs and falls in older people: a systematic review and meta-analysis: II. Cardiac and analgesic drugs. *Journal of the American Geriatrics Society*. 1999; 47: 40-50 All available at: **www.nelh.nhs.uk**
Delirium prevention, detection and treatment	Royal College of Physicians/British Geriatrics Society. *National guidelines for the prevention, diagnosis and management of delirium in older people.* Available at: **www.rcplondon.ac.uk/pubs/brochure.aspx?e=142**
Dementia care in acute hospital settings	LET'S RESPECT – a 'toolkit' primarily for healthcare staff who care for older people with mental health needs in acute hospitals. Available at: **www.olderpeoplesmentalhealth.csip.org.uk/lets-respect.html** *Who Cares Wins: Improving the outcome for older people admitted to the general hospital: guidelines for development of Liaison Mental Health Services for older people.* Available at: **www.alzheimers.org.uk/Working_with_people_with_dementia/PDF/WhoCaresWins.pdf** A resource for caring for people with memory problems on medical and surgical wards. Available at: **www.changeagentteam.org.uk/index.cfm?pid=250**
Medical review	British Geriatrics Society. *Comprehensive assessment for the older frail person in hospital*
Eyesight	British Geriatrics Society. *Importance of vision in preventing falls*

The environment

Many aspects of the hospital environment may have an impact on the risk of falls or injury.

These include:

- flooring surface, including any unevenness, and how slippery it is when wet or dry;
- flooring density, including how soft or hard a surface is to land on;
- flooring pattern as this can create an illusion of slopes or steps to impaired eyesight;
- lighting, including poor lighting and sudden changes from dim to bright lighting, and the position of light switches;
- the design of doors, hand rails, toilets and bathrooms;
- the distance and spaces between hand holds, beds, chairs and toilets;
- the line of sight for staff observing patients;
- trip hazards, including steps, clutter and cables;
- furniture and medical devices, including beds, trolleys, mattresses, chairs, commodes and wheelchairs, including stability if patients lean on them.

It has also been suggested that poor storage of equipment and supplies can increase the risk of patients falling. If staff leave patients unobserved each time they have to fetch equipment or supplies, patients could be at a greater risk of falling.[39]

The literature review found some small studies that suggest carpets placed on wooden floors are associated with fewer injuries than vinyl on top of concrete, but noted that more research was needed. The review found no other evidence about the impact of environmental changes on falls, but noted there were several good examples of guidance on environmental safety.

The better-quality trials of multifaceted interventions include some environmental measures, for example:

- fitted bed sheets;
- non-slip chair mats;
- ultra-low beds;
- sensor lights;
- non-slip flooring;
- extended bedside call bells;
- magnets to keep doors open;
- low-shine floor cleaning;
- improved seating.

Many NHS organisations have considered environmental issues in their falls prevention policy, including prompt cleaning of spillages, avoiding clutter, cable covers, and special non-slip flooring in toilets and bathrooms.

Environmental changes can also help balance dignity and falls prevention in toilets. Additional curtains or screens within toilets can allow staff to stay close to a patient vulnerable to falls without the patient losing all privacy.

Other NHS organisations have made changes to their call bells, so patients can reach them wherever they lie or sit.

As noted earlier, around five per cent of falls reported to the NRLS were thought to have been caused by environmental factors, with one per cent of reports involving wet floors, usually due to the patient's urine rather than cleaning.

The environment:

the real life issues

Professor Julian Minns, an NHS consultant clinical scientist, describes a trial of a foam type material, similar to that used in gyms, used as an underlay under vinyl in one rehabilitation ward in the north of England. The accident report forms were examined for two years before and after the underlay was changed.

He says: "There were a similar number of falls, but a large reduction in injuries – only one fracture in two years. The staff reported that if they dropped crockery on the floor it didn't break. There were occasional problems with dents – heavy furniture would create a dip as the underlay compressed. Though the study was not conclusive due to the small numbers involved, it has raised interest in this issue."

Contact details: Professor Julian Minns	**r.j.minns@btinternet.com**

In Northamptonshire Healthcare NHS Trust, the community falls prevention co-ordinator looked at the environment in community hospitals. Proactive changes could be made, even though the age and design of the buildings limited what was possible. Call bells in toilet areas were often poorly sited: sometimes within reach, but out of sight on the wall behind the toilet. Nurses had tried to adapt call bells by tying longer cords to them.

They were moved to the side and in easy reach as well as in sight, and the new call bells were easier to clean.They did the same with the toilet roll holders, and added movable toilet roll holders for patients who could, for instance, only use their left hand.

Older patients undergoing rehabilitation and who needed to sit down to wash at the sink are now able to reach a newly installed call bell, and have chairs specifically for use at a sink.

Contact details: Ian Staples, Risk Manager at Northamptonshire Healthcare NHS Trust	**ian.staples@northants.nhs.uk**

A three-year randomised controlled clinical trial, led by Portsmouth University and using national expertise, is being established to test a new flooring underlay product in elderly mental health wards and general older people's rehabilitation wards. Laboratory tests suggest that it will reduce the impact of falls, and the trial hopes to demonstrate a reduction in hip, pelvis and wrist fractures as well as head injuries.

Julie Windsor, the Falls Specialist Nurse at Portsmouth Hospital says: "Locally, we have developed a model of good practice across our hospitals to improve the quality of falls reporting and facilitate ward-based root cause analysis and so far with good effect."

One ward identified a lot of falls from commodes and, on investigation, many were found to be unsafe. Some were repaired and others replaced. Another ward identified a lot of falls happening, in a particular side ward, especially at night. The ward 'falls champion' discussed this with the night staff who said that patients had to go from a brightly lit corridor into a dark room when returning from the toilet and could not see properly. Consequently, the lighting in the corridor was changed and overhead individual lighting installed to the beds.

Contact details: Julie Windsor, Falls Specialist Nurse	**julie.windsor@porthosp.nhs.uk**

Keith Peskitt, Royal West Sussex NHS Trust, says: "We used a HSE tool which helps assess slipperiness and the likelihood of falls in our acute hospital.[40] It is very useful for establishing the grip characteristics of a surface and highlights hot spots such as entrances that are fine when dry, but as it rains the floor gets damp and grip is gone. The same floor can display great grip in the dry. We have found that the biggest cause of slips and trips is a wet floor or spillages that have not been dealt with, rather than the floor having insufficient grip."

Contact details: Keith Peskitt, Chartered Safety and Health Practitioner	**keith.peskett@rws-tr.nhs.uk**

"Removing many environmental risks is possible in all hospitals. Whilst some interventions can only be implemented in a new building, for example, en suite toilets with a door opening the right way and in the right place to make it the shortest possible journey for the patient, and reducing the need for patients to cross open spaces without handrails, there is still a lot that can be done to existing environments.

"Trip hazards can be reduced by making sure feet cannot get caught on furniture, such as the over-bed table, and medical equipment, such as an intravenous drip that stands with protruding legs. Making sure plugs are in the right place reduces the risk of cables being trailed across floors. A clip or loop on chairs and lockers for hanging walking sticks means they are always within reach and do not create a trip hazard. Walking frames should be within reach, but without creating a trip hazard for the patient in the next bed.

"Falls due to fainting will usually occur when moving from lying or sitting to standing, so are likely to be by a chair, bed or toilet. Improving flooring and using padded rather than wooden arms on chairs can reduce the impact. Crash mats will do the same but they can also introduce a trip risk.

"Having something to hold onto helps patients who fall because they are weak. Grab rails are useful but it is also important to make sure furniture is stable when leant on and any brakes are applied. Consider whether furniture can be rearranged so that there are fewer spaces without handholds. It is important to make sure that a room does not become cluttered with furniture whilst also making sure that spaces without handholds are not too wide."

If you would like to find out more about design for falls prevention, please contact Colum Lowe, Head of Design and Human Factors, NPSA	**colum.lowe@npsa.nhs.uk**

Falls and the hospital environment:

find out more

HSE resources	*Slips and trips in health services.* Available at: **www.hse.gov.uk/slips/information.htm** *Reducing slips and trips in health services: a two year campaign.* Available at: **www.hse.gov.uk/slips/campaign.htm** *Slips and trips: the importance of floor cleaning.* Available at: **www.hse.gov.uk/slips/information.htm** *Slips Assessment Tool (SAT).* Available at: **www.hsesat.info/** *Footwear.* Available at: **www.hse.gov.uk/slips/manufactfoot.htm** *CIRIA Safer surfaces to walk on – reducing the risk of slipping.* Available at: **www.hse.gov.uk/slips/architects.htm** *Research on the links between cleaning and slips and trips in healthcare.* Available at: **www.hse.gov.uk/healthservices/issues.htm#slips**
Other resources for the environment and falls prevention	Ulrich R. *Designing the 21st Century Hospital.* (2005). Available at: **www.rwjf.org/files/publications/other/Design21CenturyHospital.pdf** HSE. *Specifiers' handbook for inclusive design: internal floor finishes.* Available at: **www.hse.gov.uk/slips/architects.htm** An index page for all Department of Health Estates and Facilities resources, including design of new buildings. Available at: **www.dh.gov.uk/PolicyAndGuidance/OrganisationPolicy/EstatesAndFacilitiesManagement/fs/en** *Health Technical Memorandum 61*: Flooring. Available at: **195.92.246.148/nhsestates/knowledge/knowledge_content/home/home.asp** MHRA Device Bulletin 2006 (05). *Managing Medical Devices.* Available at: **www.mhra.gov.uk** MHRA Device Alert 2005/002. *Wheelchair seating and accessories.* Available at: **www.mhra.gov.uk**

Technology to prevent falls and injury

Technological interventions include movement alarms and hip protectors.

Movement alarms are pressure sensors or infra-red beams that alert staff if the patient moves. The buzzer may be attached to the device, or remotely connected or wired to a central point like a nurses' station. Because they alert staff when a patient moves, they cannot prevent falls in patients with very poor mobility who would fall as soon as they move out of their chair or bed. They are also not designed for patients who, although at high risk of falls, want to move around.

The literature review found only one small hospital study of alarm devices, which concluded that there is no evidence that alarm devices are effective in preventing falls, and pointed out their potential to restrict freedom or rehabilitation.

Hip protectors are plastic shells or gel-like padding worn over the hip in tight fitting pants. They aim to reduce the impact of falls and prevent hip fracture. The review found that although early trials of hip protectors in care homes appeared promising, as more scientific studies were done it was less clear whether they had any affect on injury, even for high risk patients in care homes.

The review also noted that patients tend not to wear them. Similar conclusions were made by NICE guidance[3] and the Cochrane review of hip protectors.[42]

In the NPSA survey of NHS organisations' policies, a small number of NHS organisations recommend movement alarms for particular types of high risk patients. A small proportion of policies include hip protectors – most as a last resort for very high risk patients after other possible interventions have been considered. In a few NHS organisations' policies, they are used as a routine intervention.

In reports to the NRLS, movement alarms are only mentioned when they failed to prevent a fall, for example:

"Staff heard chair sensor alarm. On attending they found patient on the floor."

There are very occasional references to hip protectors in NRLS reports; usually in the context that the patient has refused to wear them.

Technology to prevent falls and injury:

the real life issues

Dr Frank Miskelly, Clinical Senior Lecturer, Imperial College London, has been piloting various types of bed and chair alarms in hospitals in London for some years. He says alarms are straightforward to set up, and the false alarm rate is fairly low. The alarms alert staff that someone has got up, but whether or not they prevent falls is unproven because it is difficult to do random controlled trials. Dr Miskelly says: "In practice, it is important you select the right kind of patient. It has to be patients that are at high risk of falling, but not likely to fall as soon as they stand up."

Dr Miskelly found that they worked best in well-staffed wards where staff are particularly motivated to prevent falls, for example, in rehabilitation wards and orthopaedic wards where a staff nurse or sister champions their use. He does also warn that nurses are surrounded by bells and alarms and so can find it hard to respond to one more alarm. The alarms do not work so well on busy acute wards where staff may not always be able to respond promptly, or in wards where there are a lot of agency staff. Dr Miskelly has also found that sometimes other patients call out "sit down" whenever a patient's alarm goes off.

Contact details: Dr Francis Miskelly	**f.miskelly@imperial.ac.uk**

In 2003, concerns were raised with the NPSA that there was a wide range of hip protectors available, without consistency in quality. This was felt to compromise patient safety. The Surgical Dressings Manufacturers Association (SDMA) brought together the NPSA, key organisations and experts, both national and international, and all UK providers and manufacturers, who agreed a manufacturing standard. A proposal was made to take this forward as a European Committee for Standardisation (CEN) kite-mark standard. A test rig was developed so that the effect of hip protectors on impact, at least in a laboratory setting, could be confirmed. The test rig is being further developed for commercial use. In the future, only hip protectors that have passed the test will be able to be purchased by NHS organisations.

The NPSA also commissioned a review of evidence[42] on how older people decide whether or not to wear their hip protectors, especially in care homes. This found that women were more likely to wear hip protectors than men, and people in early old age were more likely to wear them than people who were very old. A key reason for older people choosing not to wear hip protectors was that even if they had already had a fall and fracture, they did not think it would happen again.

Comfort was also an issue. Hip protectors have to be fairly tight to keep the pads or shells in the right place, and many older people found the tight fit uncomfortable. If older people had continence or urgency problems, they struggled with the extra garment. Confused residents tended to remove them.

Care home staff brought up similar issues to the residents: the extra time and effort needed to help residents get dressed, undressed and use the toilet. They thought residents might be uncomfortable and the hip protectors could lead to pressure ulcers. Laundry was also a problem: hip protectors are expensive and residents tended to have 'one and a spare'.

Overall, the review found that if care home staff were convinced the hip protectors were effective, they made efforts to keep residents using them. Similarly, if older people were convinced they were effective, they were more likely to put up with any extra effort or discomfort. Now that the evidence that hip protectors are effective looks doubtful, it is likely that compliance will be even lower than it was in the past.

If you would like to find out more about hip protectors, please contact Elaine Stevenson, Safer Practice Lead, NPSA, at: **elaine.stevenson@npsa.nhs.uk**

Falls and technology:

find out more

Hip protectors	**Systematic review of hip protectors:** Parker MJ et al. Hip protectors for preventing hip fractures in older people: systematic review. *British Medical Journal*. 2006; 332: 571-574. Available at: **www.nelh.nhs.uk/cochrane.asp** (Cochrane Database of Systematic Reviews, 2005) or **www.bmj.com/cgi/content/full/332/7541/571** (*BMJ* version) **Systematic review of acceptability of hip protectors to older people:** Van Schoor NM et al. Acceptance and compliance with external hip protectors: a systematic review of the literature. *Osteoporosis International*. 2002; 13: 917-924. Available at: **www.nelh.nhs.uk**
Movement alarms	**RCT of movement alarms to prevent falls:** Tideiksaar R et al. Falls prevention: the efficacy of a bed alarm system in an acute care setting. *Mount Sinai Journal of Medicine*. 1993; 60: 522-527. Available at: **www.nelh.nhs.uk** Imperial College London and partner organisations' programme of research on technology and older people: Available at: **http://ntec.org.uk/**

Wristbands, symbols and observation

Some studies in the literature review mention giving coloured wristbands to patients at high risk of falling, or putting symbols by the patient's bed such as a leaf or falling star. It is not always clear what action is expected to follow these, but the studies imply that staff should observe these patients more closely.

Some studies refer to special observation, where a member of staff constantly watches a patient who is at very high risk of falls, or to moving patients within the ward so they can be observed more easily.

The literature review includes one good quality RCT centred on coloured wristbands where no decrease in falls or injury was found.[43] A study of patients' opinions found some patients thought bedside symbols were not acceptable, even with patients' consent.[44] A study using volunteers to watch patients found no significant reduction in falls.[45]

A small proportion of NHS organisations' policies in the NPSA survey included coloured wristbands, and one policy recommended using a bedside symbol. The policies require staff to give the wristbands or bedside symbols to patients above a certain risk score.

The policies were generally less clear about what staff were expected to do if they saw that a patient had a coloured wristband or symbol, but appeared to be using them to raise staff awareness. Coloured wristbands could introduce unintended risks, and the NPSA is working on standardising wristband specifications.[46]

Most policies have some reference to observing the patients most likely to fall. This often included moving the patient to an area where observing them is easier, for example, to a bay closer to the nurses' station. Some policies also say when one-to-one observation is required – this is one nurse staying constantly with a patient. Some policies had reference to the limitations of constant observation, for example:

"For most patients, privacy and dignity needs will require them to be left unobserved whilst using the toilet…"

"One-to-one observation is not the perfect answer to falls prevention: in an acute hospital environment it is almost impossible for staff to concentrate solely on one patient whilst the other patients in view might also fall, collapse, vomit, call out for urgent help or become breathless, etc."

Most NHS organisations' policies also noted that, although it might be the natural instinct for staff to try and catch a falling patient, there is a risk of staff being seriously injured.

Because of the difficulties with one-to-one observation, some organisations have moved to a zone or group observation approach. Examples included a nurse allocated to a mental health unit living room during patient's waking hours, not just to observe, but to meet patients' needs, and an 'observation bay' in an acute hospital.

The NRLS has a few reports of wristbands or symbols being in place before patients fell, or being added after patients fell. Most of the falls reported to the NRLS were not witnessed: if the patient was not within the sight of staff, their symbol or wristband would also not have been in sight. Even when the patient was in sight, a wristband may not be visible under clothing or nightwear, and the patient may not be near their bedside symbol. One report suggests the coloured wristbands were being used to indicate patients who should not be allowed to walk alone:

"Action following fall – yellow wristband not applied as patient does not need staff with her when she walks."

Reports to the NRLS often included fairly vague references to increasing observation, for example:

"Increase observation as far as possible whilst meeting needs of other patients."

"Endeavour to monitor/supervision to minimise risk of falls."

Reports to the NRLS suggest it can be difficult to get extra staff for constant observation at short notice, for example:

"…should have one-to-one observation but no staff available."

Observation:

the real life issues

A medical speciality in North Lincolnshire and Goole Hospitals Trust uses a cohort approach: when the matron identifies more than one patient at very high risk of falling, she brings them together so they can be observed together. A nurse is on hand to help them if they try to walk alone. This has resulted in a reduction in the number of falls. It also reassures families that staff are doing all they can to prevent falls.

Elaine O'Kelly, Matron for Medical Services, says: "You don't have to get in extra staff, just deploy people differently. The difficulty is getting everyone else to think like this." The focus is on flexibility and adaptability: responding to what is happening on the ward rather than just carrying on with a routine. She goes on to say: "Moving patients needs careful planning – you have to weigh up the benefits and risks, and it is not always possible to put people together, but usually something can be sorted out if you think about how to manage the situation."

Contact details: Eileen O'Kelly, Matron for Medical Services	**eileen.o'kelly@nlg.nhs.uk**

In mental health units for older people, the issues can be different. Unlike acutely ill patients, older mental health clients can be both very mobile and at high risk of falls, and their risk may remain high for weeks or months, rather than days. In a unit in Yorkshire, it had been common practice to put clients at high risk of falls on one-to-one observation, but despite spending a great deal of money on extra staff, clients were still falling and staff had suffered back and muscle injuries trying to catch them. They decided to withdraw the one-to-one observations and focus on assessing risk factors such as blood pressure, medicines, feet, footwear and eyesight. They also looked at appropriate technologies and changes to the environment, such as moving furniture.

Julie Oxer, North Yorkshire and York Primary Care Trust, says: "This concerned some carers, and we had to explain to them that the one-to-one observation had not been working: having a nurse with the client at all times does not prevent falls. We explained that it is important to rehabilitate clients and that this will involve some calculated risks. We want people to be on their feet and mobile. We also do zone observation – having someone in the lounge area all the time who will be involved with the clients, talking to them and doing activities, but who can intervene if they see someone is unsteady when getting up."

Contact details: Julie Oxer, Clinical Service Manager, North Yorkshire and York Primary Care Trust	**julie.oxer@nyypct.nhs.uk**

Observation and wristbands:

find out more

Wristband RCT (no reduction in falls and injury)	Mayo NE et al. A randomized trial of identification bracelets to prevent falls among patients in a rehabilitation hospital. *Archives Of Physical Medicine And Rehabilitation*. 1994; 75: 1302-1308. Available at: **www.nelh.nhs.uk**
NPSA wristband standardisation project	National Patient Safety Agency. *Safer patient identification*. (2005) – outlines future work on wristband standardisation. Available at: **www.npsa.nhs.uk/display?contentId=4401**
Observation with volunteers (no reduction in falls and injury)	Giles LC et al. Can volunteer companions prevent falls among inpatients? A feasibility study using a pre-post comparative design. *BioMed Central Geriatrics*. 2006; 6: 11. Available at: **www.nelh.nhs.uk**

Patients' views on interventions that can prevent falls

The complex interplay of risk factors that result in patients falling means interventions should be tailored to the needs of individual patients.

It is also important to consider patients' wishes, particularly because many patients vulnerable to falls in hospitals and mental health units will be too ill or too confused to be able to discuss, understand and consent to interventions that could prevent them from falling.

There are many studies on the views of older people living in the community on falls prevention.[47] These suggest that although older people are aware of the serious consequences of falls, and fear that injuries from a fall could lead to the loss of independence, they are often reluctant to change their behaviour or lifestyle.

They may be reluctant to wear hip protectors; choose not to comply with advice on removing hazards in the home; and be reluctant to reduce or discontinue medication associated with an increased risk of falling, such as sleeping tablets. There are exercises that older people can do to reduce the risk of falling, but these are often not carried out, unless in a social setting.

There are far fewer studies on patients' views on interventions that can prevent falls in hospitals. One study tried to educate patients in a rehabilitation setting on how to reduce the risk of falls.[48] Only about one-third of the patients were considered well enough to participate. Although most said they had changed their behaviour, they were unable to say how, except in terms of generally being more careful. There is limited evidence on the views of carers and relatives.

Another study asked 57 patients their opinion on various interventions.[44] Overall, patients thought preventing falls was very important, and that staff should intervene to stop a patient from coming to harm.

All the patients thought using a wristband was acceptable; 89 per cent thought bedrails were acceptable; 84 per cent thought using a symbol by the bed was acceptable; 47 per cent thought using a reclining chair was acceptable; but only seven per cent thought nursing a patient on a mattress on the floor was acceptable. Relatives asked their opinion in the same study had similar opinions.

An American study that interviewed patients[49] suggests that patients are willing to accept even restrictive safety measures to prevent falls during an acute hospital admission; apparently because the effect of a fall on their long term independence worried them more than any temporary restriction to their independence in hospital.

Patients' views are key to developing effective policies for preventing falls. NHS organisations' policies should take into account that each patient will have different views on what is right for them.

Most of the policies reviewed by the NPSA emphasised the importance of considering the needs and wishes of individual patients. However, some were prescriptive, for example, suggesting staff should routinely stay with high risk patients whilst they used the toilet.

A small minority of policies showed a poor understanding of the individual needs of patients with memory problems, suggesting that repeated reminders should be given (an unrealistic approach for patients unable to retain new information). Around half of the policies included giving leaflets to patients and their relatives with information on how they could help to avoid falls.

Some reports to the NRLS suggest that many patients are too ill or confused to understand advice on avoiding falls, but following are examples of staff engaging patients in preventing themselves from falling:

"Physio explained to patient how to avoid this kind of accident when getting out of chair."

"Bedrails discussed and patient agrees she would feel safer with them left up."

Patients' views:

the real life issues

Shirley Love, Clinical Services Manager and Lead Nurse for Osteoporosis and Falls, describes the steps taken at Cambridge University NHS Foundation Hospitals Trust to engage patients, relatives and the public when developing a hospital-wide falls prevention policy. The team produced a leaflet with the help of older people and their carers. It gives advice to patients, carers and staff, outlining how to prevent falls, and the measures that might be taken to protect patients if they were considered at risk of falling. The leaflet is available in English and other languages.

At a hospital open day, a falls prevention stall with leaflets and posters also offered face-to-face advice about preventing falls and osteoporosis. There was also a press and radio campaign.

At regular public consultation evenings, the focus was on falls in hospital and older people. Carers were able to explain what they needed to know.

Contact details: Shirley Love, Clinical Services Manager and Lead Nurse for Osteoporosis and Falls	**shirley.love@addenbrookes.nhs.uk**

Patients' views on falls prevention

find out more

Research studies	McInnes E, Askie L. Evidence review on older people's views and experiences of falls prevention strategies. *Worldviews on Evidence-based Nursing.* 2004; 1: 20-37 Vassallo M et al. Acceptability of falls prevention measures for hospital inpatients. *Age and Ageing*. 2004; 33: 400-401 Vassallo M et al. Attitudes to restraint for the prevention of falls in hospital. *Gerontology.* 2005; 51: 66-70 All available at: **www.nelh.nhs.uk**
Ethical and legal issues	*Residents taking risks* – although intended for care homes, a discussion of independence and dignity balanced with safety relevant to any setting. Order from: **www.counselandcare.org.uk** *Mental Capacity Act 2005.* Available at: **www.dca.gov.uk/menincap/legis.htm**
Dignity in care	Dignity in care campaign. Available at: **www.scie.org.uk/publications/practiceguides/practiceguide09/challenge/index.asp** Dignity in care resources. Available at: **www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/SocialCare/DignityInCare**
Patient education materials	Help the Aged. Available at: **www.helptheaged.org.uk/slipstrips** National Osteoporosis Society. Available at: **www.nos.org.uk/** Royal Society for the Prevention of Accidents. Available at: **www.rospa.com/homesafety/advice/olderpeople/accidents.htm**

Cost benefits of preventing falls

There were not enough data in the literature review to calculate the financial benefits of falls prevention policies in hospitals, except for hip protectors, which data suggest are not cost effective.

However, the literature review does suggest that introducing an appropriate range of interventions could be expected to reduce falls by 18 per cent.

Based on the immediate healthcare costs of falls, estimated earlier in this report of £92,000 per year, this might be expected to produce a saving of £16,560 each year for an average 800-bed acute hospital trust, before savings associated with reduced need for care after discharge from hospital or reduced litigation costs are added in.

The cost of introducing falls prevention policies is less clear. Successful interventions addressing a number of individually targeted risk factors have been introduced without ring fencing funds or requiring extra staff.[38] However, these were not cost-free: they involved using existing budgets for items such as footwear, environmental improvements and new furniture, and diverting existing staff to promote the interventions. Staff involved in these projects emphasised that although some things could be done without costs, budgets were needed for effectively implementing interventions, training other staff and for some environmental improvements.

The best practice examples in this report suggest that NHS organisations could spend their current falls prevention budgets and staff time more effectively. NHS organisations may wish to review their current spending on hip protectors and disposable slippers, one-to-one observations and time spent completing falls risk scores.

After a fall

After a patient has fallen, there is still an opportunity to reduce the degree of harm by promptly detecting and effectively treating any injuries, considering why the patient fell, and applying measures that could reduce the risk of further falls or injury.

The literature review emphasises that falls can be an indication of an underlying illness, or a sign that a patient's condition has deteriorated.[19] Because patients may fall more than once,[3] each fall should trigger a review of whether further interventions could reduce the risk of the patient falling again, including medical assessment where appropriate.

Early detection and treatment of fractured neck of femur is associated with reduced mortality.[15] NICE has guidance on detecting and treating head injuries[50] and on bone strengthening treatment to prevent further fractures after a first osteoporotic fracture.[18]

Some NHS organisations provide excellent advice on what should happen after a fall, including checklists and flow charts to guide staff checking for injuries, deciding how urgently medical review is needed, considering underlying illness, and acting to prevent another fall.

However, some policies are focused almost exclusively on preventing falls with little guidance on what staff should do after a fall except in relation to manual handling of patients who are on the floor, and reporting requirements.

Advice on observations to detect injuries varies, with only a minority of policies providing advice on how often to take neurological observations when a head injury is known or suspected.

The NRLS includes examples of situations where a fall may have been a sign of underlying illness:

"Patient independently mobile, went to toilet… heard a bump and on investigating found patient on the floor. No apparent injury he was taken back to his chair. Obs were done – BP a little high but within his usual range… half an hour later pt was found unresponsive… condition deteriorated, crash team called."

Very rarely, reports indicate delays in diagnosing injury:

"Patient fell from bed on a late shift during the drugs round. Patient did not complain of hip pain on mobilisation, but did complain of pain later in the shift… was found the next morning to have fractured her hip and shoulder."

Some reports suggest that NHS organisations have detailed and well-known procedures to check for injury and illness, for example:

"BP 120 /80, pulse 76, oxygen saturation 95% in air, Glasgow Coma Scale 15."

"…was hypoglycaemic and pyrexial on review."

"Neuro obs taken and recorded. Electrocardiogram (ECG) done…"

However, there appears to be little consistency, with a different range of observations apparently being taken in different organisations. Temperature is rarely taken, although it can be useful in the context of febrile illness leading to delirium and falls. Checking observations is generally mentioned less often in reports from mental health units and community hospitals. Because reports of falls are usually made by nurses, they tend not to include actions by medical staff (which will be in the patient's notes).

Some reports suggest that nurses only involve doctors in detecting and treating injuries after a fall, and are less likely to consider that the fall could be a sign of deterioration requiring medical diagnosis and treatment.

Reports to the NRLS also suggest that treatment after a fall can create logistical difficulties, for example, obtaining medical advice or x-rays in community hospitals, escorting mental health patients to A&E, or arranging timely internal transfers of acute patients with fractures into orthopaedic care.

Care after a fall in hospital should be comparable to aftercare for people who fall in the community. For example, if older people living in the community who attend A&E with a fracture are routinely offered an appointment at a falls clinic, a patient who falls in a hospital and has a fracture should receive the same assessments and interventions, whether through attending the falls clinic, or through their inpatient care.

A fall in hospital is also likely to be a significant issue when planning a patient's discharge. As well as putting in place interventions that could reduce their risk of falling again, patients who have fallen are likely to need support from a social worker, occupational therapist and physiotherapist to help them return home safely. They may need a home safety assessment and alterations, equipment to improve their safety, installation of emergency call systems, check calls or visits, and advice on how to get up safely after a fall.

After a fall:

find out more

NICE guidance on head injury	NICE. *Head injury: triage, assessment, investigation and early management of head injury in infants, children and adults.* (2003). Available at: **www.nice.org.uk/guidance/CG4**
NICE guidance on osteoporosis	NICE. *The clinical effectiveness and cost effectiveness of technologies for the secondary prevention of osteoporotic fractures in postmenopausal women.* (2005). Available at: **www.nice.org.uk/guidance/TA87**
Systematic literature review on osteoporosis	Poole KES, Compston JE. Osteoporosis and its management. *British Medical Journal*. 2006; 333: 1251-1256. Available at: **www.bmj.com/cgi/content/full/333/7581/1251**
Service improvement	NHS Institute for Innovation and Improvement. Focus on fractured neck of femur. (2006). Available at: **www.institute.nhs.uk/Products/FocusOnFracturedNeckofFemur.htm**

Share your learning on prevention of falls and injury

Throughout the preparation of this report, the NPSA has found NHS staff who are passionate about improving the care of patients vulnerable to falls, and came across many examples of good practice being developed, piloted, or implemented in NHS organisations. Although there is not enough room in this report to include all these, saferhealthcare is developing a special interest area that we hope will build into an extensive and ongoing resource of local initiatives that can prevent falls. Please consider sharing your own experience of implementing evidence-based interventions there, so staff and patients in other organisations can learn from them.

Templates for writing up your local work can be found at **www.saferhealthcare.org.uk**

Recommendations for NHS organisations on preventing falls and reducing injury:

- Create a falls prevention group with the right members to act on both clinical and environmental risk factors.
- Base falls prevention policies on the evidence described in this report.
- If using a falls risk score, understand to what degree they under- or over-predict the chances of a patient falling.
- Have appropriate guidance for staff on how to observe, investigate, care for and treat patients who have fallen.

NPSA safer practice notice:

using bedrails safely and effectively

Bedrails are designed to reduce the risk of patients accidentally slipping, sliding, falling, or rolling out of bed. However, bedrails will not be suitable for every hospital patient – patients who are independently mobile would be restricted by bedrails, and bedrails could increase the risk of injury in patients who are confused enough to try and climb over them.

The prevailing opinion in most nursing literature is that bedrails do not prevent falls and may increase the likelihood of injury in falls from bed. However, a systematic review of the literature carried out by the NPSA suggests that falls from bed with bedrails are usually associated with lower rates of injury, and initiatives aimed at substantially reducing bedrail use can increase falls.

Patients consulted by the NPSA said that if they are well enough, they want to be consulted about bedrails, and see bedrails as an acceptable safety measure. This is supported in published patient studies.[44]

Reports to the NRLS from acute hospitals, community hospitals and mental health units were reviewed to gain an understanding about the circumstances of falls from bed. More detail on bedrail-related incidents reported to the NPSA, HSE and NHSLA can be found in appendix 4. The main findings from reports received over 12 months are:

- around 44,000 patients fell from bed;
- around 90 patients fractured their neck of femur in falls from bed;
- eleven deaths occurred after falls from bed;
- eight per cent of falls from bed occurred when bedrails were being used;
- falls from bed without bedrails were significantly more likely to involve injury, particularly minor head injuries;
- falls from bed reported to the HSE and the NHSLA showed a similar pattern;
- around 1,250 patients injured themselves on bedrails, usually scrapes or bruises to legs.

An overnight survey carried out by the NPSA with the help of NHS acute hospitals showed that 26 per cent of patients had bedrails raised at night. Patients with bedrails were, on average, older and had poorer mobility than patients without bedrails.

Published literature on bedrails has described deaths in the USA from suffocation through bedrail entrapment over the last 20 years.[51]

Design changes have reduced some entrapment risks and the MHRA has issued advice on the safer use of bedrails, emphasising the main risks that arise from poorly fitted or maintained bedrails, particularly if used with divan beds in care homes.[52] Deaths from bedrail entrapment in hospital settings in England and Wales have been recorded, but appear to be extremely rare, with three fatalities located by the HSE, MHRA and NPSA from records covering the past seven years.

An NPSA survey of NHS organisations' bedrail policies found that some covered the potential risk of fatal entrapment at length, with little reference to the risk of falling from bed.

Policies sometimes presented bedrail entrapment as a random risk that could only be avoided by not using bedrails at all, rather than supporting staff to take the steps recommended by the MHRA to reduce the risk of bedrail entrapment through safe systems in purchasing, risk assessing, fitting and maintaining bedrails.

Because of these findings, and after wide consultation with patient organisations, frontline clinical staff, falls experts and organisations working to reduce harm from falls, the NPSA has developed a safer practice notice, *Using bedrails safely and effectively,* which aims to ensure that:

- patients who are well enough, make their own decisions about bedrails;
- staff are better informed about relative risks of falls and injury with and without bedrails;
- bedrails are used for preventing falls from bed when the benefits outweigh the risks;
- bedrails are not used inappropriately as restraints;
- systems are in place to help frontline staff comply with MHRA advice, including how to reduce the risk of entrapment and bedrail failure.

The safer practice notice and supporting resources, including a systematic literature review on bedrails, and full results of the overnight survey of bedrail use, can be downloaded from **www.npsa.nhs.uk**. NPSA resources are designed to complement MHRA advice and resources[52,53], which can be downloaded from: **www.mhra.gov.uk**

The third report from the Patient Safety Observatory

Conclusion

Each year, over 200,000 patients fall in hospital. Although 96 per cent of falls result in minor injuries or no harm, even these falls can result in reduced confidence, delays in discharge, and loss of independent living.

For some patients, falls will result in very serious injury, with over 530 patients suffering a hip fracture. The patients most likely to fall are also the patients most vulnerable to injury, and the least able to recover when serious injury is added to the illness they were admitted to hospital for. Twenty-six patients who died after falling in hospital were identified, and known mortality for fractured neck of femur suggests 95 further deaths may have occurred in the weeks following a fall.

Preventing falls, however, must be balanced with patients' rights to dignity, privacy, independence, rehabilitation and their choices about the risks they are prepared to take. A ward where no patient ever falls is likely to be a ward where no patient can regain their independence and return home.

Approaches to preventing falls must be individualised, as each patient is affected differently by the interplay between a range of risk factors.

Relatives expect hospitals to be places of safety, and are devastated if their family member is injured in a fall. For staff, trying to keep very vulnerable patients safe from falls is a constant source of anxiety. Staff, too, are devastated if a patient is injured in a fall, and many have committed their time and energy to implementing changes aimed at reducing the number of falls.

For NHS organisations, the cost of treating falls in hospital can be significant, with the annual healthcare cost estimated at £92,000 for an average acute hospital trust, with additional costs for health and social care after discharge, and from litigation.

NRLS data have been able to provide the most comprehensive picture yet of who, when, where and why patients fall. This can help NHS organisations make the best use of their resources, by targeting them to where they are needed most. However, every hospital will be caring for different patients in different environments, so analysing and reviewing local data to inform local action is also essential.

Falls have very complex and wide-ranging causes, and interventions to prevent them need to reflect this. Although much more research is needed, there are many examples of good policies and practices. This report details six recommendations for NHS organisations that can improve the care of patients vulnerable to falling (see page 7), and has directed NHS organisations to a wide range of evidence sources and other resources that can help them.

The NPSA will continue to work with NHS organisations and national organisations on the prevention of falls.

This report reminds NHS organisations of the human and financial costs of falls. There are no simple fixes for preventing falls, but concentrating on the interventions that could prevent individual patients from falling can make a difference.

The third report from the Patient Safety Observatory

Appendices

Appendix 1: the NSPA expert reference group

The external reference group on safer use of bedrails provided guidance and comments during the development of the report:

Val Attwood/ Melissa Gaselee, NHS Purchasing and Supply Agency

Daniel Blake, Action on Elder Abuse

Linda Brown, Consultant Psychiatrist for the Elderly

Stephen Burke, Chief Executive, Counsel and Care

Karen Cowley, Registered Nurse/NICE Falls Prevention in Older People

Clive Evers, Alzheimer's Society

Susan Fleming, Nurse Directors Association

Kathy George, Nursing and Midwifery Council

Frances Healey, NPSA Patient Safety Manager/Bedrails Project Manager

Colum Lowe, NPSA Head of Design and Human Factors

Judith McNulty-Green, Health and Safety Executive

Linda Matthew, NPSA Patient Safety Manager/Pharmacist

Alison Milne, Social Gerontologist/ NPSA Mental Health External Reference Group

David Oliver, Senior Lecturer/Consultant in Elderly Care Medicine/British Geriatrics Society

Tracy Paine, Royal College of Nursing

Julie Parry, NPSA Patient Safety Manager North Wales

Jonathan Plumb, Nursing Advisor, Medicines and Healthcare products Regulatory Agency

Mervyn Richardson, Carer/ NPSA Mental Health External Reference Group

Nadine Schofield, Older People's Mental Health/National Institute for Mental Health in England

Elaine Stevenson (Chair), NPSA Safer Practice Lead

Deborah Sturdy, Department of Health Older Person/Mental Health Lead

Ashley Thompson, Healthcare Commission

Sarah Williamson, Clinical Risk Manager, Sheffield Teaching Hospitals NHS Trust

Appendix 2: the NPSA, the Patient Safety Observatory and the NRLS

The role of the NPSA
The NPSA was set up in 2001 to make changes at a national level that will improve patient safety in the NHS. The NPSA:

- identifies trends and patterns in patient safety incidents using its NRLS and data from other sources;
- provides tools for staff locally to understand underlying causes of incidents and then be able to act on them, for example the root cause analysis toolkit, and the incident decision tree;
- develops solutions at a national level, for example our national campaign to improve hand hygiene in hospitals (clean**your**hands);
- identifies opportunities to share best practice, in particular spreading local solutions at a national level.

The NPSA is currently working on projects to develop solutions to safety problems.

In 2005, the NPSA took on new roles and is now also responsible for supporting local organisations in addressing their concerns about the performance of individual doctors and dentists; ensuring research is carried out safely; looking after the safety aspects of hospital design, cleanliness and food; and managing the contracts with the three Confidential Enquiries.

The reporting of patient safety incidents is essential to improving safety. One of the NPSA's core functions has been the development of the NRLS to collect reports of patient safety incidents. Incident reporting enables the types and causes of safety problems to be identified so that practical solutions can be developed to prevent harm to patients.

Further information about the NPSA can be found on our website at: **www.npsa.nhs.uk**

The Patient Safety Observatory
Although incident reports are fundamental to understanding patient safety, on their own they cannot tell us all that we need to know.

There are a number of reasons for this. Firstly, incident reporting systems are not comprehensive due to under-reporting, biases in what types of incident are reported, and the existence of several reporting systems. For example, in the UK, in addition to the NRLS there are separate reporting systems for medical device incidents, adverse drug reactions, healthcare associated infections, and suicide and homicide of people with mental illness. Also, serious incidents are rare, and information on them is often distributed across the healthcare system.

In order to achieve a more comprehensive understanding of patient safety and to help reduce risk across all healthcare sectors, the NPSA has developed the Patient Safety Observatory in collaboration with a number of partners from both the NHS and elsewhere.

The primary function of the Patient Safety Observatory is to quantify, characterise and prioritise patient safety issues in order to support the NHS in making healthcare safer. The Patient Safety Observatory enables us to draw upon a wide range of data and intelligence so that we can identify and monitor trends in patient safety incidents and prioritise areas for action.

The National Reporting and Learning System
The NRLS is the primary mechanism for the NPSA to collect information on patient safety incidents from across England and Wales.

The NRLS dataset is designed to collect a notification report of a single patient safety incident soon after it occurs. It focuses on what happened, when and where it happened, the characteristics of the patient(s) involved (such as age, sex and ethnicity), and the outcome for the patient(s). The dataset also includes contributory factors, and factors that might have prevented harm. Reports also contain free text that explains what happened in varying degrees of detail. Additional detail is provided in reports involving medication and medical devices.

The NRLS is the first national reporting system of its kind in the world. It collects data from across all healthcare settings and provides a springboard for developing national solutions to patient safety problems and for identifying priorities for the NPSA and the wider health service.

The reports from the Patient Safety Observatory are part of a programme of work to exploit the data within the NRLS, and to provide feedback to those who report.

The NPSA is committed to undertaking thematic analyses of incidents from different sectors or topics. Alongside detailed thematic reports, the NPSA will also provide regular analysis of reports from the whole NRLS.

How to interpret NRLS data
There are a number of notes of caution in interpreting the data from the NRLS:

- NHS organisations have provided data to the NRLS for varying lengths of time, so data included within this report may not be representative of the rate of incidents across all of England and Wales.
- International research suggests that there is significant under-reporting of incidents.
- Reports made to local risk management systems may not capture all types of incidents that occur.
- The data are confidential. The NPSA does not seek to hold information on the identities of individual staff or patients, and this means that the data are not routinely checked with the reporter. However, steps are usually taken to maximise the quality of the data by, for example, checking for duplicate reports and feeding back to individual trusts if there are problems with their reports.
- Incident reports are often made soon after the incident, but before the incident has been investigated locally. Hence, the reports to the NRLS may not contain complete information about the incident, especially findings of more detailed investigations such as root cause analysis.
- There are no reports from the public or patients included in this analysis, although, since April 2006, the public and patients have been able to report incidents via a dedicated reporting form.
- A higher number of reported incidents from a trust, specialty or location, does not necessarily mean that the trust, specialty or location has a higher number of incidents; it may instead reflect greater levels of reporting. Organisations reporting higher numbers of patient safety incidents may have a better developed safety culture, resulting in greater reporting and learning from reports.
- Some incidents recorded in local risk management systems, and subsequently forwarded to the NRLS, may not technically be patient safety incidents. For example, deaths from natural causes that occurred in hospital, and also deaths where patients died unexpectedly, are sometimes reported to local risk management systems, for local audit purposes, and hence reported to the NRLS.
- The data are likely to include incidents where the impact on the patient, or whether the incident could have been avoided, is not clear. For example, suicides are often reported to local risk management systems in cases where the event could not have been prevented by health services.
- The level of detail collected locally varies. For example, some organisations and local data collection systems do not currently collect information on contributing factors or the ethnicity of the patient(s) involved. At the present time, there is insufficient information on the age and gender of patients involved in incidents to allow analysis of this information, but the quality of demographic data is improving.

Appendix 3: methodology for analysis of samples of NRLS incidents

Two hundred incidents were randomly selected from each care setting. The sampled incidents were reviewed to identify the circumstances of the falls, local action following a fall, and whether falls were witnessed.

The results from the samples were used to estimate the range within which we would expect particular problems or features to occur in the entire NRLS dataset.

Confidence intervals were calculated to give a feel for the precision of statistics derived from the samples. A 95 per cent confidence interval gives an upper and lower limit: there is a 95 per cent chance that this range contains the 'true' value of the statistic.

The wider the interval, the less precise/reliable the statistic.

In addition, a search of the entire NRLS dataset was undertaken for three specific consequences of falls: fractured neck of femur, other fractures, and lacerations.

The following search terms were used:

- *fractured neck of femur:* #NOF, NOF, Hip or FEMUR (4,469 incidents identified);
- *other fractures:* fracture, broken or # (1,728 incidents identified);
- *lacerations:* skin tear, laceration, cut, suture, suturing, stitches, stitching (12,714 incidents identified).

Samples of these incidents were reviewed (1,000 fractured neck of femur reports; 500 other fracture reports; 200 laceration reports). These estimates were then applied to the entire falls dataset.

For a wider discussion of the implications of these statistics and their policy and practice context, please see the NPSA's safer practice notice on bedrails and associated resources at **www.npsa.nhs.uk**

Appendix 4: bedrail-related statistics

Table A: NRLS data, all hospital settings 2005–06

	A. Total number of falls reported	B. Proportion of falls from bed, from review of random samples	Estimate of falls from bed per year based on A and B (95% C.I.)	Midpoint of estimate of falls from bed
Acute hospitals	152,056	43/200	24,937 – 42,119	32,692
Community hospitals	28,195	48/200	5,244 – 8,571	6,767
Mental health units	26,072	32/200	3,024 – 5,658	4,172
Total estimate of falls from bed reported per year:				**43,631**
Deaths	11/26 deaths were falls from bed. The bedrail broke or detached in one fall, was raised in one fall, and was not in use in two falls. The remaining eight falls did not indicate if bedrails were raised.			
Fractured neck of femur (#NOF)	20/1,000 sample from a keyword search locating 4,469 falls were confirmed #NOF in falls from bed, and this suggests around 89 reports (95% confidence intervals; 58 to 139). Bedrails raised in 5/20.			
Subdural haematoma	2/10 from a keyword search, excluding fatalities, were falls from bed, both with bedrails raised.			
Random sample of falls	123/600 falls from bed (200 from each setting); 10/123 (8.1%) with bedrails raised,* 36/123 (29.3%) were falls from beds without bedrails,† 77 reports did not indicate if bedrails raised.			

Source: 206,350 falls in hospitals/mental health units reported to the NRLS between 1 Sept 2005 and 31 August 2006.

* Indications were clear statement that bedrails were raised, action after fall included removing bedrails, or patient described as climbing out of bed.
† Indications were clear statement that bedrails were down or not in use, action after fall included adding bedrails, or patient described as rolling, slipping or sliding out of bed.

Table B: NRLS data, acute settings 2005	
Random sample of falls	98/346 falls from bed. 7/98 (7.1%) with bedrails (six no harm, one low harm). 35/98 (35.7%) without bedrails (27 no harm, seven low harm, one moderate harm). 56/98 did not indicate if bedrails raised (45 no harm, 10 low harm, one moderate harm).
All death/severe falls	Three actual death/severe falls from bed out of 117 coded as death/severe; one severe without bedrails; one severe with bedrails, one death did not indicate if bedrails raised.
Bedrail/rail/cotside keyword search – falls	First 100 falls from bed with bedrails: 86/100 no harm, 12 /100 low harm, one moderate harm, one severe harm including 3/100 minor head injury First 100 falls from bed without bedrails: 69/100 no harm, 31/100 low harm, including 21/100 minor head injury. *The differences between falls with and without bedrails were statistically significant for no harm; statistically significant for low harm; not statistically significant for moderate or severe harm; and highly statistically significant for minor head injury.*
Bedrail/rail/cotside keyword search – direct injury	500 sample from 2,349 reports located by keyword search of 84,646 patient safety incidents. 35/500 direct injury from striking limb on bedrail/trapping limb in bedrail (22/35 legs). 35/500 equivalent to 164 (95% C.I. 120-126) in six months when 84,646 patient safety incidents reported. This is approximately 1,246 reports of direct injury in 643,151 patient safety incidents reported 1/9/05-31/8/06.

Source: 84,646 patient safety incidents including 30,771 falls in acute hospitals reported to the NRLS between 1/1/2005 and 30/6/2005.

Table C: Observatory partners' data on falls	
Bedrail/rail/cotside keyword search HSE data 1/4/01 to 31/3/04 – direct injury	Six reports of injury from bedrail entrapment, including two upper arm fractures and one dislocation from apparent combined entrapment and fall. Seven detached/broken bedrails including one #NOF and one possibly related death.
HSE falls from height + slips trips and falls 1/4/04 to 31/3/05	Fifteen falls from bed with rails, 21 without bedrails, 28 unclear, two detached/broken bedrails.
Bedrail/rail/cotside keyword search NHSLA claims data 1/4/96 to 31/3/05	Two falls from bed with bedrails, 31 without bedrails, six unclear. No direct injury from bedrail claims.
NHSLA claims data related to patient falls 1/4/96 to 31/3/05	Five falls from bed with bedrails, 62 without bedrails, 79 unclear, one from sitting position on side of bed.

The third report from the Patient Safety Observatory

References

1 Department of Health. *The National Service Framework for Older People.* (2001).

2 Welsh Assembly Government. *National Service Framework for Older People in Wales.* (2006).

3 National Institute for Health and Clinical Excellence. *Falls. The assessment and prevention of falls in older people.* (2004). Available at: **www.nice.org.uk/guidance/CG21/guidance/pdf/English**

4 Department of Health. *A recipe for care - not a single ingredient. (*2007). Available at: **www.dh.gov.uk/assetRoot/04/14/24/27/04142427.pdf**

5 American Geriatrics Society, British Geriatrics Society, American Association of Orthopaedic Surgeons Panel on Falls Prevention. Guideline for the prevention of falls in older persons. *Journal of the American Geriatrics Society.* 2001; 49: 664-672

6 Oliver D et al. Risk factors and risk assessment tools for falls in hospital inpatients: a systematic review. *Age and Ageing*. 2004; 33: 122-130

7 Myers H. Hospital falls risk assessment tools: a critique of the literature. *International Journal of Nursing Practice.* 2003; 9: 223-235

8 Hospital Episode Statistics 2004–05. Available at: **www.hesonline.org.uk**

9 George J et al. Causes and prognosis of delirium in elderly patients admitted to hospital. *Age and Ageing*. 1997; 26: 423-427

10 Hubbard R et al. The ageing of the population; implications for multidisciplinary care in hospital. *Age and Ageing*. 2004; 33: 479-482

11 Tinetti ME et al. Risk factors for falls among elderly persons living in the community. *New England Journal of Medicine*. 1988; 319: 1701-1707

12 Oliver D. Assessing the risk of falls in hospital: time for a rethink? *Canadian Journal of Nursing Research*. 2006; 38: 89-94

13 Sari AB et al. Sensitivity of routine system for reporting patient safety incidents in an NHS hospital: retrospective case note review. *BMJ*. 2007; 334: 79

14 Blair E, Gruman C. Falls in an inpatient geriatric psychiatric population. *Journal of the American Psychiatric Nurses Association*. 2005; 11: 351-354

15 Roder F et al. Proximal femur fracture in older patients – rehabilitation and clinical outcome. *Age and Ageing*. 2003; 32: 74-80

16 Oliver D, Healey F. Preventing falls and injury in hospitals: the evidence for intervention. *Healthcare Risk Report*. 2006; June: 12-14

17 Evans D et al. Falls in hospitals: best practice. The Joanna Briggs Institute. 1998; 2: 1-6

18 National Institute for Health and Clinical Excellence. *The clinical effectiveness and cost effectiveness of technologies for the secondary prevention of osteoporotic fractures in postmenopausal women.* (2005). Available at: **www.nice.org.uk/guidance/TA87**

19 Oliver D et al. *Prevention of falls in hospitals and care homes and in persons in those settings with cognitive impairment or dementia.* Department of Health Accidental Injury Prevention Programme. (2005).

20 Van Staa TP et al. Epidemiology of fractures in England and Wales. *Bone*. 2001; 29: 517-522

21 Todd CJ et al. Differences in mortality after fracture of hip: the East Anglian audit. *British Medical Journal*. 1995; 310: 904-908

22 Fleming BE, Pendergast DR. Physical condition, activity pattern, and environment as factors in falls by adult care facility residents. *Archives of Physical Medicine and Rehabilitation*. 1993; 74: 627-630

23 Simmons M. Implementation of a patient falls risk-management strategy. *Professional Nurse*. 2001; 17: 168-171

24 Cryer C, Patel S. *Falls, fragility and fractures. The case for and strategies to implement a joint health improvement and modernisation plan for falls and osteoporosis.* National Service Framework for Older People. (2001). Available at: **www.unicef-icdc.org/publications/pdf/repcard2e.pdf**

25 Sweeting HL. Patient fall prevention – a structured approach. *Journal of Nursing Management*. 1994; 2: 187-192

26 Sutton JC et al. Patient accidents in hospital; incidence, documentation and significance. *British Journal of Clinical Practice*. 1994; 48: 63-66

27 Healey F, Oliver D. Preventing falls and injury in hospitals: where are efforts best directed? *Healthcare Risk Report*. 2006; June: 15-17

28 National Patient Safety Agency. Root cause analysis toolkit. Available at: **www.npsa.nhs.uk/root_cause_analysis**

29 Medicines and Healthcare products Regulatory Agency. Device Alert 2007/001. *Reporting Medical Device Adverse Incidents and Disseminating Medical Device Alerts*. Available at: **www.mhra.gov.uk**

30 HSE's specific recommendations on the severity and circumstances in which a fall requires reporting to them can be found at: **www.hse.gov.uk/pubns/hsis1.pdf**

31 Gillespie LD et al. Interventions for preventing falls in elderly people. *The Cochrane Database of Systematic Reviews*. 2003; 4: CD000340

32 Chang J et al. Interventions for the prevention of falls in older adults: systematic review and meta-analysis of randomised clinical trials. *British Medical Journal*. 2004; 328: 680

33 Oliver D et al. Strategies to prevent falls and fractures in hospitals and care homes and effect of cognitive impairment: systematic review and meta-analyses. *British Medical Journal*. 2006; Dec 8 [e-pub ahead of print]. Available at: **www.bmj.com/cgi/rapidpdf/bmj.39049.706493.55v1**

34 Perell KL et al. Falls risk assessment measures: an analytic review. *Journals of Gerontology*. 2001; 56: 761-766

35 Vassallo M et al. A comparative study of the use of four risk assessment tools on acute medical wards. *Journal of the American Geriatrics Society*. 2005; 53: 1034-1038

36 Fonda D et al. Reducing serious fall related injuries in hospital. *Medical Journal of Australia*. 2006; 184: 379-382

37 Haines TP et al. Effectiveness of targeted falls prevention programmes in a subacute setting. A randomised controlled trial. *British Medical Journal*. 2004; 328: 676-679

38 Healey F et al. Using targeted risk factor reduction to prevent falls in older hospital inpatients. A randomised controlled trial. *Age and Ageing*. 2004; 33: 390-395

39 Ulrich R. *Designing the 21st century hospital.* (2005). Available at: **www.rwjf.org/files/publications/other/Design21CenturyHospital.pdf**

40 Health and Safety Executive. Slips assessment tool (SAT). Available at: **www.hsesat.info**

41 Parker MJ et al. Hip protectors for preventing hip fractures in older people. *The Cochrane Database of Systematic Reviews*. 2005; 3: CD001255

42 Cryer C. *Variations in initial acceptance and continued adherence to wearing hip protectors.* (2004). Centre for Health Service Studies, University of Kent.

43 Mayo NE et al. A randomized trial of identification bracelets to prevent falls among patients in a rehabilitation hospital. *Archives of Physical Medicine and Rehabilitation*. 1994; 75: 1302-1308

44 Vassallo M et al. Acceptability of falls prevention measures for hospital inpatients. *Age and Ageing*. 2004; 33: 400-401

45 Giles LC et al. Can volunteer companions prevent falls among inpatients? A feasibility study using a pre-post comparative design. *BioMed Central Geriatrics*. 2006; 6: 11

46 National Patient Safety Agency. *Safer patient identification*. (2005). Available at: **www.npsa.nhs.uk/display?contentId=4401**

47 McInnes E, Askie L. Evidence review on older people's views and experiences of falls prevention strategies. *Worldviews on Evidence-based Nursing*. 2004; 1: 20-37

48 Haines T et al. Patient education to prevent falls in subacute care. *Clinical Rehabilitation*. 2006; 20: 970-979

49 Mion L. *Nurses' and elderly patients' decisions regarding physical restraint.* Case Western Reserve University PhD. (1992)

50 National Institute for Health and Clinical Excellence. *Head Injury: triage, assessment, investigation and early management of head injury in infants, children and adults*. (2003). Available at: **www.nice.org.uk/guidance/CG4**

51 Hignett S, Griffiths P. Do Split-side rails present an increased risk to patient safety? *Qual Saf Health Care*. 2005; 14; 113-116

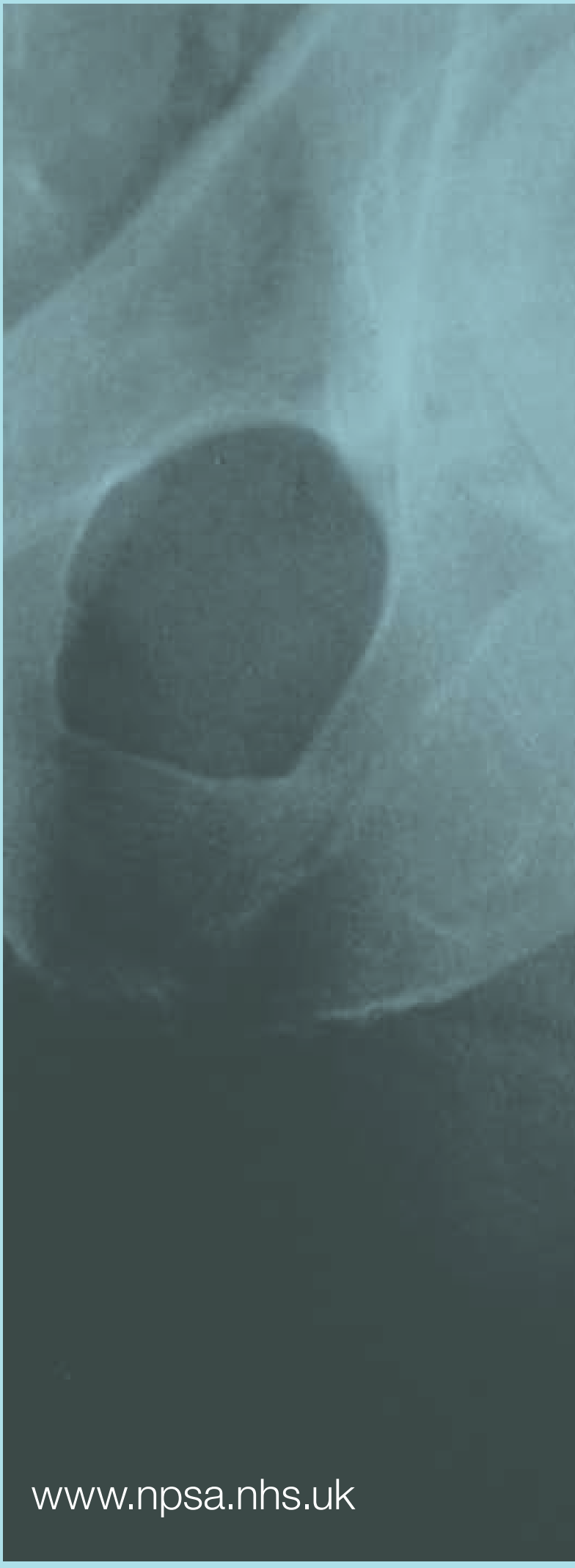
52 Medicines and Healthcare products Regulatory Agency. Device Bulletin 2006(06). *Safe Use of Bed Rails*. Available at: **www.mhra.gov.uk**

53 Medicines and Healthcare products Regulatory Agency. Device Alert 2007/009. *Beds rails and Grab Handles.* Available at: **www.mhra.gov.uk**

All websites accessed on 15 February 2007.

The National Patient Safety Agency

We recognise that healthcare will always involve risks, but these risks can be reduced by analysing and tackling the root causes of patient safety incidents. We are working with NHS staff and organisations to promote an open and fair culture, and to encourage staff to inform their local organisations and the NPSA when things have gone wrong. In this way, we can build a better picture of the patient safety issues that need to be addressed.



SHEILA TERRY/SCIENCE PHOTO LIBRARY

The National Patient Safety Agency
4 - 8 Maple Street
London
W1T 5HD

T 020 7927 9500
F 020 7927 9501

0483

www.npsa.nhs.uk