



## Slips and trips in the health services

### Health Services Sheet No 2

#### Why is it important you tackle slips and trips risks?

Slips and trips resulting in falls are the most common cause of major injuries in all workplaces in Great Britain and the second biggest cause of over-3-day injuries. Slips and trips occasionally lead directly to fatal accidents, eg from head injuries. Fortunately, the numbers of such fatal accidents reported to the Health and Safety Executive (HSE) are low, typically one or two per year. However, over 2000 injuries to employees in healthcare, attributed to slips and trips, are reported each year. Many patients and visitors also receive injuries.

Recent evidence suggests that slips are also indirectly responsible for many fatal accidents, as:

- slips are often the 'first event' in falls from heights; and
- simple slip injuries (broken bones etc) often lead to complications in older people, such as thromboses or embolisms, which may be fatal.

Slips and trips risks are especially important in healthcare because:

- injuries to healthcare workers and members of the public are frequent;
- trips account for almost 62% of major injuries to members of the public. Generally trips are believed to account for between 25% and 30% of all slips, trips and falls;
- they cause 8% of fatalities to members of the public in the healthcare industry.

The National Audit Office, in their report of April 2003,<sup>1</sup> highlighted slips and trips as a main type of accident to workers and patients. The report includes recommendations that NHS Trusts should review their health and safety risk management policies and improve accident reporting systems.

*The cost of accidents could affect the delivery of high quality patient care and viability of the business. For example:*

- patients being seriously injured through falls leads to additional medical costs and an increased stay in hospital, with implications for waiting lists and service delivery;
- staff sickness absence due to slips, trips and falls at work, and other associated costs, such as staff

- replacement costs, will have a detrimental effect on budgets;
- the total estimated cost of civil claims for slips and trips injuries to employees and the public in or on NHS premises in England, reported to the NHS Litigation Authority over the last four years, exceeds £25 million. Typical claims average around £5000 but some in the healthcare sector have been as high as £600 000. Increased insurance costs and enforcement of criminal liability can be a further consequence;
- people may experience hardship as a result of loss of wages, as well as pain and suffering.

These accidents can be cut dramatically through planning and positive management during refurbishment and new build, together with good housekeeping. Employees should be consulted at an early stage, as they will have useful experience of areas where problems arise. Accidents are not an inevitable part of the healthcare industry - they can and should be prevented.

#### Understanding how risks can be controlled

The four main causes of slips and trips accidents in healthcare are:

- slippery/wet surfaces – caused by water and other fluids;
- slippery surfaces caused by dry or dusty floor contamination, such as plastic, lint or talcum powder;
- obstructions, both temporary and permanent;
- uneven surfaces and changes of level, such as unmarked ramps.

Other causes include factors such as a poor level of lighting and external glare; human factors such as employees rushing; running or carrying heavy/cumbersome items; the wearing of unsuitable footwear or the use of improper cleaning regimes.

Studies have shown that carrying even a light load can effect gait patterns (how we walk) and increase the risk of falling, especially among older people. In areas where individuals are likely to be encumbered and therefore have a restricted view of the floor, consider particularly the anti-slip properties of the flooring material and strictly enforced rules on housekeeping.

Table 1 gives examples of how to control the risks of slipping, and tells you how to keep floors dry.

## Floor surfaces

The floor has to have an appropriate level of roughness – for smooth floors it is the ‘micro-roughness’ that matters. The environment, the footwear, and the task also have to be suitable.

The characteristics of floor surface materials, required to provide satisfactory slip resistance, were thought to be difficult to assess. However, research carried out by HSE at the Health and Safety Laboratory, in conjunction with the UK Slip Resistance Group and the British Standards Institution, has shown this is not the case. The slipperiness of flooring materials may be simply assessed by using commercially available scientific test methods:

- the ‘Pendulum’ coefficient of friction test (also known as the ‘portable skid resistance tester’, the ‘British Pendulum’, the ‘TRRL Pendulum’). This is a reliable and accurate test, and has been adopted as the standard HSE test method for the assessment of slipperiness. However, the instrument requires an experienced operative both to use it and to interpret the results. It is also quite large, reducing its portability;
  - slipperiness may be simply assessed by measuring the surface micro-roughness of flooring materials. Many types of roughness test exist, but research has shown that measurement of the ‘Rz’ parameter (formerly known as ‘Rz(DIN)’ and ‘Rtm’) allows slipperiness to be predicted accurately. Rz is a measure of total surface roughness, calculated as the mean of several peak-to-valley measurements. This measure is simple, quick, and a good indicator of floor slip resistance. It has recently been shown that floor surface Rz roughness levels of at least 20 µm (eg 30 µm) are required to enhance the slip-resistance of hard floor materials, such as ceramics and concrete, in water-wet conditions. This figure may be reduced slightly when considering soft flooring materials (eg vinyl, linoleum).
- **plan** your overall arrangements to manage slips and trips risks. In most cases, the risks will justify setting these slips and trips arrangements out separately and specifically within the overall safety policy document. Assess the risks and identify what more you need to do by looking at the tables. Get the commitment and support of others, especially senior management;
  - **organise** so that staff know what to do: establish systems for inspection, maintenance, training and consultation with safety representatives;
  - **control** the risks by taking the measures you identify;
  - **record** all incidents involving slips and trips and ensure appropriate injuries are reported to HSE as required by the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995;
  - **monitor** your achievements to ensure you are making progress, eg from accident information, inspections, audits and reports from employees. Review your plan regularly.

## Legal requirements

Although previous health and safety legislation had always required action against slips and trips risks, recent regulations have re-emphasised the importance of these measures and shown how to take them.

The Management of Health and Safety at Work Regulations 1992 (amended in 1999) specify the five steps required for effective risk control arrangements and employee duties, as well as training and consultation with safety representatives.

The Workplace (Health, Safety and Welfare) Regulations 1992 require the floor surface to be suitable by not being ‘slippery so as to expose any person to a risk to their safety’ and for the floor to have ‘effective drainage’. Preventing contamination rather than increasing the slip resistance to counteract it is clearly preferable. However, very small levels of contamination (a single drop in many circumstances) can lead to drastic increases in slipperiness. Prevention of contamination must therefore be very thorough.

There are also duties on suppliers of equipment, floor treatment substances and slip-resistant shoes to ensure, so far as reasonably practicable, the inherent safety of their products and to provide information to users.

The Workplace Regulations also require the floor construction to:

- ‘have no holes, or slope or be uneven so as to ... expose a person to a risk’; and
- so far as reasonably practicable keep floors ‘free of obstructions and from any article ... which may cause a person to ... trip’; and
- ‘not have accumulated waste materials ... except in suitable receptacles’.

Table 2 gives examples of how to control the risks of tripping accidents.

## Managing the control of slips and trips risks

What practical measures you can take will vary in different situations. You will need to assess each situation, identify what factors cause slips and trips, and match practical control measures to these factors. Specific guidance has been published for food preparation areas.<sup>2,3</sup>

You will need management arrangements to identify and implement the necessary control measures for each situation. The five steps to achieve this are listed below:

**Table 1** Slips risks controls

CAUSATIVE FACTORS	PRACTICAL MEASURES FOR SLIPS RISK CONTROL
ENVIRONMENTAL FACTORS	
<p><b>Contamination of the floor from:</b></p> <ul style="list-style-type: none"> <li>● Spillages of solid, liquid materials</li> <li>● Wet cleaning methods</li> <li>● Shoes/clothing</li> <li>● Natural contamination such as wet, and/or mud in outside areas</li> <li>● Dry contamination, eg dusts, powders, polythene bags left on floors, product spillages or cardboard laid over spills</li> <li>● Wind-driven rain, sleet and snow through doorways</li> <li>● Condensation, eg from poor ventilation</li> </ul>	<p><b>Eliminate contamination in the first place</b></p> <ul style="list-style-type: none"> <li>● Maintain equipment to prevent leakage</li> <li>● Install suitable entrance matting systems</li> <li>● Place entrances to suit the prevailing weather (only an option during the initial design of the building)</li> <li>● Put up effective entrance canopies</li> </ul> <p>If not reasonably practicable:</p> <p><b>Prevent contamination becoming deposited on walking surfaces</b></p> <ul style="list-style-type: none"> <li>● Use dry methods for cleaning floors</li> <li>● Clean and dry incoming footwear, by use of suitable entrance matting</li> </ul> <p>If not reasonably practicable:</p> <p><b>Limit the effects of contamination</b></p> <ul style="list-style-type: none"> <li>● By immediate clearing up of spillages</li> <li>● By prompt repair of leaks</li> <li>● By limiting the area of contamination</li> <li>● By restricting access to contaminated areas</li> <li>● By using underfloor heating, particularly at entrances</li> </ul> <p>If there is still a risk, follow the next steps</p>
<p><b>Inherent slip resistance of the floor not maintained adequately</b>, eg from incorrect or inadequate cleaning, maintenance or wear</p>	<p><b>Maximize the surface roughness and therefore slip resistance of the existing floor surface</b></p> <p>Methods of cleaning and cleanliness of flooring is an important factor to consider, in conjunction with slip resistance. The frequency of cleaning will be determined by how many, and the type of pedestrians, who will use the floor. Floor manufacturers are required to provide information on the cleaning regime needed to make their floor safe in the intended environment and this information should be passed to the appropriate employees.</p> <p>Just a tiny amount of contamination, wet or dry, is sufficient to make a smooth floor dangerously slippery. Take the following measures to minimise the risks due to wet cleaning:</p> <ul style="list-style-type: none"> <li>● Thoroughly dry the wet floor after cleaning</li> <li>● Exclude people from wet cleaned areas until dry</li> <li>● Clean by dry methods wherever possible</li> <li>● Clean in sections so that there is always a dry path through the area</li> <li>● Clean during quiet hours</li> <li>● Thoroughly rinse wet cleaning areas</li> <li>● Use warning signs to identify contaminated floors or floors after cleaning</li> </ul>

CAUSATIVE FACTORS	PRACTICAL MEASURES FOR SLIPS RISK CONTROL
ENVIRONMENTAL FACTORS	
	<ul style="list-style-type: none"> <li>● Spot cleaning and cleaning of spillage will be needed between scheduled whole-floor cleaning (and it is equally important to thoroughly dry these areas). Frequent spot cleaning can supplement whole-floor cleaning</li> <li>● Train, supervise and equip those who clean floors to ensure effective and safe cleaning</li> <li>● Maintain floors and drainage to maximise slip resistance. A residual film of water is just as slippery as a puddle, and is more difficult to identify</li> </ul> <p>If this is not enough, take the following steps:</p>
<p><b>The slip resistance of the floor is too low</b></p> <p>This is influenced by:</p> <ul style="list-style-type: none"> <li>● The friction between the floor and shoe</li> <li>● The presence of suitable surface micro-roughness</li> <li>● The hardness of the floor</li> <li>● Applications for sealing floors during installation</li> <li>● Later modification of the floor surface such as inappropriate varnishing/sealing/polishing</li> </ul>	<p><b>Increase the surface roughness of the existing floor</b></p> <p>Surface micro-roughness may be increased by acid etching, sand blasting, or coarse diamond grinding. However, any of these methods can destroy or permanently alter other desirable characteristics of the floor such as appearance, chemical resistance, durability and ease of cleaning. Flooring treated by some of these methods may develop unacceptable pattern staining through differential wear. Jointing and expansion joints may be affected, compromising the floor construction</p> <p>Note: Any benefits from an increase in the surface roughness (R<sub>z</sub>) will be lost if contamination build-up occurs. Therefore any surface modification has implications for the cleaning regime. Changes in cleaning methods must be based on a risk assessment that considers any potential change of slip resistance</p> <p>The use of stick-on anti-slip strips may offer limited improvement, but strips should be placed very close to one another, and should be maintained carefully</p> <p>If it is possible to influence staff footwear, then anti-slip footwear may be an option. (See below)</p> <p>If this is not enough:</p> <p><b>Lay a more slip-resistant floor with higher surface roughness and higher coefficient of friction</b></p> <p>In a few cases a new floor may be needed:</p> <ul style="list-style-type: none"> <li>● Draw up a performance specification for the supplier to meet. Specification should include specialist slip resistance data such as surface micro-roughness and coefficient of friction measurements</li> </ul> <p>Note: This data must always be specified for the 'as installed' condition, and should be based on a 'pendulum-type' test. Experience of how that floor performs in a similar situation may help; and a small sample of the preferred materials will confirm manufacturer's claims and their suitability</p> <ul style="list-style-type: none"> <li>● See the installation is correctly done</li> <li>● Check to see the specification has been met</li> </ul>

CAUSATIVE FACTORS	PRACTICAL MEASURES FOR SLIPS RISK CONTROL
ENVIRONMENTAL FACTORS	
<p><b>Steps and slopes: Do they cause sudden changes in step or not offer adequate foot hold and/or handhold?</b></p>	<p><b>Check that steps give adequate foot and handhold, and that slopes have no sudden changes</b></p> <ul style="list-style-type: none"> <li>● Is the lighting adequate?</li> <li>● Are handrails in place?</li> <li>● Are stairs clearly demarked visually?</li> <li>● Remove all sudden changes in level</li> <li>● Ensure stairs have clearly visible nosings, good handrails, and suitable balustrades</li> <li>● Ensure that the rise and going of each step in a stair is consistent in size throughout the flight</li> <li>● Ensure that any applied slip-resistant nosing does not create a tripping or heel-catch hazard</li> <li>● Good visual cues for changes in floor level and surface are essential</li> </ul>
<p><b>Adverse environmental and other conditions hiding the condition of the floor and distracting attention</b></p> <ul style="list-style-type: none"> <li>● Low light levels</li> <li>● Shadows</li> <li>● Glare</li> <li>● Excess noise</li> <li>● Extremes of temperature</li> <li>● The use of repeating patterns on floor coverings that might be distracting to the eye, for example, by disguising a change in level</li> <li>● Bulky/awkward personal protective equipment</li> </ul>	<p><b>See that the prevailing conditions allow good visibility of and concentration on floor conditions</b></p> <p>For example provide adequate lighting, and see environmental demands do not distract attention from the floor condition</p>
ORGANISATIONAL FACTORS	
<p><b>The nature of the task being carried out such as:</b></p> <ul style="list-style-type: none"> <li>● The need to carry, lift, push, lower or pull loads</li> <li>● The need to turn, to move quickly or to take long strides</li> <li>● Distractions</li> <li>● Having no hands free to hold on to handrails to stop a fall</li> <li>● Encumbrance or restricted vision</li> </ul>	<p><b>Analyse the tasks in any slip risk area to see that only careful walking is required</b></p> <p>Tasks should not compromise ability to walk safely. Tasks should be:</p> <ul style="list-style-type: none"> <li>● Mechanized to avoid the need for pushing, lifting, carrying, pulling etc while walking on a slippery surface</li> <li>● Moved to safer areas and:</li> </ul>

CAUSATIVE FACTORS	PRACTICAL MEASURES FOR SLIPS RISK CONTROL
<b>ENVIRONMENTAL FACTORS</b>	
<b>Individual capability</b> <ul style="list-style-type: none"> <li>● Poor knowledge of risks and measures</li> <li>● Poor health and safety</li> <li>● Poor eyesight</li> <li>● Fatigue</li> <li>● Physical frailty/disability</li> </ul> <b>Inadequate supervision</b> <p>Safety culture which is not supportive. For example where the risks are accepted as part of the job</p>	<b>Allocate tasks in high slip risks areas only to those competent to follow slips precautions</b> <p>and:</p> <p><b>Supervise and monitor physical controls to see safe practices are followed</b></p> <p>and:</p> <p><b>Establish a positive attitude that slips risks can be controlled. This is achieved through clear line management responsibilities and consultation with workers</b></p>
<b>PERSONAL PROTECTIVE EQUIPMENT: FOOTWEAR FACTORS</b>	
<b>Shoes offer insufficient slip resistance in combination with the floor surface, because of:</b> <ul style="list-style-type: none"> <li>● Contamination of shoes</li> <li>● Sole material</li> <li>● Sole pattern</li> <li>● Type of shoe</li> <li>● Wear</li> <li>● Fit</li> <li>● Maintenance/renewal</li> </ul>	<b>Select suitable shoes for the floor, environment and the individual</b> <p>Base this on experience and information/advice from suppliers. Ensure employees maintain the shoe soles in good repair and keep them free from contamination. Replace them before they have worn smooth</p> <p>Where overshoes are required, use good quality reuseable ones where possible, laundering them between uses. Disposable overshoes can be slippery, and are easily split</p>
<b>INDIVIDUAL FACTORS</b>	
<b>Unsafe action by staff, due to:</b> <ul style="list-style-type: none"> <li>● Awareness of risk</li> <li>● Knowledge of how slips occur</li> <li>● Information and training, or</li> <li>● Distraction, carelessness</li> </ul>	<b>Train, inform and supervise employees on the risk, the control arrangements and employees' role(s) especially to:</b> <ul style="list-style-type: none"> <li>● Clean as they go</li> <li>● Report contamination</li> <li>● Maintain footwear</li> <li>● Walk appropriately to circumstances</li> </ul> <p><b>Set procedures for visitors</b></p>

**Table 2** Trips risks controls

CAUSATIVE FACTORS	PRACTICAL MEASURES FOR TRIPS RISK CONTROL
<b>ENVIRONMENTAL FACTORS</b>	
<p><b>Uneven surfaces</b> For example gulleys, holes, steps</p> <p><b>Obstructions</b> For example accumulation of articles such as trolleys, wheelchairs, medical equipment, waste, trailing cables, floor sockets etc</p> <p><b>Adverse environment</b> For example inadequate illumination to see floor properly, or glare</p>	<p><b>Eliminate holes, slopes or uneven surfaces which could cause trips risks</b></p> <p>To do this: inspect and maintain floors so they have a consistent surface finish with no holes to cause a tripping hazard. Highlight any changes in level, particularly at single steps and at the top and bottom of ramps. Make slopes gradual and steps clearly visible, avoid open gulleys and channels;</p> <p>and:</p> <p><b>Good housekeeping</b></p> <p><b>Eliminate materials likely to obstruct walkways and therefore lead to trips</b> For example analyse work flows and design process so waste and equipment does not accumulate on walkways</p> <p>or if this is not reasonably practicable:</p> <p><b>Prevent material obstructing walkways</b> For example provide sufficient suitable receptacles for items, mark out walkways, working areas and receptacle locations and make sure they are kept free of obstruction</p> <p>and:</p> <p><b>Provide suitable lighting to permit obstructions to be seen</b></p> <p>and:</p>
<b>ORGANISATIONAL FACTORS</b>	
<p><b>The nature of the task creates obstructions</b></p> <p><b>Safety culture which is not supportive</b> For example where risks are accepted as part of the job</p>	<p><b>Analyse the tasks and process flows to see if work can be handled to eliminate or minimize obstructions</b></p> <p>and:</p> <p><b>Establish a positive attitude that trips can be prevented</b></p> <p>and:</p>
<b>INDIVIDUAL FACTORS</b>	
<b>Safe practices not followed</b>	<b>Train, inform and supervise employees</b>

## Further information

### References

1 Great Britain National Audit Office *A safer place to work* The Stationery Office 2003. ISBN 0 10 292143 1  
The Stationery Office (formerly HMSO) publications are available from The Publications Centre, PO Box 276, London SW8 5DT Tel: 0870 600 5522  
Fax: 0870 600 5533 Website: [www.tso.co.uk](http://www.tso.co.uk)  
(They are also available from bookshops)

2 *Slips and trips: Guidance for the food processing industry* HSG156 HSE Books 1996  
ISBN 0 7176 0832 8

3 *Slips and trips: Summary guidance for the food industry* Food Information Sheet FIS6 HSE Books 1996

### Further reading

*The measurement of floor slip resistance. Guidelines recommended by the UK Slip Resistance Group*  
RAPRA Technology Ltd 1996 ISBN 0 85 957079 8

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This information sheet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.

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