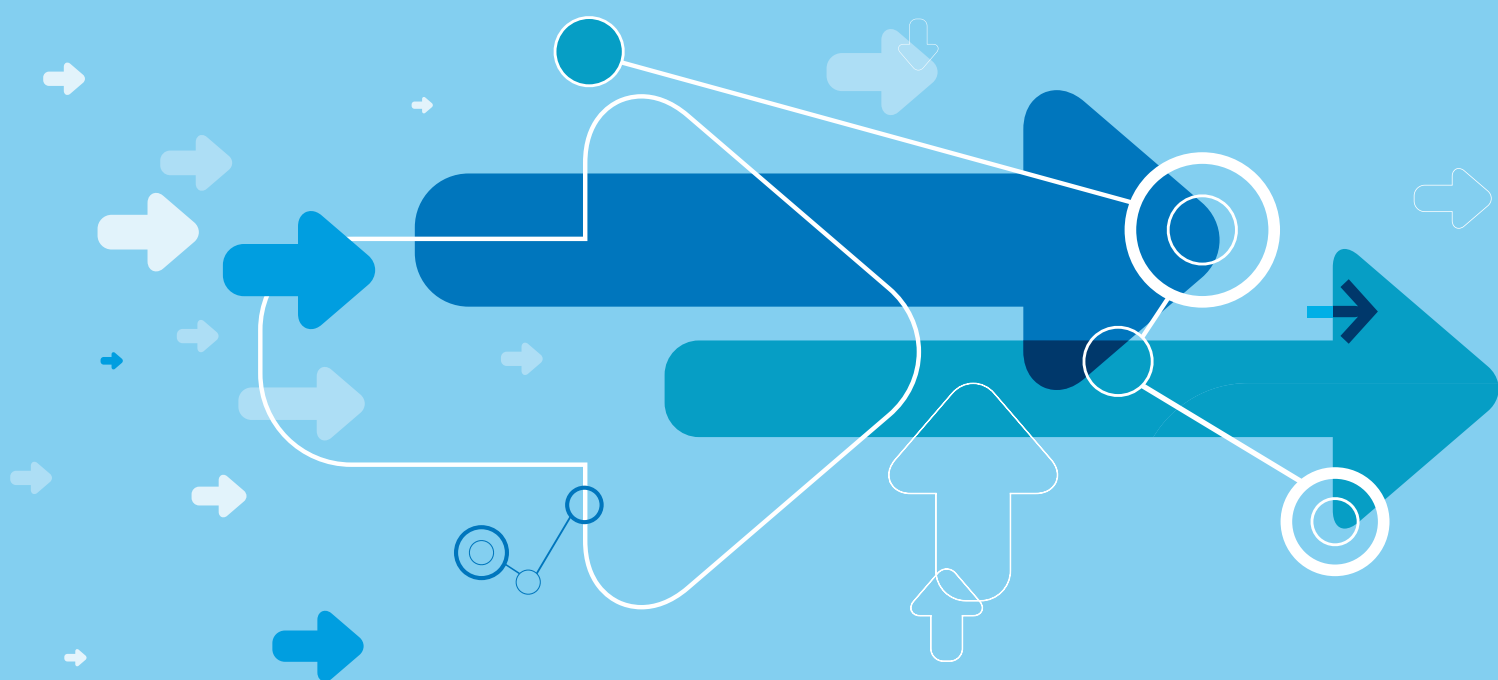


# A risk matrix for risk managers



January 2008

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## Introduction

The following guidance has been developed for the purpose of assisting NHS risk managers in implementing an integrated system of risk assessment. It can be adapted, depending on the needs of individual NHS trusts. The guidance has been developed following consultation with risk experts from different organisations and from institutions that teach or are experts in risk management. It is supported by background guidance along with the findings from workshops and consultations.

Risk assessment is a systematic and effective method of identifying risks and determining the most cost-effective means to minimise or remove them. It is an essential part of any risk management programme, and it encompasses the processes of risk analysis and risk evaluation.<sup>1,2</sup> The Department of Health (DH) recommends that the Boards of NHS organisations should ensure that the effort and resources that are spent on managing risk are proportionate to the risk itself.<sup>3</sup> NHS organisations therefore should have in place efficient assessment processes covering all areas of risk. It is also a legal requirement that all NHS staff actively manage risk.<sup>4</sup>

To separate those risks that are unacceptable from those that are tolerable, risks should be evaluated in a consistent manner. Risks are usually analysed by combining estimates of consequence (also described as severity or outcome) and likelihood (frequency or probability) in the context of existing control measures.<sup>5</sup> In general, the magnitude or rating of a given risk is established using a two-dimensional grid or matrix, with consequence as one axis and likelihood as the other.

While preparing these guidelines, the National Patient Safety Agency (NPSA) reviewed a variety of risk matrices currently in use in NHS organisations. The aim was to identify or develop a risk assessment matrix that could be recommended for use across the NHS. The review revealed the following properties as being essential for such a risk assessment matrix:

- It should be simple to use.
- It should provide consistent results when used by staff from a variety of roles or professions.
- It should be capable of assessing a broad range of risks including clinical, health and safety, financial risks, and reputation.
- It should be simple for NHS trusts to adapt to meet their specific needs.

This guidance can be used on its own as a tool for introducing risk assessments in an NHS organisation, or for improving consistency or scope of risk assessments already in place in NHS organisations and for training purposes.

It is, however, strongly recommended that where elements of this guidance are to be used as part of an organisation-wide risk assessment system, the guidance is integrated with, or directly referred to within, a Board-approved risk management policy or strategy. In particular, an NHS organisation should use this guidance only within the framework of its strategic risk appetite and risk management decision-making process.

An MS Word version of the model matrix (page 13) is available at:  
**[www.npsa.nhs.uk](http://www.npsa.nhs.uk)**

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## Guidance on consequence scoring

When undertaking a risk assessment, the consequence or 'how bad' the risk being assessed is must be measured. In this context, consequence is defined as: the outcome or the potential outcome of an event. Clearly, there may be more than one consequence of a single event.

Note that consequence scores can also be used to rate the severity of incidents, and there are some advantages to having identical or at least parallel scoring systems for risk and incidents. This document does not give detailed guidelines on incident scoring, but gives a brief explanation of how this scoring system can be used for scoring incidents (page 12).

Consequences can be assessed and scored using qualitative and quantitative data.\* Wherever possible, consequences should be assessed against objective definitions across different domains (see table 1a on page 6 for examples of domains) to ensure consistency in the risk assessment process. Despite defining consequence as objectively as possible, it is inevitable that scoring the consequences of some risks will involve a degree of subjectivity. It is important that effective, practical-based training and use of relevant examples form a part of the implementation of any risk assessment system to maximise consistency of scoring across the organisation.

The information in table 1a (page 6) should be used to obtain a consequence score. First define the risk(s) explicitly in terms of the adverse consequence(s) that might arise from the risk being assessed. Then use table 1a to determine the consequence score(s) for the potential adverse outcome(s) relevant to the risk being evaluated. The examples given in table 1a are not exhaustive, and the table used by an NHS organisation should reflect its nature and needs, and the activity being studied.

### **How to use consequence table 1a**

Choose the most appropriate domain for the identified risk from the left hand side of the table. Then work along the columns in the same row to assess the severity of the risk on the scale of 1–5 to determine the consequence score, which is the number given at the top of the column.

\*Defined by the NHS trusts.

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## Consequence scoring

1	Negligible
2	Minor
3	Moderate
4	Major
5	Catastrophic

The examples shown in table 1a are illustrative only and individual organisations may give their own. Many issues need to be factored into the assessment of consequence. Some of these are:

- Does the organisation have a clear definition of what constitutes a minor injury?
- What measures are being used to determine psychological impact on individuals?
- What is defined as an adverse event and how many individuals may be affected?

A single risk area may have multiple potential consequences, and these may require separate assessment. It is also important to consider from whose perspective the risk is being assessed (organisation, member of staff, patient) because this may affect the assessment of the risk itself, its consequences and the subsequent action taken.

NHS organisations implementing these guidelines may benefit from having more detailed definitions or examples for each consequence score. Table 1b (page 7) shows a number of examples for use a local level to exemplify various levels of consequence under the domain that covers the impact of the risk on the safety of patients, staff or public.<sup>†</sup>

Trusts should consider including more examples in any of the consequence categories if it is felt that extra guidance may be required within the trust's risk assessment procedures, for training purposes or both.

<sup>†</sup>For a more comprehensive view with regards to examples for the varying descriptors, see *Making it Work – Guidance for Risk Managers on Designing and Using a Risk Matrix* (2004).<sup>5</sup>

**Table 1a Assessment of the severity of the consequence of an identified risk: domains, consequence scores and examples of the score descriptors**

	Consequence score (severity levels) and examples of descriptors				
	1	2	3	4	5
Domains	Negligible	Minor	Moderate	Major	Catastrophic
<b>Impact on the safety of patients, staff or public (physical/psychological harm)</b>	Minimal injury requiring no/minimal intervention or treatment No time off work required	Minor injury or illness requiring minor intervention Requiring time off work for <3 days Increase in length of hospital stay by 1–3 days	Moderate injury requiring professional intervention Requiring time off work for 4–14 days Increase in length of hospital stay by 4–15 days RIDDOR/agency reportable incident An event which impacts on a small number of patients	Major injury leading to long-term incapacity/disability Requiring time off work for >14 days Increase in length of hospital stay by >15 days Mismanagement of patient care with long-term effects	Incident leading to death Multiple permanent injuries or irreversible health effects An event which impacts on a large number of patients
<b>Quality/complaints/audit</b>	Peripheral element of treatment or service sub-optimal Informal complaint/inquiry	Overall treatment or service sub-optimal Formal complaint (stage 1) Local resolution Single failure to meet internal standards Minor implications for patient safety if unresolved Reduced performance rating if unresolved	Treatment or service has significantly reduced effectiveness Formal complaint (stage 2) Local resolution (with potential to go to independent review) Repeated failure to meet internal standards Major patient safety implications if findings are not acted on	Non-compliance with national standards with significant risk to patients if unresolved Multiple complaints/independent review Low performance rating Critical report	Incident leading to totally unacceptable level or quality of treatment/service Gross failure of patient safety if findings not acted on Inquest/ombudsman inquiry Gross failure to meet national standards
<b>Human resources/organisational development/staffing/competence</b>	Short-term low staffing level that temporarily reduces service quality (<1 day)	Low staffing level that reduces service quality	Late delivery of key objective/service due to lack of staff Unsafe staffing level or competence (>1day) Low staff morale Poor staff attendance for mandatory/key training	Uncertain delivery of key objective/service due to lack of staff Unsafe staffing level or competence (>5 days) Loss of key staff Very low staff morale No staff attendance for mandatory/key training	Non-delivery of key objective/service due to lack of staff Ongoing unsafe staffing levels or competence Loss of several key staff No staff attending mandatory training/key training on an ongoing basis
<b>Statutory duty/inspections</b>	No or minimal impact or breach of guidance/statutory duty	Breach of statutory legislation Reduced performance rating if unresolved	Single breach in statutory duty Challenging external recommendations/improvement notice	Enforcement action Multiple breaches in statutory duty Improvement notices Low performance rating Critical report	Multiple breaches in statutory duty Prosecution Complete systems change required Zero performance rating Severely critical report
<b>Adverse publicity/reputation</b>	Rumours Potential for public concern	Local media coverage – short-term reduction in public confidence Elements of public expectation not being met	Local media coverage – long-term reduction in public confidence	National media coverage with <3 days service well below reasonable public expectation	National media coverage with >3 days service well below reasonable public expectation. MP concerned (questions in the House) Total loss of public confidence
<b>Business objectives/projects</b>	Insignificant cost increase/schedule slippage	<5 per cent over project budget Schedule slippage	5–10 per cent over project budget Schedule slippage	Non-compliance with national 10–25 per cent over project budget Schedule slippage Key objectives not met	Incident leading >25 per cent over project budget Schedule slippage Key objectives not met
<b>Finance including claims</b>	Small loss Risk of claim remote	Loss of 0.1–0.25 per cent of budget Claim less than £10,000	Loss of 0.25–0.5 per cent of budget Claim(s) between £10,000 and £100,000	Uncertain delivery of key objective/Loss of 0.5–1.0 per cent of budget Claim(s) between £100,000 and £1 million Purchasers failing to pay on time	Non-delivery of key objective/loss of >1 per cent of budget Failure to meet specification/slippage Loss of contract/payment by results Claim(s) >£1 million
<b>Service/business interruption Environmental impact</b>	Loss/interruption of >1 hour Minimal or no impact on the environment	Loss/interruption of >8 hours Minor impact on environment	Loss/interruption of >1 day Moderate impact on environment	Loss/interruption of >1 week Major impact on environment	Permanent loss of service or facility Catastrophic impact on environment

**Table 1b Consequence scores (additional guidance and examples relating to risks impacting on the safety of patients, staff or public)**

	Consequence score (severity levels) and examples of descriptors				
	1	2	3	4	5
Domains	Negligible	Minor	Moderate	Major	Catastrophic
<b>Impact on the safety of patients, staff or public (physical/psychological harm)</b>	Minimal injury requiring no/minimal intervention or treatment No time off work	Minor injury or illness requiring minor intervention Requiring time off work for <3 days Increase in length of hospital stay by 1–3 days	Moderate injury requiring professional intervention Requiring time off work for 4–14 days Increase in length of hospital stay by 4–15 days RIDDOR/agency reportable event An event which impacts on a small number of patients	Major injury leading to long-term incapacity/disability Requiring time off work for >14 days Increase in length of hospital stay by >15 days Mismanagement of patient care with long-term effects	Incident leading to death Multiple permanent injuries or irreversible health effects An event which impacts on a large number of patients
<b>Additional examples</b>	Incorrect medication dispensed but not taken Incident resulting in a bruise/graze Delay in routine transport for patient	Wrong drug or dosage administered, with no adverse effects Physical attack such as pushing, shoving or pinching, causing minor injury Self-harm resulting in minor injuries Grade 1 pressure ulcer Laceration, sprain, anxiety requiring occupational health counselling (no time off work required)	Wrong drug or dosage administered with potential adverse effects Physical attack causing moderate injury Self-harm requiring medical attention Grade 2/3 pressure ulcer Healthcare-acquired infection (HCAI) Incorrect or inadequate information /communication on transfer of care Vehicle carrying patient involved in a road traffic accident Slip/fall resulting in injury such as a sprain	Wrong drug or dosage administered with adverse effects Physical attack resulting in serious injury Grade 4 pressure ulcer Long-term HCAI Retained instruments/ material after surgery requiring further intervention Haemolytic transfusion reaction Slip/fall resulting in injury such as dislocation/fracture/blow to the head Loss of a limb Post-traumatic stress disorder Failure to follow up and administer vaccine to baby born to a mother with hepatitis B	Unexpected death Suicide of a patient known to the service in the past 12 months Homicide committed by a mental health patient Large-scale cervical screening errors Removal of wrong body part leading to death or permanent incapacity Incident leading to paralysis Incident leading to long-term mental health problem Rape/serious sexual assault

## Guidance on likelihood scoring

Once a specific area of risk has been assessed and its consequence score agreed, the likelihood of that consequence occurring can be identified by using table 2 below. Note that the table is intended as guidance and trusts are encouraged to populate the table with their own probability and frequency descriptions. As with the assessment of 'consequence', the likelihood of a risk occurring is assigned a number from '1' to '5': the higher the number the more likely it is the consequence will occur:

- 1 Rare
- 2 Unlikely
- 3 Possible
- 4 Likely
- 5 Almost certain

When assessing likelihood, it is important to take into consideration the controls already in place. The likelihood score is a reflection of how likely it is that the adverse consequence described will occur. Likelihood can be scored by considering:

- frequency (how many times will the adverse consequence being assessed actually be realised?)
- or
- probability (what is the chance the adverse consequence will occur in a given reference period?).

**Table 2 Likelihood scores (broad descriptors of frequency)**

Likelihood score	1	2	3	4	5
Descriptor	Rare	Unlikely	Possible	Likely	Almost certain
Frequency How often might it/does it happen	This will probably never happen/recur	Do not expect it to happen/recur but it is possible it may do so	Might happen or recur occasionally	Will probably happen/recur, but it is not a persisting issue/circumstances	Will undoubtedly happen/recur, possibly frequently

Table 2 provides definitions of descriptors that can be used to score the likelihood of a risk being realised by assessing frequency.



**Table 3 Likelihood scores (time-framed descriptors of frequency)**

Likelihood score	1	2	3	4	5
Descriptor	Rare	Unlikely	Possible	Likely	Almost certain
Frequency	Not expected to occur for years	Expected to occur at least annually	Expected to occur at least monthly	Expected to occur at least weekly	Expected to occur at least daily

It is possible to use more quantitative descriptions for frequency by considering how often the adverse consequence being assessed will be realised. For example, when assessing the risk of staff shortages on a ward, the likelihood of it occurring could be assessed as expected to occur daily or even weekly depending on staffing levels. However, if staff shortages are unlikely it could be graded as expected to occur annually. A simple set of time-framed definitions for frequency is shown above in table 3.

However, frequency is not a useful way of scoring certain risks, especially those associated with the success of time-limited or one-off projects such as a new IT system that is being delivered as part of a three-year programme or business objectives. For these kinds of risks, the likelihood score cannot be based on how often the consequence will materialise. Instead, it must be based on the probability that it will occur at all in a given time period. In other words, a three-year IT project cannot be expected to fail 'once a month', and the likelihood score will need to be assessed on the probability of adverse consequences occurring within the project's time frame.

With regard to achieving a national target, the risk of missing the target will be based on the time left during which the target is measured. A trust might have assessed the probability of missing a key target as being quite high at the beginning of the year, but nine months later, if all the control measures have been effective, there is a much reduced probability of the target not being met.

This is why specific 'probability' scores have been developed for projects and business objectives (see table 4, below). Essentially, likelihood scores based on probability have been developed from project risk assessment tools from across industry.<sup>1</sup> The vast majority of these agree that any project which is more likely to fail than succeed (that is, the chance of failing is greater than 50 per cent) should be assigned a score of 5.

**Table 4 Likelihood scores (probability descriptors)**

Likelihood score	1	2	3	4	5
Descriptor	Rare	Unlikely	Possible	Likely	Almost certain
Probability Will it happen or not?	<0.1 per cent	0.1–1 per cent	1–10 per cent	10–50 per cent	>50 per cent

Table 4 can be used to assign a probability score for risks relating to time-limited or one-off projects or business objectives. If it is not possible to determine a numerical probability, the probability descriptions can be used to determine the most appropriate score.

## Risk scoring and grading

- 1 Define the risk(s) explicitly in terms of the adverse consequence(s) that might arise from the risk.
- 2 Use table 1a to determine the consequence score(s) (C) for the potential adverse outcome(s) relevant to the risk being evaluated.
- 3 Use table 2 to determine the likelihood score(s) (L) for those adverse outcomes. If possible, score the likelihood by assigning a predicted frequency of occurrence of the adverse outcome. If this is not possible, assign a probability to the adverse outcome occurring within a given time frame, such as the lifetime of a project or a patient care episode. If a numerical probability cannot be determined, use the probability descriptions to determine the most appropriate score.
- 4 Calculate the risk score by multiplying the consequence by the likelihood:  $C \text{ (consequence)} \times L \text{ (likelihood)} = R \text{ (risk score)}$

The risk matrix in table 5 shows both numerical scoring and colour bandings. A trust's risk management policy or strategy should be used to identify the level at which the risk will be managed in the trust, assign priorities for remedial action, and determine whether risks are to be accepted, on the basis of the colour bandings and/or risk score.

**Table 5 Risk matrix**

	Likelihood				
Consequence	1	2	3	4	5
	Rare	Unlikely	Possible	Likely	Almost certain
<b>5 Catastrophic</b>	5	10	15	20	25
<b>4 Major</b>	4	8	12	16	20
<b>3 Moderate</b>	3	6	9	12	15
<b>2 Minor</b>	2	4	6	8	10
<b>1 Negligible</b>	1	2	3	4	5

For grading risk, the scores obtained from the risk matrix are assigned grades as follows:

<span style="display: inline-block; width: 10px; height: 10px; background-color: #808000; border: 1px solid black;"></span> 1–3	Low risk
<span style="display: inline-block; width: 10px; height: 10px; background-color: #FFFF00; border: 1px solid black;"></span> 4–6	Moderate risk
<span style="display: inline-block; width: 10px; height: 10px; background-color: #FFA500; border: 1px solid black;"></span> 8–12	High risk
<span style="display: inline-block; width: 10px; height: 10px; background-color: #FF0000; border: 1px solid black;"></span> 15–25	Extreme risk

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This model risk matrix has the following advantages:

- NHS trusts are familiar with a five by five matrix.
- It is simple yet flexible, and therefore lends itself to adaptability.
- It is based on simple mathematical formulae and is ideal for use in spreadsheets.
- Equal weighting of consequence and likelihood prevents disproportionate effort directed at highly unlikely but high consequence risks. This should clearly illustrate the effectiveness of risk treatment.
- There are four colour bandings for categorising risk, which may be useful for some trusts.
- Even if the boundaries of risk categorisation are changed, trusts will still be able to compare 'scores' to monitor whether risks are being evaluated in a similar manner.

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## Relationship with incident scoring

One of the features of the risk scoring system described here is that it includes a mechanism for directly scoring the consequence of an adverse event. When assessing risks, the consequence score is used to grade the consequence of events that might occur because of the risk in question. However, consequence scores can directly be used to grade incidents. It makes sense for a trust to use the same definitions, terminology and grading systems for both potential and actual incidents.

A certain amount of care is required when applying a likelihood score to an incident. A simple example is that of patient falls whilst mobilising. Following a serious fall, the severity of the incident could well be scored as 4. It may be that a particular trust may experience patient falls (whilst the patient is mobilising) on a weekly basis (giving a likelihood score of 4). So there is a danger that the incident might be given an overall score of 16 (4 × 4) which could make the incident a 'red' incident (see the model risk matrix). This would not accurately reflect the overall seriousness of the incident or the magnitude of the underlying risk.

A more detailed analysis might show that although falls do occur weekly, more serious injuries (consequence score 4) only occur once or twice a year. In the main most of the other falls have relatively minor outcomes (consequence score 2).

The incident can then be scored either according to the severity of the actual outcome that is,  $C = 4$  but  $L = 2$  because serious incidents are unlikely, or according to the most likely or typical outcome for that type of incident ( $C = 2$ ,  $L = 4$  because it is minor incidents occurring weekly). Both of these scoring methods give a final score of 8.

Both approaches are valid, however it is recommended that the approach used should be consistent across the trust.

## Conclusion

As the NHS makes progress embedding risk management into its governance arrangements, it has become more important than ever to make risk assessment easier and more consistent. It is essential that risks can be rated in a common currency within NHS trusts, allowing financial, operational and clinical risks to be compared against each other and prioritised. Lastly, individual NHS trusts should be confident that their tools for assessing risk can be used easily and consistently by a range of different professionals.

The NPSA has therefore produced this guidance to provide a risk matrix that can be adapted and incorporated into any NHS organisation's risk management system. It is intended that this guidance is used as framework around which a detailed risk assessment process can be developed and incorporated into the overall risk management policy or strategy of a trust.

Finally, it is recommended that trusts share risk management processes with neighbouring NHS trusts, partners, etc. It is important that partners working closely understand each other's key risks and priorities. However, more than that, once partners are using risk assessment tools based on a common scoring system (even when locally adapted), the NHS will be able to take the next step towards developing cross-organisational integrated risk management systems and each trust will respond to their partner(s)' key risks as they do to their own.

# Model matrix

**Table 1 Consequence scores**

Choose the most appropriate domain for the identified risk from the left hand side of the table Then work along the columns in same row to assess the severity of the risk on the scale of 1–5 to determine the consequence score, which is the number given at the top of the column. An MS Word version of this model matrix is available at [www.npsa.nhs.uk](http://www.npsa.nhs.uk)

	Consequence score (severity levels) and examples of descriptors				
	1	2	3	4	5
Domains	Negligible	Minor	Moderate	Major	Catastrophic
<b>Impact on the safety of patients, staff or public (physical/psychological harm)</b>	Minimal injury requiring no/minimal intervention or treatment No time off work	Minor injury or illness, requiring minor intervention Requiring time off work for <3 days Increase in length of hospital stay by 1–3 days	Moderate injury requiring professional intervention Requiring time off work for 4–14 days Increase in length of hospital stay by 4–15 days RIDDOR/agency reportable incident An event which impacts on a small number of patients	Major injury leading to long-term incapacity/disability Requiring time off work for >14 days Increase in length of hospital stay by >15 days Mismanagement of patient care with long-term effects	Incident leading to death Multiple permanent injuries or irreversible health effects An event which impacts on a large number of patients
<b>Quality/complaints/audit</b>	Peripheral element of treatment or service sub-optimal Informal complaint/inquiry	Overall treatment or service suboptimal Formal complaint (stage 1) Local resolution Single failure to meet internal standards Minor implications for patient safety if unresolved Reduced performance rating if unresolved	Treatment or service has significantly reduced effectiveness Formal complaint (stage 2) complaint Local resolution (with potential to go to independent review) Repeated failure to meet internal standards Major patient safety implications if findings are not acted on	Non-compliance with national standards with significant risk to patients if unresolved Multiple complaints/independent review Low performance rating Critical report	Totally unacceptable level or quality of treatment/service Gross failure of patient safety if findings not acted on Inquest/ombudsman inquiry Gross failure to meet national standards
<b>Human resources/organisational development/staffing/competence</b>	Short-term low staffing level that temporarily reduces service quality (< 1 day)	Low staffing level that reduces the service quality	Late delivery of key objective/service due to lack of staff Unsafe staffing level or competence (>1 day) Low staff morale Poor staff attendance for mandatory/key training	Uncertain delivery of key objective/service due to lack of staff Unsafe staffing level or competence (>5 days) Loss of key staff Very low staff morale No staff attending mandatory/ key training	Non-delivery of key objective/service due to lack of staff Ongoing unsafe staffing levels or competence Loss of several key staff No staff attending mandatory training /key training on an ongoing basis
<b>Statutory duty/inspections</b>	No or minimal impact or breach of guidance/statutory duty	Breach of statutory legislation Reduced performance rating if unresolved	Single breach in statutory duty Challenging external recommendations/improvement notice	Enforcement action Multiple breaches in statutory duty Improvement notices Low performance rating Critical report	Multiple breaches in statutory duty Prosecution Complete systems change required Zero performance rating Severely critical report
<b>Adverse publicity/reputation</b>	Rumours Potential for public concern	Local media coverage – short-term reduction in public confidence Elements of public expectation not being met	Local media coverage – long-term reduction in public confidence	National media coverage with <3 days service well below reasonable public expectation	National media coverage with >3 days service well below reasonable public expectation. MP concerned (questions in the House) Total loss of public confidence
<b>Business objectives/projects</b>	Insignificant cost increase/schedule slippage	<5 per cent over project budget Schedule slippage	5–10 per cent over project budget Schedule slippage	Non-compliance with national 10–25 per cent over project budget Schedule slippage Key objectives not met	Incident leading >25 per cent over project budget Schedule slippage Key objectives not met
<b>Finance including claims</b>	Small loss Risk of claim remote	Loss of 0.1–0.25 per cent of budget Claim less than £10,000	Loss of 0.25–0.5 per cent of budget Claim(s) between £10,000 and £100,000	Uncertain delivery of key objective/Loss of 0.5–1.0 per cent of budget Claim(s) between £100,000 and £1 million Purchasers failing to pay on time	Non-delivery of key objective/ Loss of >1 per cent of budget Failure to meet specification/ slippage Loss of contract / payment by results Claim(s) >£1 million
<b>Service/business interruption Environmental impact</b>	Loss/interruption of >1 hour Minimal or no impact on the environment	Loss/interruption of >8 hours Minor impact on environment	Loss/interruption of >1 day Moderate impact on environment	Loss/interruption of >1 week Major impact on environment	Permanent loss of service or facility Catastrophic impact on environment

## Table 2 Likelihood score (L)

What is the likelihood of the consequence occurring?

The frequency-based score is appropriate in most circumstances and is easier to identify. It should be used whenever it is possible to identify a frequency.

Likelihood score	1	2	3	4	5
Descriptor	Rare	Unlikely	Possible	Likely	Almost certain
Frequency How often might it/does it happen	This will probably never happen/recur	Do not expect it to happen/recur but it is possible it may do so	Might happen or recur occasionally	Will probably happen/recur but it is not a persisting issue	Will undoubtedly happen/recur, possibly frequently

Note: the above table can be tailored to meet the needs of the individual organisation.

Some organisations may want to use probability for scoring likelihood, especially for specific areas of risk which are time limited. For a detailed discussion about frequency and probability see the guidance notes.

## Table 3 Risk scoring = consequence × likelihood (C × L)

	Likelihood				
Consequence	1	2	3	4	5
	Rare	Unlikely	Possible	Likely	Almost certain
5 Catastrophic	5	10	15	20	25
4 Major	4	8	12	16	20
3 Moderate	3	6	9	12	15
2 Minor	2	4	6	8	10
1 Negligible	1	2	3	4	5

Note: the above table can be adapted to meet the needs of the individual trust.

For grading risk, the scores obtained from the risk matrix are assigned grades as follows:

■ 1–3	Low risk
■ 4–6	Moderate risk
■ 8–12	High risk
■ 15–25	Extreme risk

### Instructions for use

- 1 Define the risk(s) explicitly in terms of the adverse consequence(s) that might arise from the risk.
- 2 Use table 1 (page 13) to determine the consequence score(s) (C) for the potential adverse outcome(s) relevant to the risk being evaluated.
- 3 Use table 2 (above) to determine the likelihood score(s) (L) for those adverse outcomes. If possible, score the likelihood by assigning a predicted frequency of occurrence of the adverse outcome. If this is not possible, assign a probability to the adverse outcome occurring within a given time frame, such as the lifetime of a project or a patient care episode. If it is not possible to determine a numerical probability then use the probability descriptions to determine the most appropriate score.
- 4 Calculate the risk score the risk multiplying the consequence by the likelihood:  
C (consequence) × L (likelihood) = R (risk score)
- 5 Identify the level at which the risk will be managed in the organisation, assign priorities for remedial action, and determine whether risks are to be accepted on the basis of the colour bandings and risk ratings, and the organisation's risk management system. Include the risk in the organisation risk register at the appropriate level.

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## Acknowledgements

**For more information, or if you want to provide feedback, contact Aly Hulme, Patient Safety Manager/Risk Matrix Project Lead, NPSA (aly.hulme@npsa.nhs.uk)**

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## Definitions

**Risk management** is the assessment, analysis and management of risks. It is simply a way of recognising which events (hazards) may lead to harm in the future, and minimising their likelihood of occurrence (how often?) and consequence(s) (how bad?).

An **adverse event** is any event or circumstance leading to unintentional harm or suffering.

A **patient safety incident** is any unintended or unexpected incident which could have harmed or did lead to harm for one or more patients receiving healthcare. It is a specific type of adverse event.

**Acceptable/tolerable risk** is defined based on the following principles.

- Tolerability does not mean acceptability. It refers to a willingness to live with risk to secure certain benefits, but with the confidence that it is being properly controlled. To tolerate risk does not mean to disregard it, but rather that it is reviewed with the aim of reducing further risk.
- No person should be exposed to serious risk unless they agree to accept the risk.
- It is reasonable to accept a risk that under normal circumstances would be unacceptable if the risk of all other alternatives, including nothing, is even greater.

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## References

1. BSI British Standards. *Risk Management Vocabulary – Guidelines for Use in Standards*. (2002). PD ISO/IEC guide 73:2002.
2. Institute of Risk Management. Association of Insurance and Risk Managers (AIRMIC) and the National Forum for Risk Management in the Public Sector (ALARM). *Risk Management Standard*. (2002) AIRMIC, London. Available at <http://www.airmic.com/>
3. Department of Health. *Assurance: The Board Agenda*. (2002) Department of Health, Crown Copyright, London.
4. Health and Safety Executive. *Management of Health and Safety at Work: Approved Code of Practice*. (1999). Health and Safety Executive, London.
5. Standards Australia. *Guidelines for Managing Risk in Healthcare*. (2000) Standards Australia International, Sydney.
6. Controls Assurance Support Unit. *Making it Work – Guidance for Risk Managers on Designing and Using a Risk Matrix*. (2004). Risk management working group (now known as the Health Care Standards Unit), Keele University, Keele, UK.

## Further reading

Australian/New Zealand Standard. Risk Management: AS/NZS 4360 1999: Copyright Standards Association of Australia.(1999). Strathfield, New South Wales. Australia.Birch K, Scrivens E. *Developing an Assurance Framework in Primary Care Trusts*. CASU Working Paper 5. (2003) Controls Assurance Support Unit, Keele University, Keele, Staffordshire UK.

Department of Health. *HSC Governance in the new NHS: Controls Assurance Statements 1999/2000*. (1999) Crown Copyright, London.

Wilde K, Scrivens E. *Survey of the Controls Assurance Process 2000/1 and Related Issues in NHS Trusts Providing Acute Services*. CASU Working Paper 4. (2003) Controls Assurance Support Unit, Keele University, Keele, Staffordshire, UK.



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## Risk matrix and related material reviewed for this guidance

Alcan Packaging. Risk Matrix Example. Available at: **[www.publications.alcan.com/sustainability/en/actions/matrix.pdf](http://www.publications.alcan.com/sustainability/en/actions/matrix.pdf)**

Australian/ New Zealand Standard. Risk Management: AS/NZS 4360 1999. (1999) Copyright Standards Association of Australia, Strathfield, New South Wales, Australia.

Department for Environment, Food and Rural affairs (DEFRA). Available at: **[www.defra.gov.uk](http://www.defra.gov.uk)**

Department of Environment, Transport and the Regions. *Guidelines for Environmental Risk Assessment and Management*. (2000). DETR, London.

Ministry of Agriculture, Fisheries and Food. *Flood and Coastal Defence Project Appraisal Guidance: approaches to risk*. (2000). MAFF, London.

Monash University. Risk Management. Available at: **[www.adm.monash.edu.au/audit/risk](http://www.adm.monash.edu.au/audit/risk)**

Northern Ireland Department of Health, Social Services and Public Safety. How to Classify Incidents and Risk. A guidance document. Contact **[Heather.Shepherd@dhsspsni.gov.uk](mailto:Heather.Shepherd@dhsspsni.gov.uk)**

NPSA Pilot stage – a risk assessment tool for assessing the level of incident investigation. (2002). M Dineen at Consequence

NPSA. *Healthcare Risk Assessment Made Easy*. (2007).  
**Available at : [www.npsa.nhs.uk](http://www.npsa.nhs.uk)**

Oxleas NHS Trust. Classification of incidents/accidents.  
Contact **[Susan.Owen@oxleas.nhs.uk](mailto:Susan.Owen@oxleas.nhs.uk)**

Pontypridd and Rhondda NHS trust. Risk Matrix.  
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Taunton and Somerset NHS Trust. Risk Matrix.  
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Walsall Hospitals NHS Trust. Risk Matrix.  
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Worcester Acute NHS Trust. Risk Matrix.  
Contact **[Chris.Rawlings@worcsacute.wmids.nhs.uk](mailto:Chris.Rawlings@worcsacute.wmids.nhs.uk)**

Zurich. Zurich Strategic Risk. Available at: **[www.zurichstrategicrisk.com](http://www.zurichstrategicrisk.com)**

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