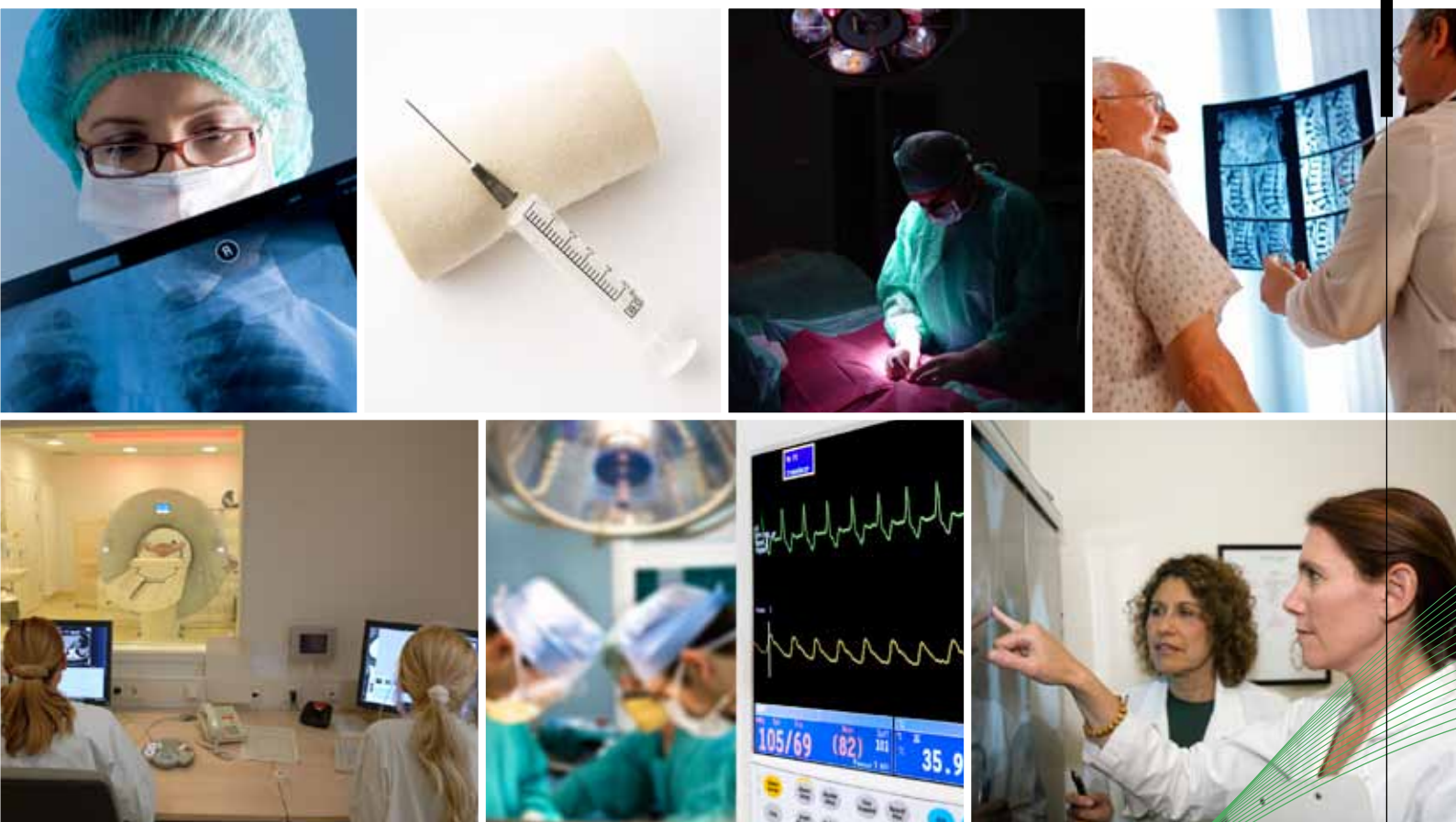


Occupational health and safety risks in the healthcare sector

Guide to prevention and good practice

Social Europe



European Commission

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Occupational health and safety risks in the healthcare sector



European Commission

Directorate-General for Employment, Social Affairs and Inclusion

Unit B.3

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Preamble

About 10 % of workers in the European Union belong to the health and welfare sector, and many of them work in hospitals. These workers may be exposed to a very wide variety of risks. EU legislation on health and safety at work currently covers most of these risks — nevertheless, the combination of such diverse risks arising at the same time and the fact that this is clearly a high-risk sector have given rise to a debate on the need for a specific approach in order to improve the protection of the health and safety of hospital personnel at Union level.

All the considerations and any measures designed to improve the health and safety of hospital personnel can be extended to workers in the health sector in general.

Background

In November 2001, a first meeting was held with the representatives of the Member States' governments to discuss the situation in their countries and the initial positions on the question of possible Community measures aimed at improving occupational health and safety in the hospital sector. It was considered appropriate to start with contacts with government representatives because it was felt important to have an overview of the particular situation concerning occupational health and safety in healthcare establishments in the EU and the implementation of the Community provisions in force in this area.

During the meeting, the participants particularly welcomed the Commission's initiative to launch a debate on the situation in a sector which employs a high percentage of the EU's working population and where the workers are exposed to a large number of different types of concomitant risks (infections, chemical agents, carcinogens, musculoskeletal disorders, accidents, radiation, etc.). The participants were unanimous in their view that, although new specific Community legislation for the hospital sector does not seem necessary at present, the adoption of other, non-legislative measures, such as a recommendation and the production at Community level of guides to good practice for this sector, would be a very positive and necessary step. Particular importance was also attached to the dissemination of information and the exchange of experience in this area, especially via the European Agency for Health and Safety at Work (EU-OSHA), based in Bilbao.

It was also felt that the creation of an ad hoc group on 'Health and safety in the hospital sector' within the Advisory Committee would make it possible to continue the analysis of possible Community measures within a tripartite context. The ad hoc group was also tasked with preparing a draft opinion for the consideration of the Advisory Committee on possible Community measures to improve protection of the health and safety of workers in the hospital sector.

The working party adopted a draft opinion which was presented for discussion and later adopted by the committee. The committee was of the opinion that there are a number of possible initiatives that could be taken at Community level. Having discussed the various options available, the committee agreed that all occupational health and safety risks within the healthcare sector are already adequately covered by the framework directive, Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work ⁽¹⁾, and other health and safety at work directives.

⁽¹⁾ OJ L 183, 29.6.1989, pp. 1-8.

Furthermore, the Committee agreed that priority should be given to the production, at Community level, of a guide to prevention and good practice for hospital workers, focusing on the most significant risks in the sector, especially:

- a) biological agents
- b) musculoskeletal disorders
- c) psychosocial disorders, and
- d) chemical agents.

These risk groups are being targeted from the occupational health and safety perspective, and exclude all public health considerations except where these impinge on health and safety. Other potential risks have been excluded from the guide since they already fall within the scope of other European Union legislation in force.

The guide to prevention and good practice has been designed and produced as a very practical, easily understood tool that can be used as the basis for initial and periodic training measures for hospital personnel. The guide takes account, in particular, of the latest technical and scientific knowledge available in the field of prevention, as well as the guides and good-quality materials already existing at national level, together with the information available via EU-OSHA.

When describing the applicable measures, the guide follows the hierarchical methods of prevention outlined in Council Directive 89/391/EEC.

Special attention is given to vulnerable groups working within the sector — pregnant workers, the young, the old and migrant workers, and where appropriate, specific preventive and protective measures are mentioned in respect of these groups.

Introduction and vision

This guide to prevention and good practice in the healthcare sector aims at improving health and safety standards in health institutions in the EU.

Occupational health and safety (OSH) issues are an important part of quality management, risk management and corporate social responsibility (CSR). In this sense, OSH aspects must be an integrated element of all managerial development processes, i.e. corporate strategy, human resources and organisational development.

The basis of the vision regarding better, healthier and more competitive workplaces is to create a corporate culture where managers and workers (as experts on their workplaces) discuss work processes together in a continuous improvement process including all related risks and possible measures for improvements. Such a positive corporate culture is the core for the sustainable development and success of health institutions.

This guide introduces the foundation on which appropriate health and safety systems may be built. It offers orientation to non-specialists in this field about the scope of action. However, it does not provide in-depth knowledge about certain measures and methods of prevention. A list of Internet links at the end of each chapter refers to further and more detailed information as well as specific instruments. The guide addresses both employers and healthcare workers about occupational risks which occur in the healthcare sector.

The user will find information on the nature of risks and the methods of risk assessment, and recommendations on measures and training options to prevent adverse health effects. Furthermore, this guide gives workers and employers clear information about good practices aimed at preventing the risks covered.

The guide is based on the European Union directives obligatory for all Member States. Therefore, the user has to bear in mind that there may be stricter regulations at national level which also have to be taken into account.

1

Prevention and health promotion as a management task

Workplace-related health impairments, injuries and illnesses cause great human suffering and incur high costs, both for those affected and for society as a whole. Occupational health and safety measures and health promotion in workplaces are aimed at preventing this. But, in addition to protecting workers from harm, this guide wants to show managers in the healthcare system how to achieve a health-promoting hospital or facility according to the World Health Organisation (WHO) definition of health. This defines health as a state of complete physical, mental and social well-being, as well as the empowerment of individuals to use their own health potential and to deal successfully with the demands of their environment.

Such pronounced health competence among workers can only be achieved if a prevention culture prevails in the company which systematically allows for health-related aspects in all company matters. Management is not only responsible for the implementation of health-promoting measures in the company in the sense of circumstantial prevention. Above all, it also has to set an example in terms of its own conduct. As a result, it has a crucial impact on the corporate culture and initiates changes at the behaviour level among the workers.

Therefore, occupational health and safety must be seen as an important corporate goal of the organisation, like quality, customer satisfaction, productivity, growth and profitability. Safe and healthy working conditions for workers can be achieved more efficiently if the implementation of occupational health and safety is integrated into a quality management system. Risk assessment is an ongoing process and has to be repeated frequently, and the results have to be documented and integrated into the strategic planning by the management.

Definition of occupational health and safety ⁽²⁾

In 1950, the Joint ILO/WHO Committee on Occupational Health stated that “Occupational health should aim at the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities”. In summary: “the adaptation of work to man, and of each man to his job.”

Statutory European Union specifications

According to Article 153 of the Treaty on the Functioning of the European Union, the Union shall support and complement the activities of the Member States in the following fields:

- a) improvement in particular of the working environment to protect workers’ health and safety;
- b) working conditions;
- c) social security and social protection of workers;
- d) protection of workers where their employment contract is terminated;
- e) informing and consulting workers.

⁽²⁾ Stellman, J. M. (ed.), *ILO Encyclopaedia of Occupational Health and Safety*, Vol. 1:16.1–16.62, International Labour Organisation, Geneva, 1998.

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in health and safety of workers at work laid down minimum regulations which promote the improvement of, in particular, the working environment in order to give greater protection to the health and safety of workers⁽³⁾. The specific requirements of the directive will be referred to in detail later in the guide. The directive has been implemented in national legislation that may include additional requirements.

Employers are required to assess risks and take practical measures to protect the health and safety of their workers, keep accident records, provide information and training, consult employees and cooperate and coordinate measures with contractors.

Preventive and protective measures should be implemented in the following order of priority:⁽⁴⁾

- elimination of the hazard/risk;
- control of the hazard/risk at source, through the use of engineering controls or organisational measures;
- minimisation of the hazard/risk by the design of safe work systems, which include administrative control measures;
- where residual hazards/risks cannot be controlled by collective measures, provision by the employer of appropriate personal protective equipment, including clothing, at no cost, and implementation of measures to ensure its use and maintenance.

Obligations to implement occupational health and safety measures do not only exist on the employers' side. There is also an obligation for the workers to cooperate in this matter (i.e. taking part in training courses offered, the cooperation of workers and safety representatives). Paragraph 1 of Article 13 of Directive 89/391/EEC states:

'It shall be the responsibility of each worker to take care as far as possible of his own health and safety and that of other persons affected by his acts or omissions at work in accordance with his training and the instructions given by his employer.'

⁽³⁾ Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in health and safety of workers at work, OJ C, 29.6.1989, pp. 1–8.

⁽⁴⁾ 'Guidelines on occupational health and safety management systems', ILO-OSH, Geneva, 2001, p. 11.



A structured approach to management ensures that risks are fully assessed and that safe methods of work are introduced and followed. Periodic reviews ensure that these measures remain appropriate. A typical management model is described below ⁽⁵⁾.

- Policy: sets a clear commitment and objectives, responsibilities and procedures for the organisation.
- Planning: identifies and assesses the risks arising from work activities and how they can be controlled. Activities in the planning process include:
 - » risk assessment and identification of preventive measures;
 - » identifying the management arrangements and organisation needed to exercise control;
 - » identifying training needs;
 - » ensuring that occupational health and safety knowledge, skills and expertise are available.
- Implementation and operation: involves putting plans into practice. This may mean: making changes to the organisation and working procedures, working environment, equipment and products used; training management and staff, and improving communication.
- Checking and corrective action: performance should be monitored. This can be reactive — for example, using accident records — or proactive, for example, through feedback from inspections and audits and from staff surveys. Accident investigations should identify the immediate and underlying causes, including management failings. The aim is to ensure that systems and procedures are working and to immediately take any corrective action needed.
- Management review and audit: allows checking of the management system's overall performance. External circumstances may have changed — for example, new legislation may have been introduced. There is also an opportunity to look forward, for example, to changes in business structure, development of new products or the introduction of new technology. Review of accidents should include learning lessons at management level. Auditing examines whether the policy, organisation and systems are actually achieving the right results.

Occupational health and safety management systems must have the following components

- Constant participation of the workers in determining objectives and measures of occupational health and safety — the employees are the experts for their own workplaces!
- Consultation concerning workers' experience with existing health risks.
- Ideas for improving the assignment of duties, the procedural sequences and the concrete working conditions in the activities and at the workplaces.

Occupational health and safety objectives must be measurable and must be scheduled, and they must conform to the principles mentioned above. The organisation must provide the resources required for implementation — this applies in particular to the naming of individuals with occupational health and safety functions (including release from other duties).

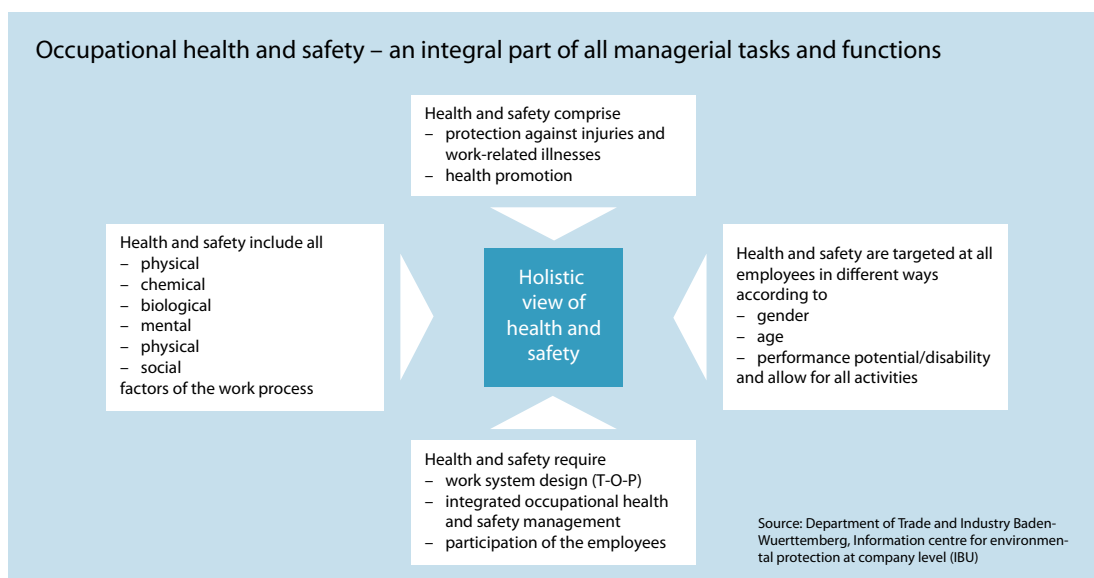
⁽⁵⁾ http://osha.europa.eu/en/topics/accident_prevention

Every organisation should record the following in writing:

- a) the factors triggering a hazard determination and identification;
- b) how hazards are determined and risks assessed;
- c) how results are evaluated;
- d) how necessary measures are laid down and implemented;
- e) how the effectiveness of the measures taken is checked.

It is not only in-house factors that play a role in occupational health and safety — it must also be ensured that products purchased and used by the company meet the occupational health and safety requirements laid down. Furthermore, it must be recorded in writing how any hazardous substances must be handled in everyday routines in the company.

The organisation must collect, record and evaluate appropriate data in order to establish the suitability and effectiveness of occupational health and safety and to be able to initiate improvement measures at an appropriate point.



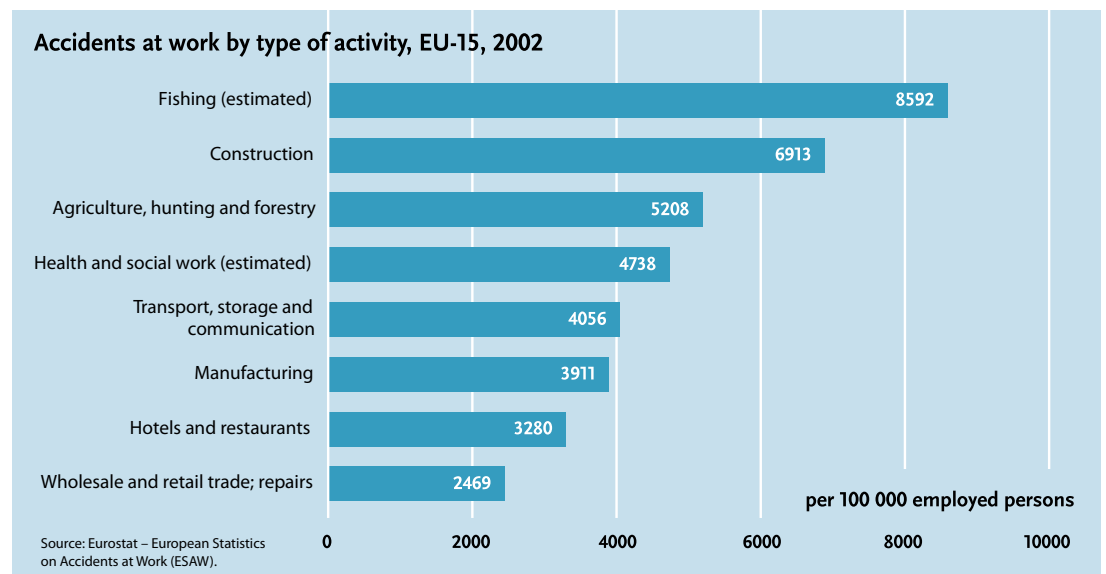
Any assessment of occupational health and safety measures should take into account the following information:

- a) feedback from workers and external occupational health and safety partners;
- b) results of communication with workers;
- c) ways of dealing with changes which may have an impact on the integration of occupational health and safety in quality management;
- d) results of hazard determinations and assessments;
- e) evaluations of accident reports, first aid book entries, suspicion notifications and occupational diseases

Economic benefit and value of occupational health and safety for the competitiveness of facilities

Improvement of health and safety at work is important not only in human terms to reduce workers' pain and suffering but also as a way of ensuring that enterprises are successful and sustainable and that economies thrive in the long term. According to EU-OSHA, every year 142 400 people in the EU die from occupational diseases and 8 900 from work-related accidents. Eurostat data from 2000 show that about 150 million days are lost each year due to accidents at work and 350 million due to other health problems caused by work in the EU-15 Member States ⁽⁶⁾.

In the healthcare sector, the number of accidents at work is rather high compared to other activities:



Systematic information on the costs of accidents at work and other work-related health problems is not available. Therefore, Eurostat carried out a study to develop a pilot model to estimate the costs of accidents at work. These were estimated to have caused costs of EUR 55 billion in the EU-15 in 2000. These are only the costs specified by the companies and most of them (88 %) were due to lost working time (labour costs). The costs relating to the victims are not included ⁽⁷⁾.

⁽⁶⁾ The social situation in the European Union 2005–06, p 114, <http://bookshop.europa.eu/en/the-social-situation-in-the-european-union-2005-2006-pbKEAG06001/>

⁽⁷⁾ Statistical analysis of socio-economic costs of accidents at work in the European Union, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-CC-04-006/EN/KS-CC-04-006-EN.PDF



A study in Germany came to the conclusion that the costs of work-induced illnesses could be estimated at a minimum of EUR 28 billion per annum (estimate based on data for 1998). These costs were at the lower limit on the basis of physical loads and comprised direct costs of EUR 15 billion (treatment of illnesses) and indirect costs of EUR 13 billion (loss of working years due to incapacity to work). The most significant load factors are the difficulty of work/lifting loads and little latitude for action. The highest costs are attributable to diseases of the musculoskeletal system and the digestive organs, as well as accidents at work ⁽⁸⁾.

Studies subsequently made available, particularly from the USA, examine the commercial efficiency of health promotion and prevention at the workplace. The most significant savings for companies are recorded for illness costs and illness-related absenteeism. In the literature, a return on investment of 1:2.3 to 1:1.59 is given for illness costs (i.e. for each dollar invested in company health protection USD 2.3 to USD 5.9 flows back into the company) ⁽⁹⁾.

Studies by Chapman ⁽¹⁰⁾ showed that workplace health promotion measures result in an average reduction in the illness costs of 26.1 %. Illness-related absenteeism is reduced by an average of 26.8 %.

Not all workplace health promotion measures prove to be equally effective. Preventive measures which are merely aimed at the communication of knowledge and information in the form of instruction make hardly any contribution towards reducing health complaints and therefore absenteeism. There is strong evidence that multicomponent programmes that prove to be effective combine both behavioural prevention measures (training courses, exercise programmes) with ergonomic intervention (circumstantial prevention), e.g. technical aids for lifting and carrying or changes in work organisation ⁽¹¹⁾.

Special programmes for stopping smoking, alcohol prevention and the prevention of psychosocial risks also proved to be particularly cost-effective with regard to the problem of absenteeism.

The results of a survey of companies with many years of experience with workplace health promotion in Germany clearly showed that 'a sustained corporate health management system not only improves the health situation of the workers but, in addition, also has a positive impact on the cost-efficiency and competitiveness of a company. Here, the key to success ... is the improvement in in-house information, participation and multi-level cooperation, the core process of a company health management system.' ⁽¹²⁾

⁽⁸⁾ Bödeker, W., H. Friedel, Chr. Röttger and A. Schröer, *Kosten arbeitsbedingter Erkrankungen in Deutschland*, Wirtschaftsverlag NW Verlag für neue Wissenschaft, Bremerhaven, 2002 (Publication series of the Federal Institute for Occupational Safety and Health: Research Report, Fb 946), ISBN: 3-89701-806-3.

⁽⁹⁾ Kreis, J. and W. Bödeker, *Gesundheitlicher und ökonomischer Nutzen betrieblicher Gesundheitsförderung und Prävention. Zusammenstellung der wissenschaftlichen Evidenz, IGA- Report 3*, in: Kramer, I. et. al. (2008).

⁽¹⁰⁾ Chapman, L. S., 'Meta-evaluation of worksite health promotion economic return studies: 2005 update', *The Art of Health Promotion* 6 (6): 1–10, in: Kramer, I. et. al. (2008).

⁽¹¹⁾ See Kramer, I. (2008), pp. 70–72.

⁽¹²⁾ Lueck, P., G. Eberle and D. Bonitz, *Der Nutzen des betrieblichen Gesundheitsmanagements aus der Sicht von Unternehmen*, in: Badura, B. et. al. (2008), pp. 77–84.

Important to note

Conclusion: In a modern company, an occupational health policy is indispensable not only for reasons relating to labour law but also from the aspect of competition and must become an integral element in company management.

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Further links:

Website on occupational safety and health) and corporate social responsibility (references to many national websites and sources): <http://osha.europa.eu/en/topics/business/csr/initiatives.stm/>

Description of good company practice

Safety and health has gained a central position in the policy operations of St Elisabeth Hospital

In the 1990s, St Elisabeth Hospital (the EZ) in Tilburg, the Netherlands, aimed to profile itself as a good employer and to offer safe and healthy working conditions to its employees. As a result of changes in the law, in the mid-1990s the EZ therefore decided to embed health and safety in its business policy.

A new position was created and a health and safety coordinator was appointed to systematically develop operations management, the responsibility for which would devolve to this new position.

In 1998, the whole hospital was reorganised: overall responsibility for the entire business operations was given to the managers (integrated management). This gave an extra stimulus to the responsibility and position which health and safety held in operational management.

For years, the management had been aware of the importance of preventing absenteeism. In comparison to other top clinical hospitals, the EZ already performed well, having had an average absenteeism of around 5 % (while the national average was 6 to 8 %). To keep this absenteeism rate low, the focus on prevention increased. Some costly investments were made which produced positive results. The absenteeism rate decreased further and, at the same time, the employees were more satisfied. In nationwide research on the satisfaction of employees, EZ employees valued their working conditions as favourable.

Line management more frequently requested advice and support to improve health and safety in the hospital departments. This is why, in 2002, the hospital chose to take the responsibility for occupational health and safety management into its own hands. Previously, all the obligatory services were hired externally but, from that moment on, the EZ added more and more health and safety-related positions to its staff establishment. Currently the EZ has in its employ an occupational physician, an occupational therapist, a safety expert, an occupational welfare officer and medical assistants (who carry out examinations, give vaccinations and offer support regarding absenteeism). This internal occupational health and safety service meets the need for the provision of advice and support to managers and employees at strategic, tactical and operational levels.

In recent years, health and safety has gained a strong position in the hospital's operations. Health and safety considerations are now explicitly included, not only in purchase procedures, reconstruction and new construction, but also at strategic policy level. This has resulted, for example, in ergonomic desks, safe working stations in laboratories and the use of ergonomic furniture. Investments go before costs; the EZ is fully aware of this and shows it too. The EZ has been accredited since 2006. Quality audits are organised annually in which matters concerning health and safety and working conditions are explicitly included. For example, tests are regularly made to check whether policy developments have been implemented across the departments.

Best practice

Health and safety measures are continuing to improve. In consultation with an external research agency and Tilburg University, the EZ has worked on the development of a new method of researching the satisfaction and fitness of its employees. From 2009, the EZ is, for the first time, conducting systematic and combined research into the levels of employee satisfaction and fitness (lifetime employment). In this research study, working conditions are tested and figures are provided about the effects on the physical and psychological health of employees. This research is embedded in the policy cycles and so the implementation of measures facilitating improvement is also guaranteed.

Since 2008, it has been compulsory in the Netherlands to systematically care for the safety of patients. The EZ is one of the few Dutch hospitals to include its employees in its commitment to care. This was done because safe working conditions and patient safety overlap, for example, as regards cytostatics or lifting.

In 2009, the EZ planned to research and expand the theme of humane care. The EZ believes that a healthy, fit and content employee contributes to the humane care of patients.

St Elisabeth Hospital is a medium-sized training hospital which provides highly specialised medical care. This top clinical hospital offers education and educational programmes in a broad sense, advancing high-quality care for patients and fulfilling an important role in applied medical scientific research. It offers the opportunity for PhD research to specialists and trainee specialists.

The hospital services 435 000 inhabitants of its area. Each year, 347 000 patients visit the outpatient clinics and 44 000 patients are admitted. In the emergency care department, about 30 000 patients register annually. The hospital has 3 100 employees and 559 beds.

For further information see: <http://www.elisabeth.nl>

2

How to carry out a risk assessment

- 2.1. Introduction
- 2.2. Roles and responsibilities
- 2.3. What should be considered before I start the risk assessment
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2.1. Introduction

This guide to prevention and good practice in hospitals and the healthcare sector focuses on the most significant risks in the sector, especially:

- **biological agents**
- **musculoskeletal disorders**
- **psychosocial disorders, and**
- **chemical agents.**

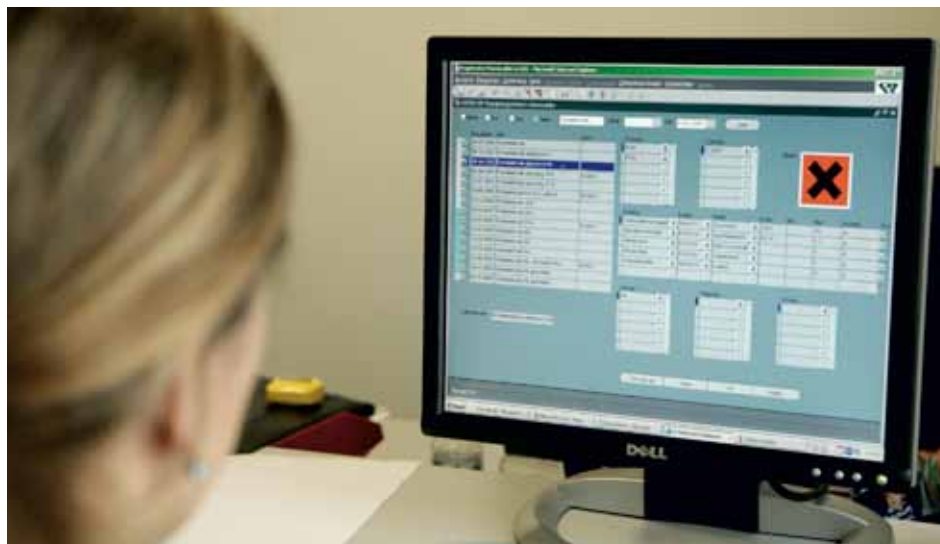
Other potential risks have been excluded from the guide since they already fall within the scope of other European Union legislation in force.

For each of the four groups, the different types of risk will be presented for carrying out different tasks at work. To facilitate a sound understanding of the significance of these risks, the effects on the health and safety of workers are described. The application of the relevant EU regulations for hospitals and the healthcare sector is explained for the risk groups and specified for the sector. In each risk group, specific aspects for the risk assessment and measures of prevention are highlighted. The readers will be able, with the help of instruments and recommendations, to identify risks in their own healthcare facility. Up-to-date technical and organisational knowledge as well as good practice examples from healthcare facilities in Europe will show how a good and healthy quality of work can be established.

2.2. Roles and responsibilities

Occupational health and safety is a management task! Under Article 6 of Council Directive 89/391/EEC, employers are obliged to take the measures necessary for the health and safety protection of workers. The necessary measures of occupational health and safety include the prevention of occupational risks, the provision of information and training and the provision of the necessary organisation and means.

01 A database can help to collect and organise information for the risk assessment.



The overall responsibility for determining and assessing risks at the workplace lies with employers. They must ensure that these activities are properly implemented. If they do not have the relevant knowledge themselves, they must obtain expert advice internally, through occupational health and safety specialists and occupational physicians, or externally, through the use of external services.

Risk assessment — Employers' roles and responsibilities

Under Articles 5 to 12 of Council Directive 89/391/EEC, employers are obliged to:

- ensure the health and safety of workers in every aspect related to work;
- be in possession of an assessment of the risks to health and safety at work, including those facing groups of workers exposed to particular risks;
- take appropriate measures so that workers and/or their representatives receive all the necessary information in accordance with national laws and/or practices;
- consult workers and/or their representatives and allow them to take part in discussions on all questions relating to health and safety at work;
- decide on the protective measures to be taken and, if necessary, the protective equipment to be used;
- take the measures necessary for the health and safety protection of workers;
- implement the necessary measures on the basis of the following general principles of prevention, see the text box 'Framework Directive 89/391/EEC, Article 6, Paragraph 2', page 26;
- ensure that each worker receives adequate health and safety training, in particular in the form of information and instructions specific to their workplace or job (on recruitment, in the event of transfer, if new work equipment or any new technology is used);
- take appropriate measures so that employers of workers from any outside establishments engaged in work in their establishment receive adequate information in accordance with national laws and/or practices, and have in fact received appropriate instructions regarding health and safety risks during their activities in their establishment;
- document, monitor and review the risk assessment and the measures taken.

For additional obligations of the employer, see Council Directive 89/391/EEC.

Risk assessment — Workers' roles and responsibilities

Workers' participation is not only a right, it is fundamental to make the employers' occupational health and safety management effective and efficient. Workers know not only the problems but also the resources when they perform their tasks or activities. Their participation also greatly increases the acceptance and long-lasting effectiveness of the preventive measures taken.

Framework Directive 89/391/EEC, Article 6, Paragraph 2

2. The employer shall implement the measures referred to in the first subparagraph of paragraph 1 on the basis of the following general principles of prevention:

- a) avoiding risks
- b) evaluating the risks which cannot be avoided
- c) combating the risks at source
- d) adapting the work to the individual, especially as regards the design of workplaces, the choice of work equipment and the choice of working and production methods, with a view, in particular, to alleviating monotonous work and work at a predetermined work-rate and to reducing their effect on health
- e) adapting to technical progress
- f) replacing the dangerous by the non-dangerous or the less dangerous
- g) developing a coherent overall prevention policy which covers technology, organisation of work, working conditions, social relationships and the influence of factors related to the working environment
- h) giving collective protective measures priority over individual protective measures
- i) giving appropriate instructions to the workers.

Under Article 6 of Council Directive 89/391/EEC, workers and or/their representatives have the following rights and obligations:



- to be consulted in the risk assessment and to take part in discussions on all questions relating to health and safety at work.; this also means that the risk assessment should take account of particularly sensitive risk groups. They must be protected against the dangers which specifically affect them. This relates, among other things, to specific risks of male and female workers, younger and older workers, pregnant workers and workers who have recently given birth or are breastfeeding, workers with different nationalities and languages and specific risks of workers from outside establishments or undertakings;
- to make proposals;
- to have balanced participation in accordance with national laws and/or practices;
- to be informed of the risks to their health and safety and of the measures necessary to eliminate or reduce these risks;

02 The risk assessment should address particularly sensitive groups.

- to be involved in the process of deciding on the preventive and protective measures to be put in place;
- to receive adequate health and safety information and training, in particular in the form of information and instructions specific to their workplace.

Workers are obliged to:

- take care, as far as possible, of their own health and safety and that of other persons affected by their acts or commissions at work in accordance with their training and the instructions given by their employer.
- in accordance with their training and the instructions given by their employer:
 - » make correct use of machinery, apparatus, tools, dangerous substances, transport equipment and other means of production;
 - » make correct use of the personal protective equipment supplied to them and, after use, return it to its proper place;
 - » refrain from disconnecting, changing or removing arbitrarily safety devices fitted, e.g. to machinery, apparatus, tools, plant and buildings, and use such safety devices correctly;
 - » immediately inform the employer and/or the workers with specific responsibility for the health and safety of workers of any work situation they have reasonable grounds for considering to be a serious and immediate danger to health and safety and of any shortcomings in the protection arrangements;
 - » cooperate, in accordance with national practice, for as long as may be necessary to enable the employer to ensure that the working environment and working conditions are safe and pose no risk to health and safety within their field of activity.



03 Workers are obliged to work in accordance with instructions given by the employer.

2.3. What should be considered before I start the risk assessment

Before the potential risks and hazards at the workplace are identified, employers should first carefully prepare the complete risk assessment process. This includes the definition of who should be included, what the different roles and responsibilities are and what the different steps of the assessment will be. According to the information provided by EU-OSHA, employers can do this through an action plan for the elimination or control of risks. The action plan should include:

- commissioning, organising and coordinating the assessment;
- appointing competent people to make the assessments; the persons carrying out the risk assessment can be the employers themselves, employees designated by the employers, external assessors and service providers;
- consulting workers' representatives on arrangements for the appointment of those who will make the assessments in accordance with national laws and practices;
- providing the necessary information, training, resources and support to assessors who are the employer's own employees;
- involving management and encouraging the participation of the workforce;
- ensuring that the risk assessment is documented;
- informing and consulting workers and/or their representatives on the results of the risk assessment and on the measures to be introduced;
- ensuring that the preventive and protective measures take account of the results of the assessment;
- monitoring and reviewing the protective and preventive measures to ensure that their effectiveness is maintained.

2.4. How do I get started with the risk assessment?

If you have an organisational chart for your facility, start with an overview of all working areas within it. Write down which tasks, such as moving patients or cleaning surfaces, are performed in the different working areas. The same tasks from different working areas can be described together to avoid writing them down twice. The tasks which are performed in your facility are the starting point for the identification of hazards or risks which are connected with performing the task and the identification of the employees who are potentially exposed to the hazards or risks.

According to the information provided by EU-OSHA, employers can take the appropriate action for the risk assessment following the five steps below.

Step 1 — Identifying hazards and those at risk

Step 2 — Evaluating and prioritising risks

Step 3 — Deciding on preventive action — T-O-P

Step 4 — Taking action

Step 5 — Documentation, monitoring and review

Step 1 — Identifying hazards and those at risk

As mentioned above, the basis for the risk assessment is the tasks which are performed in the different working areas. Documents regarding dangerous substances, the duty roster, job profiles, working appliances and so forth provide a first impression about potential risks and hazards connected to the tasks. Besides these documents, the most important information can be provided by the workers. Ask your employees about their health and safety at work and visit their workplace to get a first hand impression of their working conditions. Ask them what can be improved for a better, safer and healthier work organisation.



04 The five steps of a risk assessment are described in EU-OSHA's Factsheet 81.

Well-known occupational risks and hazards in the healthcare sector include biological, musculo-skeletal, psychosocial and chemical risks. Specific risks that should be addressed are, for example:

- the handling of blood and blood products, including the handling of needles and other sharp objects;
- exposure to chemical agents/hazardous substances, including cleaning agents and disinfectants;
- time pressure, high workload and interpersonal conflicts;
- bullying or violence at the workplace;
- shift, weekend and night work;
- manual patient handling, lifting, pushing and pulling of weights;
- the ergonomic design of workplaces.

Important to note

Tools and instruments for the risk assessment

Checklists, screening instruments or other tools and recommendations provided by different associations and liability insurances can be used to get an overall impression of potential risks and hazards. For example, psychosocial risks at work can be analysed with a mental workload screening. However, the use of a checklist or screening can only be a part of analysing the hazards and risks at work. It should not be used exclusively: always use other sources of information as well.

Step 2 — Evaluating and prioritising risks

Not all of the identified risks and hazards will have the same importance nor can they all be addressed at the same time. It is recommended to prioritise within the risks and hazards and to agree which ones should be tackled first. Improving the working conditions should be seen as a continuous improvement process of your facility, which starts with more urgent risks and hazards and continuously moves on to other related topics to establish a safe, healthy and productive work environment.



05 Ergonomically designed workplaces help to prevent musculoskeletal disorders.

How do I evaluate risks?

Look at each individual risk you identified for the tasks performed and determine if measures have to be taken. You can categorise, for example, risks into three categories. Are they:

- a) negligible?
- b) acceptable for a short time?
- c) not acceptable?

This depends on the probability and severity of potential accidents or health problems caused by the risk. If a risk is not acceptable you will have to take immediate measures. On the other hand, if a risk is acceptable for a short time, it can be addressed at a later date.

Step 3 — Deciding on preventive action — T-O-P

After identifying and prioritising the risks in your facility, the next step is the identification of the appropriate measures to eliminate or control the risks. Under Framework Directive 89/391/EEC, Article 6, paragraph 2, preventive measures follow a hierarchy (see page 26). If possible, a risk should be avoided rather than being reduced, e.g. a dangerous chemical substance should be replaced by a less dangerous one. Additionally, the following hierarchy should be considered regarding preventive measures: first technical solutions should be considered, followed by organisational and finally personal/individual measures.

Technical measures

Organisational measures

Personal/individual measures

Example

It is better to provide employees with height-adjustable tables than to train them to relax their back muscles which are cramped from sitting all day at a desk which is too high or low.



Technical measures

If possible, risks should be reduced with technical appliances, technical aids or construction measures.

Organisational measures

A good work organisation and written organisational agreements on working sequences can avoid or reduce risks.

Personal/individual measures

Individual instructions as well as training and most importantly re-training measures are necessary for sustainable effects on workers' health and safety.

Consider how technical, organisational and personal/individual measures can work together.

Important to note

Step 4 — Taking action

Implement the preventive and protective measures according to the prioritisation plan. Employees have to be informed about the results of the risk assessment and the planned improvements. The long-term implementation of measures within the daily work depends greatly on the participation of the workers and their acceptance of the measures. Specialists in occupational health and safety and quality management should compare and coordinate their activities and establish an integrated quality, as well as health and safety, management system.

The necessary improvements derived from the risk assessment should be planned regarding what should be done by whom and by when to eliminate or control the risks. A time schedule should be established together with everybody involved.

Important to note

Prioritisation plan

Priority	Task performed	Identified risk	Appropriate measures (T-O-P)	Who is responsible?	Timeline	Monitoring/ Review date
1.						
2.						
3.						
4.						

06 It is important that workers participate in the decision-making as well as the implementation process.



Step 5 — Documentation, monitoring and review

Documentation

The risk assessment has to be documented. The documentation should include the results of the risk analysis, the improvements implemented and the results of the evaluation of the improvements. What risks were identified for the workers? How high is the risk of being exposed to those risks? Is the risk negligible, acceptable for a short time or not acceptable? Which measures have been taken and which ones planned for the future? Who is responsible for the implementation of the measures? By when should the measures have been taken and how will their effectiveness be evaluated?

Monitoring

The preventive measures taken have to be monitored and evaluated. Additional modifications might be necessary if the measures do not produce the expected results. Additionally, changes in the work organisation or work environment may also change the level of risk. The risk assessment will have to be updated in such cases.

Important to note

The implemented measures must also be monitored and reviewed to ensure that they are effective and do not create additional risks, e.g. on the one hand, the use of disinfectants protects the workers from biological risks such as bacteria, but on the other it increases the risk of skin problems. Additional measures will be necessary, e.g. appropriate skin protection.

Managers, such as group leaders and the head of departments, are responsible for monitoring and reviewing risk assessments in consultation with workers and their representatives. They are also responsible for the documentation of the review process.

Review

The assessment should be reviewed at regular intervals. A set date to review the measures taken and a reevaluation of the risks at work should be included into the documentation of the risk assessment. The risk assessment has to be revised whenever significant changes occur, such as:

1. changes in the work organisation or work sequences;
2. use of new technology;
3. using a new chemical product such as cleaning agents or disinfectants;

4. an increase in the number of sick days;
5. an increase in the number of accidents;
6. new or modified laws or regulations.

The review process should determine whether:

- the chosen preventive measures have been implemented as planned;
- the chosen preventive measures are being used and being used correctly, e.g. lifting aids;
- the preventive measures are being accepted by workers and included in their daily work;
- the assessed risks have been eliminated or reduced by the measures;
- the preventive measures have resulted in any new problems;
- any new problems have occurred.

Occupational risks and hazards should be updated yearly. Occupational health and safety is a continuous improvement process within a facility. As part of the company strategy and quality management system, it contributes to corporate success. Discussing the measures taken in frequent team meetings helps to integrate them into daily work. The workers know best why something does or does not work and can provide immediate feedback.

Combining occupational health and safety (OSH) measures with quality management and strategy supports the hospital's or healthcare facility's success. To show a positive effect of OSH measures on the quality of care and economic situation of the hospital, criteria described in quality management have to be combined with OSH data. Preventive measures to reduce trips and falls will potentially also reduce the number of falls from patients, and improved hygiene measures will result in a lower number of bacterial infections and so forth.

Important to note

Reporting the results of the preventive measures taken to the higher management is the last step of a risk assessment which is integrated into the strategy of the hospital or healthcare facility. As mentioned above, the results can be reported in the context of data referring to the quality of care and the economic situation of the hospital or healthcare facility.



07 The use of technology can improve the working conditions; but does it also cause any new problems?

2.5. Inclusion of gender aspects in the risk assessment

Step 1 — Identifying hazards and those at risk

- Asking both female and male workers what problems they have in their work
- Avoiding making initial assumptions about what might be ‘trivial’
- Encouraging women to report issues that they think may affect their health and safety at work as well as problems that may be related to work
- Considering the entire workforce including cleaners, receptionists and part-time workers

Step 2 — Evaluating and prioritising risks

- Involving female workers in risk assessment; considering using health circles with members from different occupational groups, hierarchies, age groups etc.
- Providing sufficient information about gender and diversity issues
- Making sure instruments and tools used for the assessment include issues relevant to both male and female workers
- Informing external assessors that they should take a gender-sensitive approach
- Including harassment, emotional stressors and reproductive risks
- Looking critically at weights of loads that have to be handled and how often

Step 3 — Deciding on preventive action — T-O-P

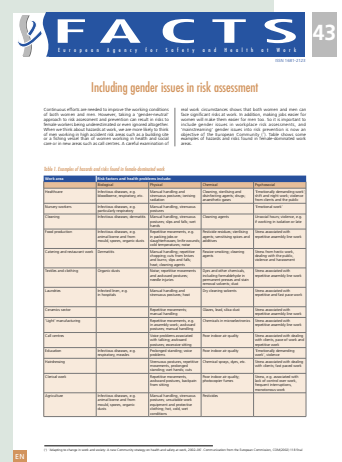
- Selecting protective equipment according to individual needs
- Involving female workers in decision-making

Step 4 — Taking action

- Involving female workers in the implementation of solutions
- Making sure male and female workers are provided with occupational health and safety information and training

Step 5 — Documentation, monitoring and review

- Making sure female workers participate in the review process
- Being aware of new information about gender-related occupational health issues



08 Factsheet 43 'Including gender aspects in risk assessment', EU-OSHA, 2003 (<http://osha.europa.eu/en/publications/factsheets/43/>).

2.6. Description of good company practice

The St Elisabeth Hospital in Tilburg, the Netherlands, is a hospital with a 180-year history. It was started as a nursing home, and now has 3 100 employees and 4 000 inpatients per year. In addition, 347 000 patients are treated yearly in the polyclinic. In this interview, Ms Christel van Neerven, the head of the occupational health and safety department, and Ms Monique Pullen, adviser on occupational health and safety, describe the hospital's risk assessment process.

Interviewer: How do you assess risks at work? Do you perform a risk assessment every year or frequently?

Ms van Neerven: We had a method for the frequent risk assessment which was performed every few years. But this year, we will be starting a new system, with a new kind of survey. Besides risks at work, we will also be asking about health, loyalty and how content our employees are at work. The new survey also includes questions about private and family demands. This is going to take place every two years in every department. In this way, we will obtain a frequent evaluation of the risks at work including the work setting and the environment.



Christel van Neerven, head of the occupational health and safety department.



Monique Pullen, adviser on occupational health and safety.

Interviewer: Who is taking part in it? Is the management involved?

Ms van Neerven: We organise the risk assessment and ensure that good instruments are used. The management, the human resources department and employees from the different departments work with us. The team leaders in the departments are the owners of the risk assessment. They have to take action once they receive a report. It's their responsibility. Before we start a risk assessment, we draw up a project plan. What are we going to do? Why are we doing it? Who is responsible for what? And top management has to give its 'OK' before we start. I present the project plan to the management and the workers' representatives. And when they all agree, we can start. Afterwards, we address the heads of the departments and the team leaders to make the appointment for the survey. We inform them about the goal and the means. They have to say 'Go, you can do it!' and 'We think it's important that you perform this risk assessment for us so that we have information to improve the workplace for our staff'. Health and safety management is included in the hospital's strategy. Health and safety is part of the quality of care. The management sees it as their responsibility to take good care of the employees. The health and safety management is included in the management strategy. It's one of the main points of the strategic policy of the hospital.

Interviewer: Who has to approve the preventive measures?

Ms van Neerven: It's the responsibility of the team leaders and the heads of the departments to take action. They have to write it down in CEO plans. Such plans include a follow-up schedule with the board of the hospital. After one year, they have to report on what they did and did not do with the plans.

Best practice



Best practice

Interviewer: Do you include employees in the risk assessment?

Ms Pullen: Employees participate in two ways. Firstly, we ask them to fill out a questionnaire, our survey. Secondly, we perform an inspection on the work floor and speak to them directly.

Ms van Neerven: When we make a policy on a subject, we also always ask the employees who have to work with it to observe certain rules. Their feedback is important to us.

Ms Pullen: We depend on their information. They are on the work floor and are faced with the risks. They can provide us with the right information. A lot of times they have very good suggestions. After the risk assessment, we prepare a report and discuss it with the team leader or head of the floor. We always suggest talking about it with all employees. It's actually obligatory but we also suggest it. Sometimes we come to explain the results after we have performed the risk assessment.

Ms van Neerven: For special risks, such as musculoskeletal or chemical risks, we also conduct interviews for two hours with two employees in each group. We ask all the team leaders to name two employees we can talk to. There is a great variety of functions and specialisation. So you have to talk to each one of them to gain a good impression of the risks.

Interviewer: Is it an open conversation or do you have special questions?

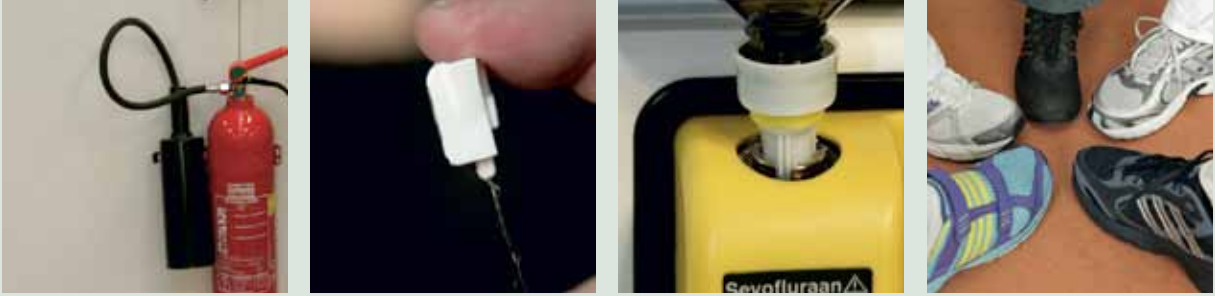
Ms Pullen: It's a specific method. We ask what kind of activities they pursue, for example a nurse washes the patient or helps him to shower, sometimes they have to do some administration work.

Interviewer: So it's task-oriented. Do you have a list of risks relating to the tasks?

Ms Pullen: Yes. Firstly, we have the interview and afterwards we go with them and observe them at the workplace to see how long they have to perform the different activities. We evaluate the duration of the activity, the frequency and if they have any complaints.

Interviewer: Where does the list of risks come from? Is a list provided by the hospital or an external agency? Who provides the method?

Ms Pullen: They are guidelines from the government. This method gives us a lot of insight into where the real problems are: what loads they have to handle and whether they also have a high mental workload, for example whether they report that they have a lot of things to think about.



Interviewer: Do you pay special attention to gender differences?

Ms Pullen: We look more at different age groups. Older workers are more likely to have back problems or to need more time to recuperate. Our employees are getting older. The average age is above 40. We use the results of the risk assessment to work out a policy for older employees, for example to ensure that they don't have to work night shifts. They also don't have to work alone and shouldn't work too many consecutive shifts. We also pay attention to achieving a balance between late and early shifts and to not make the work too difficult. Employees don't have to transfer the patients alone. We encourage them to use lifts and other technical aids. We invest more in those things. Also in the reconstruction of the hospital. We are currently rebuilding parts of it so that employees have more space to work with the patients.

Interviewer: Do you write down these policies?

Ms Pullen: Yes, and we advise employees. But it is also the responsibility of the employee him or herself to talk to the team leader. Based on our risk assessment, we also address what the greatest risks are and discuss them. How can you prevent them? We also have specially trained employees, the ergo coaches, on the floor who deal with the prevention of musculoskeletal risks. They coach their colleagues, for example on how to transfer patients in the right way. The workload is very high for the employees and they want to do a lot but sometimes it is better to ask a colleague to assist.

Interviewer: Can you describe an example of successful preventive action in your hospital?

Ms van Neerven: We are rebuilding a lot and have all kinds of companies coming here to do work. We frequently observe that they don't take enough precautions and then they can have accidents. We then make agreements with the facility department on what we have to provide so that they can work in a safe environment. We also had a lot of accidental falls in the kitchen because of a new floor. We have a very big kitchen and the floor was very slippery. We tried to find out the cause and what we could do about it. Did we have to change the floor or maybe the cleaning method? If all those things are done and there is still a risk, we provide people with good safety shoes. Another example is an accident with cytostatics. We have a policy for cytostatics but two years ago we had a few accidents with the cytostatic pump and we had a few incidents where the cytostatics exploded. The cytostatics went everywhere, even over the nurse. The pumps were too old. We researched the entire matter and this resulted in new pumps for the whole hospital. That's a good example of accidents but also of the establishment we have, our advice is taken seriously.

Best practice



Best practice

Interviewer: What has been your experience with the implementation of measures? Did you have support from top management or did you have any difficulties?

Ms van Neerven: The management participates in the survey and the recommendations. So what we advise never comes as a surprise to them.

Interviewer: Did you ever have any resistance from the team leaders or the employees?

Ms Pullen: No. It's also because of the way we did it. There were often things which were already very good. So we told them to keep it that way, it's already very good. And we also gained more insight by talking to them about what additional measures they could take. We advised them on which activities they could improve.

Interviewer: Did you do that intentionally, i.e. gave them feedback first about what they are doing well? Because it's a very good method to gain higher acceptance.

Ms van Neerven: Yes, we are very focused on communication.

Interviewer: What do you think is the basis for a good relationship in which you respect one another?

Ms van Neerven: Our strong point is communication. We focus on communication. Not only on the subject matter but how to get the message across. Our goal is to change people's attitude or behaviour. On that level we make contact. I think this is what makes our work good.

Interviewer: How did you establish good communication? How did you start?

Ms van Neerven: It took us a few years to get this far.

Ms Pullen: You have to listen to what the problems are when you talk to the team leaders. You take an interest in what they do. What are they doing? What is their main task? Where do they have problems? What are the good aspects?

Ms van Neerven: We want to be a good partner in communication. There was some prejudice about occupational health and safety: 'It costs a lot of money but it doesn't get us anywhere.' So we made an effort to let them see the results constantly, to make it positive. And the mood changed. We wanted to give occupational health and safety a face that everyone knew so that they could talk to the office of occupational health and safety if they had questions or problems. To give it a face and show results. And give small results priority over policymaking. Policy is also important but at that stage concrete results were more important. That was our goal and it worked out.

Interviewer: Do you remember one of those small results?

Ms van Neerven: They were small things. Doors which didn't close well. Problems with the floor. Problems with the computer. It took a lot of hard work but after one year I heard somebody say 'I called the office of occupational health and safety because my colleague told me that you have to call there if you want to see results'. And I thought 'That's what I wanted'. It has to grow from there. That was the first phase.

Interviewer: That's very interesting. That is a different approach to what a lot of people do — and that's probably why it works so well for you. People often start with the strategy and don't go directly to the people. You can write down a lot of things on paper but nobody really ever understands what you are doing. How do you check the effectiveness of the measures you have taken?

Ms van Neerven: With the internal audits of the quality management. Every few years we have an external audit. The internal audit is conducted every year.

Ms Pullen: We also evaluate effectiveness by talking to the team leaders informally. Have things changed? Can you manage? Do you need more assistance from us? Can we do anything?

Interviewer: How do you update the risk assessment or how do you ensure the sustainability of the measures taken? You already mentioned the follow-up two years after measures are taken and you also talk to the team leaders.

Ms van Neerven: And observe the work on the floor ourselves.

Interviewer: How do you modify measures? Based on the conversations with the team leaders?

Ms Pullen: Yes. Also together with the employees. We ask about the reasons why they don't use something and try to find out which measures suit the floor. Otherwise they might never implement them, so we try to take that into consideration.

Ms van Neerven: We also organise internal networking meetings, for example for the ergo coaches, twice a year.

Ms Pullen: They can network and ask questions. Sometimes they develop something on one floor and it is useful for another floor. We also have trial periods with tools. The employees also have to evaluate the tools. We can advise them but they also have a responsibility.

2.7. Links

No	Title	Country/Region	Contents/Source
1.	E-fact 18 -- Risk assessment in healthcare	EU-OSHA (European Agency for Safety and Health at Work)	This article outlines the risk factors specific to the healthcare sector and describes practical steps of risk assessment. http://osha.europa.eu/en/publications/e-facts/efact18
2.	Factsheet 43 — Including gender issues in risk assessments	EU-OSHA (European Agency for Safety and Health at Work)	Taking a 'gender-neutral' approach to risk assessment and prevention can result in risks to female workers being underestimated or even ignored altogether. A table shows some examples of hazards and risks found in female-dominated work areas. http://osha.europa.eu/en/publications/factsheets/43
3.	Factsheet 80 — Risk assessment — roles and responsibilities	EU-OSHA (European Agency for Safety and Health at Work)	Workers' health and safety is protected in Europe by an approach based on assessing and managing risks. In order to carry out effective workplace risk assessment, all those involved require a clear understanding of the legal context, concepts, the process of assessing the risks and the role to be played by the main actors involved in the process. http://osha.europa.eu/en/publications/factsheets/80
4.	Factsheet 81 — Risk assessment — the key to healthy workplaces	EU-OSHA (European Agency for Safety and Health at Work)	Risk assessment is the basis for successful health and safety management, and the key to reducing work-related accidents and occupational diseases. If it is implemented well, it can improve workplace health and safety — and business performance in general. http://osha.europa.eu/en/publications/factsheets/81
5.	Risk assessment essentials	EU-OSHA (European Agency for Safety and Health at Work)	This publication contains checklists related to a wide range of hazards to help to assess the risk at the workplace. It contains checklists for risk assessment of chemical substances, stress and slippery surface. http://osha.europa.eu/en/campaigns/hwi/about/material/rat2007
6.	Council Directive 89/391/EEC	EU-OSHA (European Agency for Safety and Health at Work)	Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work. http://eur-lex.europa.eu/Result.do?T1=V1&T2=1989&T3=391&RechType=RECH_naturel&Submit=Search
7.	E-fact 20 — Checklist for the prevention of accidents in laboratories	EU-OSHA (European Agency for Safety and Health at Work)	Laboratories involve a greater variety of hazards than most workplaces. This e-factsheet focuses on safety in chemical and biological laboratories in particular. It outlines EU legislation on laboratory safety, particularly as it relates to chemical and biological hazards, and pregnant and young workers. It summarises hazards that the lab worker can encounter and gives examples of serious lab accidents that could have been prevented if proper safety measures had been taken. It concludes with a set of checklists to help workers in laboratories assess possible risks and to monitor safety processes. http://osha.europa.eu/en/publications/e-facts/efact20
8.	E-fact 28 — Patient handling techniques to prevent MSDs in healthcare	EU-OSHA (European Agency for Safety and Health at Work)	Musculoskeletal disorders (MSDs) are a serious problem among hospital personnel, and in particular the nursing staff. Of primary concern are back injuries and shoulder strains, which can both be severely debilitating. The nursing profession has been shown to be one of the most at risk occupations for low back pain. The primary cause of MSDs is patient handling tasks such as lifting, transferring and repositioning of patients. This article provides recommendations and examples for nursing staff to help reducing the number and severity of MSDs due to patient handling. http://osha.europa.eu/en/publications/e-facts/efact28

No	Title	Country/Region	Contents/Source
9.	Report —Main-streaming gender into occupational safety and health	EU-OSHA (European Agency for Safety and Health at Work)	This report summarises a workshop held on 15 June 2004 in Brussels. The objectives of the seminar were, first, the exchange of information on issues specific to gender, including an approach sensitive to gender and how it can be integrated into health and safety. The goal of promoting discussion and exchange of views on the further development of gender-specific issues between the EU and national authorities and social partners and experts is also pursued. The report contains proposals for the development of gender issues in the field of safety and health at work
10.	Safety and health at work is everyone's concern: Good practice for enterprises, social partners and organisations	EU-OSHA (European Agency for Safety and Health at Work)	Good practice for enterprises, social partners and organisations. Introducing the healthy workplace initiative, to provide employers and employees with easy access to quality information about health and safety. http://osha.europa.eu/en/publications/other/brochure2007
11.	Report — Gender issues in health and safety at work	EU-OSHA (European Agency for Safety and Health at Work)	Achieving gender equality in all aspects of employment is now a key European priority. It is a matter of rights, but also of sound economic policy. The report highlights the dual importance of considering gender in risk prevention and including occupational health and safety in gender equality employment activities. Cooperation between these two policy areas is crucial, from the European level, down to the workplace, to promote improved workplace risk prevention for both women and men. http://osha.europa.eu/en/publications/reports/209
12.	Factsheet 42 — Gender issues in health and safety at work	EU-OSHA (European Agency for Safety and Health at Work)	There are substantial differences in the working lives of women and men and this affects their occupational health and safety (OSH). 'The Community strategy on health and safety at work' has 'mainstreaming', or integrating gender into occupational health and safety activities, as an objective. To support this, the Agency has produced a report examining gender differences in workplace injury and illness, gaps in knowledge and the implications for improving risk prevention. http://osha.europa.eu/en/publications/factsheets/42
13.	Factsheet 29 — Safety and health good practice online for the healthcare sector	EU-OSHA (European Agency for Safety and Health at Work)	According to European data the work-related accident rate in the healthcare sector is 34 % higher than the EU average. In addition, the sector has the second highest incidence rate of work-related musculoskeletal disorders (MSDs), after construction. This factsheet provides a basic introduction to occupational health and safety in the healthcare sector and how to find information for the sector on the Agency's website. http://osha.europa.eu/en/publications/factsheets/29
14.	Factsheet 53 — Ensuring the health and safety of workers with disabilities	EU-OSHA (European Agency for Safety and Health at Work)	People with disabilities should receive equal treatment at work. This includes equality regarding health and safety at work. People with disabilities are covered by both European anti-discrimination legislation and occupational health and safety legislation. This legislation, which the Member States implement in national legislation and arrangements, should be applied to facilitate the employment of people with disabilities, not to exclude them. http://osha.europa.eu/en/publications/factsheets/53
15.	Europe's ageing workforce	EU-OSHA (European Agency for Safety and Health at Work)	Specific occupational health and safety issues of particular concern to older workers include musculoskeletal disorders (MSDs), psychosocial job characteristics and work organisation arrangements (e.g. shift patterns). http://osha.europa.eu/en/priority_groups/ageingworkers

No	Title	Country/Region	Contents/Source
16.	Migrant workers	EU-OSHA (European Agency for Safety and Health at Work)	Occupational health and safety (OSH) issues relating to migrant workers include the high employment rates of migrant workers in high-risk sectors, language and cultural barriers to communication and training in OSH, and the fact that migrant workers often work a lot of overtime and/or are in poor health and thus are more prone to occupational injuries and diseases. http://osha.europa.eu/en/priority_groups/migrant_workers
17.	People with disabilities	EU-OSHA (European Agency for Safety and Health at Work)	EU-OSHA has compiled various resources related to occupational health and safety and people with disabilities. This website aims to provide links to practical information regarding workplace health and safety issues relating to the integration and retention of people with disabilities in employment. http://osha.europa.eu/en/good_practice/priority_groups/disability
18.	Young people	EU-OSHA (European Agency for Safety and Health at Work)	The Agency has compiled resources and links to sources of information related to young people and occupational health and safety at work. http://osha.europa.eu/en/good_practice/priority_groups/young_people
19.	Factsheet 69 — Young Workers	EU-OSHA (European Agency for Safety and Health at Work)	The factsheet gives an overview of the employment situation of young workers and the jobs they are employed in, mainly in service professions and low-skilled manual jobs. This distribution has important implications for the occupational health and safety of young people because of the specific set of potentially harmful conditions (including low pay, temporary seasonal work, poor employment conditions, atypical working time, shift, night and weekend work and physically demanding work). http://osha.europa.eu/en/publications/factsheets/69
20.	Factsheet 70 — Young Workers	EU-OSHA (European Agency for Safety and Health at Work)	This publication aims to provide a review of the hazards young workers are exposed to at work and what the consequences of this exposure are both in the short term and in the long term. Many of the sectors and occupations young people are employed in are characterised by high accident risks and exposure to many workplace hazards. Specific targeted measures need to be taken in education and training as well as in daily workplace practice http://osha.europa.eu/en/publications/factsheets/70

2.8. Relevant European Union directives

1. Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work ⁽¹³⁾
2. Council Directive 89/654/EEC of 30 November 1989 concerning the minimum safety and health requirements for the workplace ⁽¹⁴⁾
3. Council Directive 92/85/EEC of 19 October 1992 on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or women who are breastfeeding ⁽¹⁵⁾

2.9. OiRA: Online risk assessment tool, EU-OSHA

The European Agency for Safety and Health at Work (EU-OSHA) is developing an online risk assessment tool that will be available for users by 2011 (<http://osha.europa.eu/>). This consists of web pages on risk assessment that can help micro and small organisations to put in place a risk assessment process — starting with the identification and evaluation of workplace risks, through decision-making on preventive actions and the taking of action, to monitoring and reporting.

2.10. Literature

Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege (BGW), Germany, 8 July 2009 (www.bgw-online.de).

Berufsgenossenschaft für Gesundheit und Wohlfahrtspflege, Germany. Gefährdungsbeurteilung in Kliniken, 2005 (http://www.bgw-online.de/inter-net/generator/Inhalt/OnlineInhalt/Medientypen/bgw__check/TP-4GB__Gefaehrdungsbeurteilung__in__Kliniken,property=pdfDownload.pdf).

Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work (http://eur-lex.europa.eu/Result.do?T1=V1&T2=1989&T3=391&RechType=R ECH_naturel&Submit=Search).

European Agency for Safety and Health at Work, 'Factsheet — 80 Risk Assessment — roles and responsibilities' (<http://osha.europa.eu/en/publications/factsheets/80/>).

European Agency for Safety and Health at Work, 'Factsheet 43 — Including gender issues in risk assessment' (<http://osha.europa.eu/en/publications/factsheets/43/>).

European Agency for Safety and Health at Work, Risk assessment (<http://osha.europa.eu/en/topics/riskassessment>).

⁽¹³⁾ OJ L 183, 29.6.1989, pp. 1–8.

⁽¹⁴⁾ OJ L 393, 30.12.1989, pp. 1–12.

⁽¹⁵⁾ OJ L 348, 28.11.1992, pp. 1–8.

2.11. Example of a risk assessment based on the task of manually handling patients

Working area: Care Unit 2B

Professional group: All workers involved in taking care of patients

Task: Moving patients

Task	Hazard and those at risk	Risk classification	Target	Preventive actions (T-O-P)	By when and by whom	Monitoring/ Review date
Help a patient to sit up in the bed and lie down again	Physical strain of the spine, shoulder and neck areas and the hand and arm joints for all caregivers who are involved, triggered by the weight and the functional ability of the patient as well as the insufficient space to move around the bed	2	Elimination of the physical load for the carer	Electrical powered adjustable beds	Within the next two years for all care units Management, purchase department	
			Reduction of the physical load for the carer	Sufficient people in the shift to work with two colleagues Sufficient time to work in a back-friendly and patient resources-orientated working way Review of the organisation of the workflow No supplementary beds in the patients' rooms Enough space in the patients' rooms: e.g. removal of unnecessary furniture, rearrangement of the furniture	Within six months Management and head nurse Immediately Head nurse Immediately Medical management and head nurse Immediately All members of the care unit	
			Information about hazards	Information on safe conduct	Within the next six weeks for the entire staff of all care units Head nurse, security officer	
			Elimination of the physical load for the carer	Training in the handling of electrical beds Training in back-friendly and patient resources-orientated working ways	Within eight weeks The person responsible for medical devices Within the next two years, basic training for the entire workforce, Within the next four years, follow up for the entire workforce	

2.12. Example of a risk assessment based on the task of surface disinfection

Working area: Internal medicine

Professional group: Nursing staff

Task: Surface disinfection as routine disinfection (scrubbing/wiping disinfection) of large surfaces

Step 1 — Identifying hazards and those at risk

Example: Information provided by safety data sheets, the duty roster, working appliances — How can information be collected including who might be harmed and how?

Routine surface disinfection is performed as scrubbing/wiping disinfection with a diluted, aqueous disinfection solution which may contain dangerous substances. Surface disinfectant concentrates are normally diluted in water to an approx. 0.25 % to approx. 3 % application solution, depending on the type and concentration of the active substances. Consumption of the application solution is more than 50 ml/m² and less than 100 ml/m² of basic floor area but may amount to a total of several litres depending on the extent of disinfection. The activity frequently occurs on the wards, and may take minutes (e.g. with nurses) or hours (with assistant nurses or cleaning staff). Fixtures, work surfaces, beds, equipment and machines etc. are disinfected.

The workers are exposed to various risks, in particular:

- musculoskeletal risks due to prolonged or awkward postures or heavy lifting and carrying (e.g. mattresses, fixtures);
- risks of infection (infection risk typical of hospitals);
- chemical risks due to the action of various substances for cleaning and disinfecting as well as prolonged wet work which may result in swelling of the skin, wear-related dermatoses and sensitisation.

The labelling of dangerous substances normally gives the user sufficient information on the risks arising from the product. The standard dilutions produced by the users from disinfectant concentrates frequently contain active substances of less than 0.1g/100g and therefore less than 0.1 % in the working solutions. Labelling of these working solutions can usually be dispensed with. However, risks may still remain for the workers even from diluted disinfectants.

Step 2 — Evaluating and prioritising risks

Example: Not all identified risks have the same importance — How can I evaluate which risks should be prioritised and tackled first?

Dermal risks arise from direct contact with the disinfectant or from splashes. This must be allowed for, in particular with certain critical ingredients which, for example, cause sensitisation by skin contact (R43). The risk phrases for the ingredients can be found in Section 2 of the safety data sheet.

Inhalation risks arise due to the evaporation of the ingredients. Fire and the risk of explosion are possible with inflammable products. Standard application solutions, however, are not inflammable.

Reaction products do not arise if the disinfectant is used in accordance with the instructions. One speciality is products with formaldehyde splitters such as, for example, 1,6-dihydroxy-2,5-dioxahexane (CAS No 3586-55-8). In the case of these products, formaldehyde is not added as an ingredient during production but arises in a chemical reaction in the concentrate. The user is therefore confronted with a formaldehyde-containing disinfectant although this is not directly apparent.

Dermal risk

The dermal exposure can be avoided with all disinfection activities, regardless of the ingredients of the disinfectants, by wearing appropriate protective gloves. The wearing of liquid-tight protective gloves, especially for more than two hours per shift, represents a special risk from 'wet work'.

Inhalation risk

It can be stated in summary for the inhalation risk that it is normally negligible, apart from aldehydes.

The disinfectants are classified into product groups which are distinguished according to ingredients.

Product group: Quaternary ammonium compounds and biguanides

The inhalation exposure is insubstantial for products with quaternary ammonium compounds and biguanides as long as no aerosols form.

Evaluating and prioritising risks

Product group: Aldehyde-containing products

Aldehydes normally have a sensitising potential; in addition, formaldehyde even has a carcinogenic potential (C3 acc. to EU; C1 acc. to IARC). Even if the limit values are undershot, a health risk cannot be excluded with sensitising substances if they sensitise the respiratory tract (R42).

Product group: Alcohols

The inhalation alcohol exposure is negligible with alcohol-containing products with maximum concentrations of up to 10g/100g in the concentrate and therefore normally 50 mg/100g in the 0.5 % application solution.

Product group: Other ingredients (phenol derivatives)

Surface disinfectants may also contain other active substances in addition to the abovementioned ingredients, e.g. phenol derivatives. The substance-specific risk must be determined on a case-by-case basis if these products are used.

Risk of fire/explosion

A risk of fire or explosion (conflagration) only exists if the concentrates are labelled with a flame symbol or with R10 (flammable). There is no risk of fire or explosion for the other diluted application concentrations.

Products with a higher alcohol content are unsuitable as disinfectants for large surfaces owing to the risk of fire/explosion.

Step 3 — Deciding on preventive action T-O-P

Examples of appropriate measures to certain risks (Technical prior to Organisational prior to Personal measures)

Substitution

A regular check must be made to determine whether cleaning is sufficient instead of disinfection. The necessary disinfection work is stipulated in the hygiene plan.

Many products are offered for surface disinfection which have no volatile ingredients or which contain substances with fewer critical properties. The suitability for use of a less critical product must be examined.

The following risks are to be allowed for, in particular when disinfectants are replaced:

- The sensitisation potential of the ingredients (R42, R43)
- Products containing aldehydes, in particular formaldehyde and glutaraldehyde, should only be used in justified cases in view of their volatility and the risk potential which remains even if diluted solutions are used.
- Wiping procedures are to be used, not spray methods with a fine mist, for the disinfection of large surfaces.

Technical

- With application concentrations of over 1 % and volatile ingredients (apart from alcohols) it must be assumed that technical ventilation is required. The ventilation must ensure an adequate number of air changes.
- Handling of the disinfectant with aids to minimise skin contact
- Aerosols are to be avoided as far as possible. For example, with a lower pressure, aerosol formation at the discharge opening and the impact speed of liquid particles and therefore the volume of aerosol produced there can be reduced. (This is relevant, for example, in the disinfection of baths for hospitals and nursing homes with showers.)

Organisational

- Necessary disinfection work is stipulated and employees are instructed in how to work properly prior to starting these activities. Specifications on the production of the application concentration and contact time are observed.
- Good ventilation, if possible cross ventilation, during disinfection must be ensured by opening doors and windows.
- If technical ventilation facilities are present, they must be put into operation during disinfection.
- The application of disinfectants to hot surfaces must be avoided as the disinfecting action is no longer produced owing to the faster evaporation of the active substances (missing contact time). Moreover, there is also a major risk due to evaporating substances which would normally be negligible at room temperature (e.g. heat disinfection).





Personal/individual

- As regards personal protective measures, always observe Section 8 of the relevant safety data sheet.
- Use appropriate gloves; gloves made of nitrile rubber are usually suitable. In view of the variety of products used, no definitive information can be provided here on protective gloves. Section 8 of the relevant safety data sheet always contains notes.
- Wear appropriate body protection when it is expected that clothing or shoes can become wet through.

Step 4 — Taking action

Employees have to be informed about the results of the risk assessment. For the implementation of the measures, it has to be planned what should be done by whom and by when. A time schedule has to be established with everybody involved. The involvement of workers from different occupational groups and with different needs, such as younger and older workers, male and female workers and other groups of workers, in the implementation of measures supports the acceptance of measures and their long-term success.

Step 5 — Documentation, monitoring and review

Documentation

The risk assessment has to be documented. The documentation should involve the results of the risk analysis, the implemented measures and the results of the evaluation of the measures.

Monitoring

The results of the measures have to be monitored and evaluated. Additional modifications might be necessary if the improvements do not produce the expected results. The implemented measures will be monitored by one or more employees. They report to the responsible manager in their department and/or the hospital. The group leader or the head of the department is responsible for monitoring and reviewing the risk assessment.

Review

The assessment should be reviewed at regular intervals. It has to be revised whenever significant changes occur. The occupational risks and hazards should be updated yearly and a continuous improvement process established. A set date to review the measures taken and to reevaluate the risks is included in the documentation. Ideally, the managers responsible report to the higher management if the goal of preventing or reducing a risk was achieved or not.

3

Biological risks

- 3.1. Introduction
- 3.2. General risk assessment of potential occupational exposure to infection
- 3.3. Special risk assessment of biological risks
 - 3.3.1. Risk of blood-borne infections
 - 3.3.2. Risk of airborne infection
 - 3.3.3. Risk of direct and indirect contact infection
 - 3.3.4. Description of good company practice: handling contact infections
 - 3.3.5. Special infections
- 3.4. Pregnancy
- 3.5. Relevant European Union directives
- 3.6. Links
- 3.7. Literature

3.1. Introduction

Health sector personnel face an increased risk of contracting an infection, for which numerous and to some extent quite disparate pathogens play a significant role. As a rule, the risk is either unexpected or not immediately apparent, which makes risk assessment particularly difficult.

A new way to assess risk

A risk assessment is crucial to the prevention of infection among personnel working in areas of high risk.

Any assessment of risk potential must take account of:

1. the natural virulence of the pathogen;
2. its capacity to survive in the environment;
3. the severity of the disease;
4. the dose or exposure level necessary to cause illness or infection;
5. the mode of transmission;
6. epidemiological factors.

The classification of Directive 2000/54/EC of the European Parliament and of the Council on the protection of workers from risks related to exposure to biological agents at work

Four risk groups, according to their level of risk of infection:

- **Group 1**
Biological agent means one that is unlikely to cause human disease.
- **Group 2**
Biological agent means one that can cause human disease and might be a hazard to workers; it is unlikely to spread to the community and there is usually effective prophylaxis or treatment available.
- **Group 3**
Biological agent means one that can cause severe human disease and present a serious hazard to workers; it may present a risk of spreading to the community, but there is usually effective prophylaxis or treatment available.
- **Group 4**
Biological agent means one that causes severe human disease and is a serious hazard to workers; it may present a high risk of spreading to the community; there is usually no effective prophylaxis or treatment available ⁽¹⁶⁾.

⁽¹⁶⁾ See Article 2 of Directive 2000/54/EC of the European Parliament and of the Council of 18 September 2000 on the protection of workers from risks related to exposure to biological agents at work (seventh individual directive within the meaning of Article 16(1) of Directive 89/391/EEC) (OJ L 262, 17.10.2000, pp. 21–45). Annex III contains a list of Community classified biological agents.

Connected with the risk groups is a classified bundle of protective measures that allows a general reaction on different levels of hazard. Nevertheless, a specific response on a current situation is not easy with this system, as hazard in healthcare can change rapidly.

The European system of risk assessment requires an evaluation of the risk potential of every pathogen likely to be encountered, the allocation of pathogens into risk groups and the drawing up of precautions based on this risk analysis and risk grouping. If pathogens of different risk groups are present, the set of precautions for the highest risk category should be implemented. Although this approach is effective, it is also time consuming and complex and the determination of the protective measures to be employed is abstract.

For the purpose of meaningful risk assessment, it is strategically more sensible to bundle pathogens into groups rather than consider every pathogen individually. Categorisation according to the mode of transmission offers an appropriate solution, because protective measures are directly connected to the mode of transmission.



01 The employer is responsible for the risk assessment.

In the context of the health sector three modes of transmission are of relevance:

1. blood-borne infections
2. airborne infections
3. contact infections.

Faecal-oral infections also present a risk but can be prevented in the same manner as contact infections.

Risk analysis and assessment procedures should be developed separately for each of the defined modes of transmission and the protective measures stipulated respectively.

In some instances, special attention needs to be paid to special aspects or questions that arise in connection with particular pathogens or health sector activities. These are referred to below.

3.2. General risk assessment of potential occupational exposure to infection

Health service workers engaged in different areas or activities are exposed to quite different types of risk from infection.

Step 1 — Identifying hazards and those at risk

Information on the risk from biological agents can also be found in books on occupational medicine (see literature). Instructions concerning the current risk situation can be obtained from national databases, for example in Germany epidemiological studies on outbreak situations by the Robert Koch Institute. The employer should utilise the expertise of a physician who specialises in occupational medicine and conduct the risk analysis together with him or her.

Risk areas include (non-exhaustive list)

- Operating theatres
- Acute medicine
- Intensive care units
- Emergency and ambulance services
- Dialysis
- Laboratories
- Geriatrics, especially where there is exposure to blood and blood products, potentially hazardous devices and instruments, or handling of aggressive patients
- Pathology, anatomy and forensic medicine (excluding laboratories)
- Blood and plasma donor banks and centres.

Activities with potential risk of infection

- Clinical examination of humans
- Taking specimens of blood, body fluids or other clinical specimens e. g. smears
- Surgical procedures
- Dressing/treatment of wounds
- Care of patients incapable of looking after themselves
- Attending humans or animals at risk from others or themselves
- Working with animals.

In addition, the following activities can also present a risk of infection:

- cleaning, disinfection, repair and maintenance work as well as transport and disposal work in contaminated areas and/or with contaminated equipment and objects;
- contact with areas where infection is suspected, e.g. contaminated materials in laundries (soiled laundry zone);
- handling/moving of cleaning or disinfection apparatus;
- handling pointed or sharp instruments or equipment.

Step 2 — Evaluating and prioritising risks

Specific risk assessment for biological risks

This is based on empirical knowledge, i.e. of which pathogens usually occur. In addition, epidemiological studies provide details of the frequency of infections and hence instructions concerning the risk assessment. Information about sud-

denly changing situations (under certain circumstances pandemic outbreaks such as SARS or swine flu) is passed on in the public media. It should include:

- consideration of which pathogens are commonly encountered (epidemiological situation);
- consideration of which pathogens present a risk or possible exposure (risk group);
- consideration of which means of transmission are encountered;
- consideration of whether the work situation involve pressures of time and responsibility or high stress levels;
- assessment of which risks require a risk minimisation plan;
- determination of concrete measures to minimise risk;
- implementation of health and safety measures.



02 There is a high risk from blood in operating theatres.

Step 3 — Deciding on preventive action — T-O-P

General precautions — Standard measures of hygiene

These are measures that have to be taken with contact to all patients to avoid a transmission of pathogens to the patients and to healthcare workers to reduce the risk of nosocomial infections. These include mainly the hygienic disinfection of the hands, but also the correct use of barrier precautions, according to the circumstances:

- use of gloves (see below);
- use of protective clothing (see below);
- use of filtering face masks (see below);
- the disinfecting and cleaning of visibly contaminated surfaces and objects and regular maintenance of medical products, as an important standard hygiene measure.



03 Example of a technical measure: safe equipment should be used.



Technical measures and building installations

The following preventive methods relate to general, basic methods of patient hygiene and care. They are, however, equally relevant to the health and safety of workers and should therefore be mentioned. In order to avoid potential risk, the employer is obliged to ensure that the necessary technical and hygienic measures are put in place. In certain situations the use of personal/individual protection methods is also appropriate and should be implemented. The specific methods prescribed depend on the actual situation or working conditions and, where necessary, should be extended or altered to take account of materials and workplace criteria.

Measures of hand hygiene

Hygienic hand disinfection

If there is an actual or even possible microbial contamination of the hands, hygienic hand disinfection is essential. In the case of a suspected or probable contamination use must be made of a reliable bactericidal, fungicidal and virucidal preparation, provided valid test results are available for it (e.g. isolation unit, children's ward, suspected or definitely transmittable infection). Hygienic hand disinfection must be carried out in such a way that the contamination flora still on the hands are largely killed off.

The alcoholic preparation is rubbed in over all the areas of the dry hands, paying special attention to the inner and outer surfaces including the wrists, the areas between the fingers, the finger tips, the nail folds and thumbs, and these are to be kept moist for the entire exposure time.

Hygienic hand disinfection is necessary:

- before the individual concerned enters the clean side of the personnel sluice of operating departments, sterilisation departments and other clean room areas;
- prior to invasive measures, even if gloves (sterilised or unsterilised) are worn (e.g. installing a vein or bladder catheter, before angiography, bronchoscopy, endoscopy, injections, puncturing);

04 Hand disinfection has priority over hand washing. Hands should only be washed first and then disinfected if they are visibly dirty.



- prior to contact with patients who are subject to a particularly high degree to the risk of infection (e.g. leukaemia patients, polytraumatised patients, patients who have been exposed to radiation or are otherwise seriously ill, patients with burns);
- prior to activities involving a risk of contamination (e.g. provision of infusions, production of mixed infusions, charging medications);
- before and after any contact with wounds;
- before and after contact with the area of insertion points for catheters, drain tubes etc.
- after contact with potentially or definitively infectious material (blood, secretion or excrement) or infected areas of the body.
- after contact with potentially contaminated objects, liquids or surfaces (urine collection systems, evacuation units, respirators, respiration masks, tracheal tubes, drain tubes, dirty washing, waste etc.).
- after contact with patients who may be a source of infections or who carry pathogens which are of special significance in terms of hospital hygiene (e.g. Methicillin-resistant *Staphylococcus aureus* (MRSA)).
- after removing protective gloves where there has been or probably has been pathogen contact or major soiling.

Before aseptic measures (e.g. when dealing with patients with burns) it may be necessary to wash the hands prior to hand disinfection as with surgical hand disinfection.

In the following situations a decision must be taken regarding hygienic hand disinfection or hand washing, according to the risk involved:

- before preparing and distributing food;
- before and after nursing or attending to patients where the indications mentioned with respect to hygienic hand disinfection do not apply;
- after visiting the toilet (if the individual is suffering from diarrhoea, it is highly probable that there will be a major discharge of viral, bacterial or parasitic pathogens with extremely low infection dose — rotavirus, SRSV, EHEC, *Clostridium difficile* and *Cryptosporidia* — and so hands should be disinfected first);
- after blowing one's nose (in the presence of rhinitis there is a high probability of a viral infection with consecutive increased discharge of *Staphylococcus aureus*, and so hands should be disinfected first).



05 The use of a brush to wash hands can be dispensed with because the brush may damage the skin.

Hygienic hand disinfection is a frequently repeated activity and mistakes are often made when it is being done. Such mistakes contribute both to a difficult to determine (but not inconsiderable) proportion of nosocomial infections and to work-related diseases (occupational diseases) among workers in the health service. It is the employer's job to strengthen compliance, in particular with respect to hand disinfection. This can

be achieved by taking part in campaigns (e.g. clean hands campaigns) or by means of inspections — measurement of the consumption of disinfectants or (unnoticed) observation of workers as they perform duties involving compulsory disinfection.

Hand washing

Before the start and after the end of work it is sufficient to wash one's hands once.

Mainly owing to its limited effectiveness, hygienic hand washing is no alternative to hygienic hand disinfection. If, in addition to hygienic hand disinfection, cleaning is required, this should only be carried out after disinfection, with the following exceptions. Heavily soiled hands are first carefully rinsed off and then washed, and care must be taken to ensure that the surrounding area and clothing are not splashed (e.g. in the case of soiling by blood).

Where necessary, the contaminated area must be disinfected subsequently and the overalls changed. Then the hands must be disinfected. Where the soiling is limited to certain spots, it can be removed using a paper handkerchief, cellulose or similar soaked in hand disinfectant and then the hand can be disinfected.

06 Hand washing before and after work, and when the hands are dirty.



Skin protection and skin care

Skin care for hands and underarms is an occupational duty since even the smallest cracks or microtraumas are potential pathogen reservoirs and it is not possible to reliably disinfect uncared for skin. It is important when providing skin care products and for hand disinfection and washing agents that they are not only demonstrably effective and available at an acceptable price, but also that they are acceptable to the personnel, which will be reflected in the degree of compliance with all measures of hand hygiene.

Skin care products should be taken from dispensers or tubes and are best used in work breaks or after work, given the impaired effectiveness of hand disinfection demonstrated as a function of the preparation; this applies where the manufacturer does not give well-founded instructions for use.

Where the skin is at risk from working in a wet environment, moisture-proof gloves must be worn, controlled precautionary occupational healthcare must be ensured, an operating manual must be produced and a skin protection plan drawn up. Jobs performed with liquid-proof gloves for more than two hours are also deemed to be wet work.

Basically the following applies:

Where hands are severely or visibly soiled they must first be washed.

Where it is suspected or definitely known that the hands are contaminated, priority must be given to hand disinfection. This is because disinfection is more effective in reducing germs and frequent hand washing damages the skin barrier.

All workers must have access to hand-washing stations with hot and cold running water, hand disinfectant dispensers, appropriate skin protection and skin care products, and disposable towels.

Workers must also have separate toilet facilities that are inaccessible to patients. This does not apply to the domestic sector. Surfaces (e.g. floors, worktops and surfaces, surfaces of apparatus, equipment) should be easy to clean and must be resistant to damage from the cleaning agent(s) and disinfectants used.

In work areas where activities are carried out which present an increased risk of infection, hand basins should be fitted with taps that do not require hand contact to be operated.

Organisational measures

The employer should only delegate work to persons who are suitably qualified in a health sector occupation unless they work under the instruction and supervision of an appropriately qualified member of staff whose training and experience make it possible to identify risks of infection and implement the correct preventive measures (e.g. doctors, nurses, medical assistant technicians, midwives and disinfectant specialists, as well as trained medical, dental and veterinary staff, ambulance staff, paramedics and care personnel). The requirement for supervision is deemed to be fulfilled when the person supervising the personnel is convinced that further monitoring is not necessary and that the designated task or function can be fulfilled without further supervision and includes the provision that spot checks should be carried out to make sure that the work is being carried out properly and safely.

The employer may not delegate tasks where there is a potential risk of infection to juveniles or expectant and nursing mothers unless precautions are taken to ensure that they are not exposed to a health risk. The employer is responsible for preparing a list of written measures (hygiene plan) geared to the specific area of work and risk of infection, including disinfection, cleaning and sterilisation, and supplies and disposal.

Personnel should not consume or store any food or drink in workplace areas where there is danger of contamination through biological agents. Employers should therefore provide staff lounges/separate rest areas for this purpose. In the case of activities where hygiene considerations dictate hand disinfection, personnel should be informed that no jewellery or watches may be worn on the hands or lower arms and that no earrings and other jewellery are permitted.

Following contact with patients and exposure to infectious or potentially contaminated materials, personnel must disinfect and/or wash their hands taking into account the risk assessment of the specific cases.





Personal/individual protection

Protective wear is any clothing specifically intended to protect workers from the potential hazards and risks of the work situation or to protect their ordinary work clothes or personal clothing from becoming contaminated with pathogens. Used protective clothing must be kept separate from all other clothing. To this end, the employer must provide separate cloakrooms and changing facilities.

Employers should provide personnel with sufficient quantities of the appropriate protective clothing and all other personal protective gear and equipment (PPE), especially fine, impermeable, hypoallergenic gloves. They must also ensure that these materials are regularly disinfected, cleaned and, where indicated, mended or repaired. Workers' representatives shall be consulted before a decision on the use of protective equipment is made (Article 8 of Council Directive 89/656/EEC ⁽¹⁷⁾). If work clothes become contaminated they should be changed and then disinfected and cleaned by the employer. Personnel are obliged to use the protective wear and equipment provided. Personnel should not be allowed to take protective wear home for the purpose of washing. Admission to staff lounges, rest areas and canteens is not permitted to personnel wearing protective wear.

07 Adequate face protection is absolutely essential for operations involving a risk of splashing.

08 Face visors can prevent contamination of the eyes.



The employer should also provide staff with the following additional personal/individual protection:

- durable, impermeable, hypoallergenic gloves to be worn when disinfecting and cleaning used instruments, equipment and surfaces; gloves should not be affected by the disinfectants used;
- impermeable, hypoallergenic gloves for cleaning work with long arms (gauntlet gloves) that can be tucked in to prevent contaminated fluids from running back under the glove;
- cotton inner gloves for activities that involve prolonged use;
- waterproof aprons or gowns where there is a possibility that clothing could get wet;
- waterproof footwear for working conditions where it could be wet underfoot.

⁽¹⁷⁾ Council Directive 89/656/EEC of 30 November 1989 on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace (third individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC, OJ L 393, 30.12.1989, pp. 18–28.

Eye and face protection should be provided against aerosol droplets and splashes of contaminated or potentially contaminated materials or fluids if technical measures do not otherwise afford sufficient protection.

This could occur in the following situations:

- surgical procedures, e.g. in vascular surgery, orthopaedic procedures (sawing bone);
- endoscopic examinations;
- diagnostic and therapeutic punctation;
- intubation, extubation and management of endotracheal tubes;
- insertion, cleaning and removal of in-dwelling catheters.
- dental procedures, e.g. ultrasound removal of dental calculi;
- caring for patients where there is coughing or expectoration;
- cleaning contaminated instruments by hand or ultrasound;
- work in mortuaries, e.g. when using hand-held devices or in the event of compression of the chest cavity of bodies when lifting and moving.

Suitable equipment for protecting eyes and face includes:

- safety glasses with side protection, including corrective glasses;
- fit-over safety goggles;
- safety glasses — disposable with side shields;
- mouth protection and visor combination (disposable).

Personnel are obliged to wear the prescribed personal protective gear.



09 Eye protection for dental procedures.

Medical gloves: requirements for medical gloves

Qualitative minimum requirements for disposable medical gloves in the health service

These must be manufactured in compliance with EN 455, i.e. with its stipulated thickness (accepted quality norm: AQL > 1.5) and other criteria. In view of the relatively high number of health sector workers with latex allergies, disposable gloves made of natural latex must comply with the guidelines on hazardous materials and should therefore be non-powdered and hypoallergenic.

Use of protective gloves

The so-called glove plan, which sets down guidelines regarding which type of glove should be worn by whom and for which purpose, often proves a valuable decision-making aid. The glove plan not only reduces the possibility of mistakes about the suitability for use but also serves cost reduction. Ideally, the decision about which gloves to select should be made in the works' health and safety committee, which would, in all probability, ensure greater acceptance among personnel (see Table 3.1, page 62).

In the operating theatre, non-powdered surgical gloves made of natural latex are advisable as currently no other material equals them in terms of comfort, fit, grip and wear. Surgical departments must decide internally when it is necessary to wear double gloves or gloves with a perforation indication system. The latter may be useful in the case of long surgical procedures lasting several hours as well as in procedures where there is an increased risk of perforation (e.g. in trauma surgery or orthopaedic procedures) or a specific risk of infection (e.g. HIV/AIDS).

With respect to the use of non-sterile protective gloves, there are at least three different types that recommend themselves and should be made available.

- In non-clinical activities, such as kitchens, technical services or cleaning (as long as infectious or potentially contaminated material is not involved), PVC or polyethylene (PE) gloves may be used; however, medical protective gloves (tested to EN 455 standards) are not necessary.
- For simple tasks in patient care where grip control or sensitivity to touch are not particularly important, gloves made of synthetic materials such as PVC or PE are generally sufficient.
- By contrast, latex gloves are preferable for all activities that involve exceptional mechanical strain or where gloves need to be worn for longer periods of time. For tasks requiring a high degree of sensitivity to touch and strong grip control, it is essential that latex gloves are worn.

It is advisable to store gloves at all workplaces because the route to finding the gloves prevents the wearing of them. For the user, this means the end of a thoughtless, careless attitude towards gloves. In future, more consideration should be given to the importance and function of gloves. Management must ensure that the importance of wearing gloves forms part of workplace instruction, which should be included in basic training, refresher courses and further training.

If workers report allergic reactions or sensitivity following contact with medical gloves a decision should be made (in cooperation with the works physician or health and safety expert) regarding the choice of alternative products. Following consultation with all departments it is generally possible to put together a selection of gloves that meets all the different sets of requirements. Allergies or adverse reactions associated with the wearing of medical gloves need to be taken seriously and diagnostic procedures (including dermatological diagnosis if necessary) should be initiated.

Mistakes relating to the use of medical gloves

- Disinfectants are usually concentrates that are diluted in solution. When using solutions made up from concentrates it is necessary to wear the appropriate chemical gloves in order to provide effective skin protection (higher membrane strength, compliant with EN 374). Medical gloves (made of latex, PVC or polyethylene) are not suitable wear for this type of work.
- Work in the emergency and rescue services requires especially tough gloves that are strong, durable and do not tear easily. This is often not given sufficient attention (see PVC).
- Incorrect storage of packs of gloves, for example involving exposure to heat or ultraviolet rays (fluorescent lamps, sunlight), has been observed in many ambulances (and doctors' surgeries). Light and heat cause oxidation, which effectively reduces the strength and elasticity of natural latex products.
- Gloves are put on although the hands are still wet from residual hand disinfectant. Once covered, alcohol-based hand rubs cannot evaporate. This may cause burn-like symptoms. It has yet to be determined whether disinfectants with additional extracts cause after-effects.
- Surgical gloves are frequently worn for aseptic tasks and procedures, although sterile examination gloves (which are usually much less expensive) are entirely suited for such purposes. According to the task or activity, individually packed sterile gloves are perfectly sufficient, e.g. for endotracheal suction of patients on respirators.

As a basic principle the selection of personal protective equipment must take full account of the risk and the activity involved (the protective goal). Below are three tables containing instructions for the use of protective gloves and protective clothing.

Glove	Material	Use	Examples
Unsterile	Disposable glove (polyethylene (PE))	Working with low mechanical load	Discharging urine
	Household glove	Working with high mechanical load	On contact with dirt
	Latex examination glove	For medical activities	Removing dressings, disposing of soiled material Working with tactile sensation
	Examination glove (latex-free e.g. PVC)	Working with disinfectant/cleaning solutions and in case of allergies against latex	Working with tactile sensation Working with surface and instrument disinfectant solutions
	Protective glove of nitrile or similar	Broad use spectrum with exposure to hazardous substances (cytostatica)	With skin irritations, incompatibility, for big operations, good tactile properties
	Cloth glove (e.g. seamless cotton yarn gloves)	When protective gloves are worn for long periods	With skin irritations, incompatibilities
Where relevant also acceptable to use sterile			
Sterile operating gloves	Disposable glove (polyethylene (PE))	When working under sterile conditions and with low mechanical load	With indwelling catheter, tracheal evacuation glove liner in the case of possible latex intolerance
	Latex glove (sterile use operating gloves)	When working under sterile conditions with high mechanical load	Wound care, insertion of catheters, operations
	Latex-free glove	See above Where allergy has been determined in patient or personnel	See above

Table 3.1: Glove materials, special uses for these gloves and examples of the application of protective gloves in the health service

Source: Deutsche Gesellschaft für Krankenhaushygiene.

Clothing	Use	Frequency of change
Work clothing	In working areas with low hygienic requirements (e.g. psychiatry, old people's residential facilities) Where there is the risk of contamination, protective clothing from employer	The frequency of change depends on the individual circumstances at the workplace; in the case of contamination immediately Normally daily change
Area clothing Allocation to a certain working area	In defined areas, such as operating/functional areas	To be taken off when leaving the area
Protective clothing Apron overall Protection of working/service clothing	Over working, area or personal clothing	Immediately after visible soiling After completion of activity To be taken off for eating and in breaks
Hair protection	Protection of head from contamination by infectious material (e.g. during invasive measures)	Disposable product, direct disposal after use Subsequent hygienic hand disinfection
Eye protection	Protection of eyes against contamination from infectious material or chemical hazardous substances/operations	Disposal of single-use material Disinfection/cleaning of reprocessible material in the case of contamination
Mouth-nose protection (mask)	Protection of patient against contamination, exhaled and spat-out aerosols	Direct disposal of single-use products To be taken off after completion of work Subsequent hygienic hand disinfection
Respiratory protection Filters the respiration air in order to retain infectious aerosols	Where infectious aerosols arise, or where there are airborne infections	Disposable product, with subsequent hygienic hand disinfection No reuse



10 Area clothing does not meet the requirements of protective clothing; the protective clothing must be worn over the area clothing.

Table 3.2: Protective equipment — use and change requirement

Source: Deutsche Gesellschaft für Krankenhaushygiene.

	Work clothing	Protective clothing	Hair protection	Eye protection	Mouth-nose protection
Hospital	Work clothing to be provided by company/ employer.	<p>Sterile protective clothing, e.g. for invasive measures</p> <p>Sterile protective clothing where there is a risk of contamination and for isolation</p>	<p>Operating/functional departments</p> <p>In the case of operative interventions where there is a risk of contamination</p>	<p>Where there is a risk of splashing when handling body fluids and disinfectant/cleaning concentrates and other chemical substances</p>	<p>Operating/functional areas</p> <p>Risk of contamination for patients</p> <ul style="list-style-type: none"> – where relevant in the case of isolation – in the case of immunity-suppressed patients <p>Respiratory mask as protection for personnel when dealing with airborne diseases</p>
Rehabilitation clinics	Work clothing to be provided by company/ employer	<p>Sterile protective clothing for operative/invasive interventions</p> <p>Unsterile protective clothing where there is a risk of contamination</p>	In the case of invasive measures	<p>Where there is a risk of contamination</p> <p>When handling disinfectant/cleaning concentrates and other chemical substances</p>	<p>For example, in the case of defined invasive measures</p> <ul style="list-style-type: none"> – where there is a risk of contamination – where relevant in the case of isolation – where relevant with immunity-suppressed patients <p>Respiration mask</p> <p>Isolation/dealing with highly contagious diseases</p>
Nursing facilities	Work clothing to be provided by company/ employer	<p>Unsterile protective clothing in the case of invasive measures</p> <p>Sterile protective clothing where there is a risk of contamination and in cases of isolation</p>	In the case of invasive measures	<p>Where there is a risk of contamination</p> <p>When handling disinfectant/cleaning concentrates, including chemical substances</p>	<p>As patient protection with invasive measures</p> <p>Where there is a risk of contamination for infectious patients to reduce infectious aerosols</p> <p>In cases of isolation</p>
Outpatient care	Work clothing	<p>Sterile protective clothing for defined invasive measures</p> <p>Unsterile protective clothing (apron) where there is a risk of contamination for short-sleeved clothing</p> <p>Covering overall where there is a risk of contamination to the lower arm/when clothing is drawn back</p>	Not applicable	Not applicable	<p>For defined invasive measures</p> <p>Where there is a risk of contamination</p> <p>Where relevant in the case of immunity-suppressed patients see ‘Nursing facilities’</p>

Table 3.3: Use of different protective clothing in various areas of the health service

Source: Deutsche Gesellschaft für Krankenhaushygiene.

Cleaning, disinfection, sterilisation

When cleaning used instruments additional protective measures in keeping with the respective mode of transmission should be adopted. Special protective measures are required when personnel are engaged in the cleaning and sterilisation of instruments that have been in contact with patients with Creutzfeldt-Jakob disease (CJD) or new variant Creutzfeldt-Jakob disease or comparable spongiform encephalopathy or suspected cases.

The greatest risk of infection occurs when preparing instruments for cleaning as they are still contaminated by blood, body fluids or body tissues and the risk of injury is relatively high. Disinfectants effectively reduce the bacteria count and hence the risk of infection is much lower after disinfection. But there is also a clear risk of injury during the manual cleaning of instruments. At the same time, attention should be paid to the effects of the potentially allergenic and hazardous chemical materials employed in such procedures.

If infectious or potentially contaminated instrumentation, devices, equipment or materials are handled at one central unit, it is essential that the incoming (unclean or contaminated) zone and the outgoing (clean/sterile) zone be strictly separated both in terms of organisation and actual location. The incoming zone should be spacious enough to be able to store the soiled incoming items for a brief period before they can be dealt with effectively. Prior to leaving the contaminated zone personnel must remove all personal protective equipment (PPE) and disinfect their hands. If instruments are cleaned and sterilised in one central unit any risk assessment must take account of all the potential pathogens generally encountered.

When cleaning instruments from high-risk medical situations, particular care and attention should be paid to the increased incidence of microorganisms specific to that situation and the special risks anticipated. The disinfection and cleaning of instruments should preferably be carried out in a closed automated system in order to minimise the risk of injury or contamination and to protect workers from contact with disinfectants. Technical and organisational steps should be taken so that the soiled instruments do not need to be re-packed in advance of cleaning.



11 The personal protective equipment must be put on before the activity involving the risk of infection.

Manual cleaning of contaminated instruments should be kept to an absolute minimum. However, if manual preparation of the instruments is unavoidable, this should be done in a separate, well-ventilated room that is not used for other purposes, especially not for the storage of open items, such as a changing room or recreational or rest area.

Whilst cleaning instruments manually, personnel must wear long protective gloves, mouth-nose protectors and protective glasses, as well as a waterproof apron or gown to protect skin and mucous membranes against contact with infectious material. If the staff member carrying out manual cleaning operates behind a screen and is effectively protected, the mouth-nose protector and protective eyewear may be dispensed with. The protective gloves chosen must be suitable for working with disinfectants and afford protection against potentially infectious material.

It is important to avoid producing aerosols or airborne droplets during the initial cleaning of instruments, especially if sticky, dried-on material needs to be removed. For this reason, the instruments should not be placed under a strong jet of water or sprayed. If contaminated instruments are placed in an ultrasonic cleaning bath, the bath should be covered during use and the aerosols extracted by suction.

Every precaution should be taken to avoid injury when handling sharp, pointed and cutting instruments designated for manual cleaning. To this end, various precautionary steps should be taken beforehand, for example in the operating theatre or treatment room.

- All items which are not designated for processing, such as single use instruments, swabs, compresses, wipes and towels, should be removed from the sieve or container using tongs or a similar tool.
- Scalpel blades, needles and canulae should — wherever possible — also be handled using tongs or a similar tool. Sharp or pointed instruments or instrument parts should be laid out separately in a sieve or on a kidney dish.

12 Care must be taken to select sturdy protective gloves for cleaning work.



- All machines and equipment that need to be processed by hand must be handled separately with caution. Attachments such as drills and cutting devices, should be removed.
- Minimally invasive surgical (MIS) instruments, which need to be taken apart prior to processing, should be kept separate and — if possible — placed on an MIS sterilisation trolley at the same time as they are disassembled.
- Tangled hoses, pipes and cables should be avoided by keeping them separate from the outset.

Handling soiled linen

Linen used where there is a high risk of contamination from pathogens and infectious materials must be discarded and disposed of immediately at the site of use in sufficiently sturdy, closed containers ready for collection. Laundry should be transported so that personnel are not exposed to biological agents. The containers must be clearly labelled.

The following precautions apply to linen collection:

- separate handling of infectious linen;
- separate handling of wet linen (heavily soiled with body excretions);
- separation according to the method of laundering and cleaning.

A suitable laundry collection system uses:

- textile bags made of a fabric which is so closely woven and dense that it is virtually impenetrable;
- plastic bags, e.g. polyethylene sacks, to bag the soiled linen;

For the purpose of infection control, the following points should be observed regarding the handling and transport of full laundry bags.

- They should be closed during transportation, should not be thrown, stacked high or rammed together.
- It should be possible to put the contents in the washing machine or in the laundry system.

Precautionary measures

In occupations where there is a high risk of infection the workers should be examined regularly with respect to the work they carry out. It is particularly important that occupational health checks and examinations are carried out if there is an occupational exposure to microorganisms which could cause infectious disease.

Medical check-ups and health and safety reviews should help identify problems at an early stage and ideally prevent health problems resulting from transmissible infection.

The employer, usually in consultation with the medical officer or designated health and safety officer, chooses the persons and groups of workers selected for medicals. In the health sector, a medical check-up is a condition of employment for all new workers.

In addition to medical check-ups, occupational healthcare embraces the assessment and management of occupational health risks (including recommendations on suitable precautions and protective measures). It also entails the submission of health and safety recommendations about workplace conditions and the continual improvement of occupational health and safety standards by applying the lessons gained through experience and through ongoing instruction and advice for staff and management. Vaccinations carried out during the course of medicals may prove necessary if risk assessment indicates vaccination as a suitable control of infectious pathogens.

One of the key tasks of occupational healthcare is the delivery of information and advice. Where workers are at risk from biological agents (pathogens) medical aspects are of great importance to occupational health. For example, if there is a history of a particular disease that might result in weakened immunity, there could be an increased risk of infection. A knowledge of modes of transmission, symptoms and post-exposure prophylaxis is also required, firstly to determine the precautions needed to prevent and control infection and secondly to ensure a prompt, correct response to critical exposures (e.g. needlestick injuries). In view of the aforementioned, advice on occupational health and risk control must address both management and personnel.

Workers are generally advised on occupational health at the same time as they undergo their medical check-up and the advice and information should be geared to the individual health status of the individual. However, as the intervals between medical check-ups tend to be quite long, it is advisable to provide all workers with general instruction and advice on occupational health and safety issues at least once a year. Here the aim is to remind personnel of the health risks associated with their work, especially when immunity is weakened, and to encourage them to accept the help available.

Vaccination

Vaccinations are an important link in the chain of preventive measures. An indicative list of diseases which can be prevented by vaccination can be found below. Directives 2000/54/EC ⁽¹⁸⁾ and 2010/32/EU ⁽¹⁹⁾ contain provisions regarding vaccinations. Vaccination is not compulsory.

13 It is advisable to provide all workers with general instruction and advice on occupational health and safety issues at least once a year.



Directive 2000/54/EC ⁽¹⁸⁾, Article 14, paragraph 3:

‘The assessment referred to in Article 3 should identify those workers for whom special protective measures may be required. When necessary, effective vaccines should be made available for those workers who are not already immune to the biological agent to which they are exposed or are likely to be exposed. When employers make vaccines available, they should take account of the recommended code of practice set out in Annex VII.’

Annex VII. (3): ‘Vaccination must be offered free of charge to workers.’

Directive 2010/32/EU of 10 May 2010 implementing the Framework Agreement on prevention from sharp injuries in the hospital and healthcare sector concluded by HOSPEEM and EPSU ⁽¹⁹⁾ states, in Clause 6 of the annex to the directive:

‘3. If the assessment referred to in Clause 5 ⁽²⁰⁾ reveals that there is a risk to the safety and health of workers due to their exposure to biological agents for which effective vaccines exist, workers shall be offered vaccination.’

⁽¹⁸⁾ Directive 2000/54/EC of the European Parliament and of the Council of 18 September 2000 on the protection of workers from risks related to exposure to biological agents at work (seventh individual directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 262, 17.10.2000, pp. 21–45.

⁽¹⁹⁾ Council Directive 2010/32/EU of 10 May 2010 implementing the Framework Agreement on prevention from sharp injuries in the hospital and healthcare sector concluded by HOSPEEM and EPSU (Text with EEA relevance), OJ L 134, 1.6.2010, pp. 66–72.

⁽²⁰⁾ Clause 5 concerns risk assessment.

Indicative list of illnesses that can be prevented by immunisation

Diphtheria	Influenza	Pneumococci
Hepatitis A	Measles	Rubella
Hepatitis B	Mumps	Tetanus
Human papilloma virus	Pertussis	

Step 4 — Taking action

Infection prevention measures must be implemented in consultation with the hygiene commission (a physician responsible for matters of hygiene) and a physician with expertise in occupational medicine. Bacteriological checks must be conducted to preclude any risk to workers.

Step 5 — Monitoring and review

Infection monitoring measures must be inspected regularly. If an outbreak occurs, special, more extensive investigations are required. The integration of a quality management system can give effective support when implementing infection monitoring measures.

3.3. Special risk assessment of biological risks

3.3.1. Risk of blood-borne infections

Blood-borne infections:

Hepatitis virus B, C and D

Human immune deficiency virus (HIV)

Handling blood

These viruses are transmitted parenterally (through blood-to-blood transmission). They enter the blood stream of the healthcare worker via contact with the infected body fluids of a virus carrier (predominately blood and blood products) and are transmitted through the mucous membrane or broken skin of the healthcare professional.

Occupational health risks are posed by:

- injuries from contaminated canulae, lancets or similar implements;
- broken skin — often unnoticed — when blood plasma, serum or similar fluids enter via broken skin despite the absence of any sharps or needlestick injury.

Areas of special exposure

These include: health services; mental health institutes and the prison service; care of the elderly; and ambulant care services, especially where personnel handle blood and blood products or potentially hazardous implements or equipment, or attend aggressive patients, such as:

- operating theatres and anaesthesia units;
- intensive care units;
- emergency and ambulance services;
- blood and plasma donor banks and centres;
- the supply and disposal side or other areas which serve the operation and maintenance of the areas listed above;
- dental units.

Activities with potential risk of infection include:

- clinical examination of humans;
- taking specimens of blood, body fluids or other clinical specimens, such as smears;



14 Installing an infusion is a critical moment with a high risk of injury.

- surgical procedures;
- dressing/treatment of wounds;
- care of patients incapable of looking after themselves;
- attending humans at risk from others or themselves.

In addition, the following activities can also present a risk of infection:

- cleaning, disinfection, repair and maintenance work, and transport and disposal work in contaminated areas and/or with contaminated equipment and objects;
- handling infectious materials or where contamination is anticipated or suspected (soiled laundry zone);
- setting up cleaning or disinfection apparatus;
- handling pointed or sharp instruments or equipment;
- handling healthcare waste.

Blood is the body fluid that presents the greatest risk of infection to healthcare personnel.

Basic hygiene rules

Body fluids, excretions and secretions must always be handled as if they were infectious. Therefore the most effective precautions must always be stringently and consistently applied to protect patients and personnel.

15 16 Sharps containers of an appropriate size must be available at the workplace.



Technical precautions

Risk assessment and needlestick injuries: safe sharps

In order to minimise the risk of workers injuring themselves with sharp medical instruments traditional instruments should be replaced — on the basis of the results if a risk assessment dictates and insofar as this is technically possible — with safer, modern equipment that presents a lower risk of resultant injury.

Safe equipment and utensils should be used in areas that present a high risk of infection and/or injury, such as:

- care and treatment of patients with blood-borne infections;
- attending patients who pose a threat to others;
- ambulance and emergency services and casualty departments
- hospital prison service

Safe equipment should be used as a matter of routine in all activities where there is a possibility of transmitting relevant amounts of infectious matter via body fluids, in particular when

- taking blood specimens;
- collecting other body fluids (minimally invasive punctures).

The selection of safe equipment must take account of various criteria, including: whether it is fit for the purpose; easy to operate and handle; and acceptable among the personnel for whom it is intended. Work practices and methods should be adapted to incorporate safe systems and best practice. Management has a responsibility to ensure that workers are capable of using safe equipment correctly. This can be achieved by informing workers about safe equipment and how it should be used.



17 There are very different technical solutions to prevent cannula injuries.



The success of the new measures should be monitored.

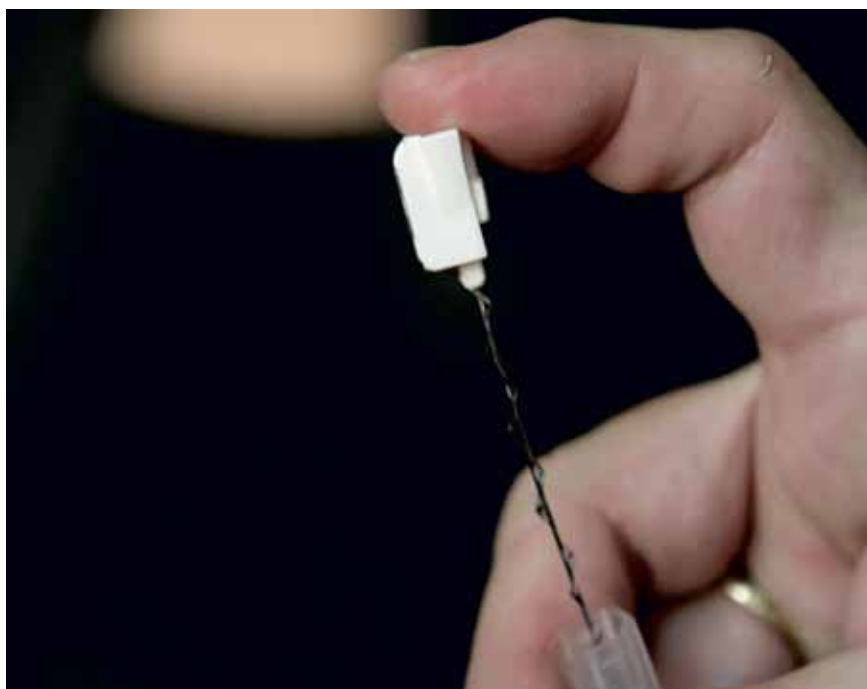
Safe equipment and utensils designed to protect staff from needlestick and cut injuries must not present any risk to patients.

Furthermore, they should fulfil the following criteria.

- The safety mechanism is integral to the system and compatible with other tools and accessories.
- It requires only one hand to activate.
- Activation can proceed immediately after use.
- The safety mechanism excludes further use.
- The safety product does not necessitate any changes to the application procedure.
- The safety mechanism must emit a clear signal (tactile or audible).

The use of safe equipment is accorded the same importance as procedures which facilitate putting syringes back in protective sheaths using just one hand, as exemplified by local anaesthesia in dental medicine or pens to inject medicine.

18 Needlestick injuries can be avoided with the use of safe products. After the injection, a protective cap remains at the end of the hollow needle to prevent puncture injuries.



Disposal of pointed and sharp instruments

As sharp, blood-contaminated objects present probably the greatest risk to personnel, it is essential that items such as syringes and canulae are immediately disposed of at the site of use in impenetrable, unbreakable containers. Staff should take such a container with them every time they carry out any invasive procedure — irrespective of how minimal — and containers should be placed in every work area where such instruments and objects are frequently used.

Waste containers

Personnel must have access to and use pierce-proof/puncture-proof, unbreakable containers for the collection of sharp and pointed instruments. Such containers should have the following characteristics:

- Closable, single-use containers
- Ability to retain contents even if knocked, placed under pressure or tipped over
- Impermeable and impenetrable
- Moisture does not adversely affect their solidity
- Suitable for the waste product in question in terms of size/capacity and the size of the opening
- The safety mechanism is not deactivated by disposal
- Clearly identifiable as waste containers through their colour, shape and labelling.



19 Sharp and pointed objects must be disposed of immediately after use.

Organisational measures should include:

- immediate disposal of sharp instruments in unbreakable, impenetrable containers directly at the site of use;
- routine, regular hand hygiene and skin care;
- disinfection, cleaning and sterilisation of blood contaminated instruments and work surfaces;
- regularly issued information bulletin on work health and safety regulations.





Personal/individual protection

Protective gloves and other protective equipment must be worn:

- when performing tasks where contact with blood, blood components, body fluids, excretions or secretions can be expected;
- including protective apparel (over uniform or work clothes) and — where necessary — waterproof aprons;
- during all tasks where contamination of clothing through blood, body fluids, excretions or secretions can be expected;
- to protect the respiratory tract and eyes (with filtering face pieces (FFP2) and protective eyewear) when the formation of aerosols or droplets or splashing with blood, body fluids or excretions/secretions can be expected, for example by the intubation of bronchoscopes, suction, dental treatment and transurethral procedures.

Occupational health precautions: immunisation (vaccination)

Hepatitis B is the only form of hepatitis for which there is an effective vaccine. The employer should offer immunisation free of charge and urge all workers exposed to risk to agree to active immunisation. The anti-hepatitis B vaccine also affords protection against the hepatitis D virus. Prior to primary immunisation, the immune status of the worker should be ascertained to establish if hepatitis B (HB) antibodies already present. If there is a negative finding (no immunity), is active immunisation indicated? If tests for anti-HBc are positive, then tests should establish whether HBs Ag and anti-HBs are present. (Further advice should be sought from a general practitioner or medical specialists.)

Non-responders

Approximately 5 % of vaccinated persons either do not develop an HB immunity or exhibit insufficient immunity following the first vaccination. When this occurs, a repeat intramuscular vaccination, perhaps even a double dose administered in both upper arms (m. deltoideus) can result in the desired protection. This also applies to combination vaccine with other vaccines (e.g. hepatitis A or influenza). Healthcare professionals who are considered non-responders, i.e. who have no immunity and remain unprotected following vaccination, should be informed that they are susceptible to an increased occupational risk and told about post-exposure prophylaxis (passive immunisation). It is advisable to secure written documentation in cases where a worker refuses vaccination.

Course of hepatitis B vaccine

Initial immunisation should be given at intervals of 0.1 and six months: four weeks after primary immunisation, a test should be done for vaccination efficacy. Given anti-HBs value > 100 IE/litre, a booster vaccine (one dose) should be administered as a rule 10 years after the complete course of primary immunisation.

Given anti-HBs values below 100 IE/L, vaccinate again (one dose) within a year and conduct antibody screening after four weeks. Given anti-HBs values below 10 IE/L, there should be immediate repeat vaccination. With additional vaccinations 60–75 % of non-responders or low responders will produce an adequate antibody count. Therefore, serum testing would be necessary in some specific cases.

Immediate measures following contact with infectious material

It is possible for pathogens to enter the blood stream through percutaneous injury (e.g. cuts, needlestick injuries).

Action should be taken even if the contaminated skin appears to be intact.

- Clean off the blood as soon as possible. Rinse the skin with water and disinfect the area using a skin disinfectant.
- For splashes and droplets of blood/body fluids on intact skin, wash with soap and water. Disinfect the area using a skin disinfectant.
- For contamination of mucous membranes (mouth, nose, eyes), rinse thoroughly with water or a physiological liquid (Aquadest or sterile NaCl 0.9 %) or 1:4 diluted iodine to water solution (mouth, nose).
- For blood/body fluids splashed on broken skin, clean off blood/body fluid disinfect with a skin disinfectant plus PVP iodine.
- The event should be well documented.

Vaccination post exposure?

Determining whether to vaccinate against hepatitis B post exposure:

- If the worker is immune (has been infected with hepatitis B in the past) or is adequately protected by earlier vaccination (anti-HBs > 100 IE/L within the last 12 months or has had a successful vaccination within the past five years), further measures are not required.
- If the donor (source of infection) is HBsAg negative, further measures are unnecessary although the worker should be vaccinated against hepatitis B (in order to safeguard against a similar incident in the future) unless he or she is immune or already sufficiently protected by vaccination

Directive 2010/32/EU implementing the Framework Agreement on prevention from sharp injuries in the hospital and healthcare sector concluded by HOSPEEM and EPSU ⁽²¹⁾

In November 2008, the European social partner organisations HOSPEEM (the European Hospital and Healthcare Employers' Association, a sectoral organisation representing employers) and EPSU (the European Federation of Public Services Unions, a European trade union organisation) informed the Commission of their wish to enter into negotiations in accordance with Article 138(4) and Article 139 of the Treaty establishing the European Community (the EC Treaty) with a view to concluding a framework agreement on prevention from sharp injuries in the hospital and healthcare sector.

On 17 July 2009 the European social partners signed the text of the framework agreement on prevention from sharp injuries in the hospital and healthcare sector, and informed the Commission of their request to submit the agreement to the Council for a Council directive.

The framework agreement aims to protect workers at risk of injury from all medical sharps (including needlesticks) and to prevent the risk of injuries and infections caused by medical sharps. It provides for an integrated approach to risk assessment, risk prevention, training, information, awareness-raising and monitoring and for response and follow-up procedures. The agreement will contribute to achieving the safest possible working environment in the hospital and healthcare sector.

The European Parliament adopted on 11 February 2010 a resolution supporting the proposal for a Council directive presented by the Commission in October 2009. Directive 2010/32/EU implementing the framework agreement was adopted by the Council on 10 May 2010. The Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this directive or shall ensure that the social partners have introduced the necessary measures by agreement by 11 May 2013 at the latest.

The framework agreement, which is implemented by the above directive, is composed by a preamble and eleven clauses. The main points are the following:

Clause 1: Purpose

This clause lays down out the overall objective of the agreement (to achieve the safest possible working environment by preventing injuries to workers caused by all medical sharps, including needlesticks, and protecting workers at risk). To this end, it provides for an integrated approach, establishing policies in risk assessment, risk prevention, training, information, awareness-raising and monitoring, and for response and follow-up procedures.

Clause 2: Scope

This clause makes it clear that the agreement applies to all workers in the hospital and healthcare sector and to all who are under the managerial authority and supervision of the employers.

Clause 3: Definitions

The agreement employs various terms: workers, workplaces, employers, sharps, hierarchy of measures, specific preventative measures, workers' representatives, workers' health and safety representatives and subcontractors. Clause 3 sets out the meanings of these terms for the purpose of this agreement.

⁽²¹⁾ OJ L 134, 1.6.2010, pp. 66–72.

Clause 4: Principles

This clause lays down the principles which must be observed when taking action under the agreement.

Paragraph 1 points to the vital role of a well-trained, adequately resourced and secure health service workforce in preventing risks. It also states that preventing exposure is the key strategy for eliminating and minimising the risk of injuries and infections.

Paragraph 2 concerns the role of health and safety representatives in risk prevention and protection.

Paragraph 3 sets out the duty of the employer to ensure the health and safety of workers in every aspect relating to the work.

Paragraph 4 makes it the responsibility of each worker to take care of his or her own safety and that of other persons affected by their actions at work.

Paragraph 5 deals with the participation of workers and their representatives in the development of health and safety policy and practice.

Paragraph 6 explains that the principle of the specific preventative measures is never assuming that no risk exists. It also points to the hierarchy of measures concerning the safety and health protection of workers as set out in the relevant Community directive, i.e. to avoid risks, to evaluate remaining risks which cannot be avoided, to combat risks at source and to reduce risks to a minimum.

Paragraph 7 concerns collaboration between employers and workers' representatives with a view to eliminating and preventing risks, to protecting workers' health and safety and to creating a safe working environment.

Paragraph 8 recognises the need for action involving information and consultation in accordance with national law and/or collective agreements.

Paragraph 9 deals with the effectiveness of awareness-raising measures.

Paragraph 10 stresses the importance of a combination of several measures for achieving the safest possible workplace environment.

Paragraph 11 states that incident reporting procedures should focus on systemic factors rather than individual mistakes and that systematic reporting must be considered as accepted procedure.

Clause 5: Risk assessment

Paragraph 1 states that risk assessment procedures are to be conducted in compliance with the relevant provisions of Directives 2000/54/EC and 89/391/EEC.

Paragraph 2 stipulates what is to be included in risk assessments and specifies potentially hazardous situations to be covered by them.

Paragraph 3 lists the factors to be taken into account in risk assessments with a view to identifying how exposure can be eliminated and considering possible alternative systems.

Clause 6: Elimination, prevention and protection

Paragraphs 1 and 2 list several measures to be taken to eliminate the risk of injuries with a sharp and/or infection and to reduce the risk of exposure.

Paragraphs 3 and 4 address situations where there is a risk to the safety and health of workers owing to their exposure to biological agents for which effective vaccines exist. Under these circumstances workers are to be offered vaccination, which is to be carried out in accordance with national law and/or practice. Furthermore, workers are to receive information on the benefits and drawbacks of vaccination and non-vaccination. Vaccination must be free of charge.

Clause 7: Information and awareness-raising

As medical sharps are considered work equipment in accordance with Directive 89/655/EEC, this clause lays down several information and awareness-raising measures to be taken by the employer, in addition to the provision of information and written instructions in accordance with Article 6 of that directive.

Clause 8: Training

This clause stipulates that workers are to receive training in certain policies and procedures associated with injuries caused by sharps, including those listed. This training is in addition to measures laid down in Article 9 ('Information and training of workers') of Directive 2000/54/EC on the protection of workers from risks related to exposure to biological agents at work ⁽²²⁾.

The clause also imposes various obligations on employers with regard to training and stipulates that the training is mandatory for workers.

Clause 9: Reporting

Paragraph 1 stipulates that the existing procedures for accident reporting involving injuries are to be adapted and should be revised in conjunction with health and safety representatives and/or appropriate employers and workers' representatives. Reporting procedures should include technical details with a view to improving data collection on this type of hazard (which is underestimated) at local, national and European levels.

Paragraph 2 imposes an obligation on workers to report any accident or incident involving medical sharps immediately.

Clause 10: Response and Follow-up

This clause deals with policies and procedures that are to be in place where an injury involving a sharp occurs. In particular, it specifies several steps that are to be taken, such as the provision of post-exposure prophylaxis and the necessary medical tests, appropriate health surveillance, the investigation of the causes and circumstances of the accident, the recording of the accident and the counselling of the workers.

It states that confidentiality of injury, diagnosis and treatment must be respected.

Clause 11: Implementation

This clause lays down several provisions regarding the implementation of the agreement.

It lays down a 'minimum standards' clause, which states that the agreement is without prejudice to existing or future national and European Union provisions which are more favourable to workers' protection from injuries caused by medical sharps.

It states that the Commission could refer the interpretation of the agreement to the signatory parties, who will give their opinion, without prejudice to the roles of the Commission, the national courts and the Court of Justice of the European Union.

⁽²²⁾ OJ L 262, 17.10.2000, pp. 21–45.

Programme of tests and examinations following needlestick and sharps injuries

Risk analysis

The basis for further action is the assessment that a real risk exists. Before reaching this conclusion, it is necessary to evaluate key factors such as the immune status of the injured person, the type and gravity of the sharps or needlestick injury and the contaminated quantity of blood.

Blood tests

If risk analysis cannot exclude a risk of infection, the following tests should be carried out: anti-HBs, anti-HBc, anti-HCV and anti-HIV. These tests should be repeated six, 12 and 26 weeks after the first test. If the index patient is known and suspected of exhibiting infection, it is possible to obtain further information on the basis of an immediate single test for anti-HBs, anti-HBc, anti-HCV and anti-HIV.

Hepatitis B — Precautions

If the exposed person has not been rendered sufficiently immune by previous immunisation, the response should be immediate active anti-hepatitis B vaccination. If an injury involves proven contamination with blood that is hepatitis-B positive, this should be followed within six hours by passive immunisation.

Hepatitis C — Precautions

Two to four weeks after contact with blood from a person identified as being hepatitis C positive, HCV-PCR is recommended to facilitate early diagnosis and treatment. Irrespective of this, testing for anti-HCV must be carried out at the intervals given in the schedule above.

HIV — Measures and precautions

Following contact with blood that is from a person who is potentially infected with HIV, the infectiousness of the index patient can be determined with a quick HIV test (an antibody test). If the blood contact is from a person clinically proven to be HIV positive, medical post-exposure prophylaxis (PEP) is indicated. PEP is at its most effective if commenced within two hours of the injury and it can prevent infection even if the virus has entered the bloodstream. However, due to the severe side-effects of the medication, the decision whether to embark on PEP should be made by a specialist.

Documentation of the injury and an account of the accident

Injuries should be well documented so that accidents can be analysed and preventive measures recorded.

3.3.2. Risk of airborne infection

Aerogen transmitted infection, including:

- mumps
- influenza
- rubella
- tuberculosis
- measles
- SARS.

Introduction

Airborne pathogens are transmitted almost exclusively from one person to the next (human-to-human transmission). Aerosols are formed when patients with an infection of the respiratory organs (lungs, bronchi or larynx) cough, sneeze or speak. Thus, miniscule droplets and droplet nuclei are released as a fine mist in the exhaled air. The size of these aerosols varies as they are subject to diverse aerodynamic factors.

Risk assessment

The infectiousness of the aerosols depends on particle size and density, the density of the pathogens within the particle, as well as the time required for inhalation and the volume inhaled. Small particles (droplet nuclei $<5\mu\text{m}$) represent a particular risk if droplet nuclei and aerosols hang in the air for long enough to be inhaled in sufficient quantities and deposited in the pulmonary alveoli. It may be concluded that bodily secretions which do not generate aerosol formation (for example, urine and pus) present a lower risk of infection. This is also true of aerosols that form a sediment on the surface of objects and floors, which generally speaking are not thought to constitute any particular risk, provided that standard hygiene precautions are observed.

Areas of special exposure, including:

- tuberculosis clinics
- internal clinics specialising in infectiology
- paediatric clinics
- geriatric care.

Activities with potential risk of infection, including:

- extubation/intubation
- oral care
- bronchoscopy
- gastroscopy
- emergency care/first aid
- reanimation
- mouth-to-mouth resuscitation
- intubation.

The risk of infection to personnel is higher if they are exposed to a patient's coughing — which is often unavoidable (e.g. in bronchoscopy, prolonged periods of close contact such as physical examinations, nursing patients and attending uncooperative patients) — when high aerosol concentrations can be expected (as in acute infections) or when they are exposed to airborne microorganisms. In both ambulant and in-patient care, personnel are especially at risk from infectious patients requiring diagnostic and immediate therapeutic measures, not least because at this stage there is often no clear diagnosis.



20 Respirator masks which filter air and retain pathogens provide protection against airborne infections.

There are various hazards: unrecognised infection in patients receiving breathing therapy; long-term care patients who may be helpless and need extra assistance; and those who are uncooperative, even those being transported by ambulance. The risk of acquiring an infection is demonstrably higher where there is increased exposure to tracheobronchial secretions (bronchoscopy, endoscopy, respiration, sputum testing). Other occupational areas associated with greater exposure and hence a higher risk of infection are pathology as well as microbiological and virological laboratories.

Protective measures

General

All the precautions designed to combat airborne infections must aim to break the chain of infection and prevent it from spreading further. Any infection control precautions to tackle airborne microorganisms must primarily focus on strategies to avoid the risk of inhaling infectious aerosols and, in particular, droplet nuclei.

Every aerosol consist of its mixture of large droplets and so-called droplet nuclei, which are respirable and can therefore be infectious. Since in the daily handling of infectious patients there is no means of distinguishing whether respirable/infectious aerosols are present, when aerosols arise the use of filtering respirators is invariably recommended, for example half masks in direct contact with the face (FFP2).

In this context it is especially important that exposure to the productive coughing of infectious patients is minimised, i.e. a key part of infection control must be to inform patients about basic infection control, which may include mouth-nose cover or masks for patients.

Technical

It is important to ensure suitable ventilation and adequate hygiene standards (disinfection) at the workplace. Technical protective measures encompass: ward architecture; room partitioning; ventilation measures (directed air flow, air exchange, negative pressure); filtering measures (HEPA filter systems, exhaust air control); and sterilising measures (EN 1946 (Part 4)).

Organisational

Efficient infection control requires a quick diagnosis and early isolation of infectious patients, as well as the earliest possible initiation of effective, competent treatment. In addition, good hygiene and technical precautions such as protection against the inhalation of infectious aerosols, help reduce the risk of infection among fellow patients, contact persons and healthcare personnel.



- Patients should understand the importance of good hygienic practice, i.e. not coughing directly at nursing staff or others, refraining from doing things that provoke coughing and the generation of aerosols and always ‘covering the cough’, preferably with a mouth-nose mask.
- Healthcare workers should be instructed to maintain a distance (approx. 1.5m) from coughing patients.
- Many infectious diseases can be avoided by inoculation and vaccines (see list of diseases preventable by vaccination).
- Attention should be given to the immunisation records of personnel and contacts.
- Exposed personnel, fellow patients and other contact persons should receive full information — understandable to a lay person — about the possible risks of infection, the modes of transmission and the necessary precautions.



Personal/individual protection

Observation of general hygiene is important, but it is also important that the suitable personal protection equipment (filtering face masks) be used where there is an occupational risk and, consequently, that all workers are trained in best practice. Internal health and safety checks and inspection control are vital.

Respirator masks

- The selection of the appropriate facemask to be worn requires knowledge of the epidemiology and expert assessment of the risk in general and in particular the workplace- or occupation-related risk of contact with potentially infectious patients.
- The classification of available filtering half masks complies with European norms (EN 149/filtering face piece = FFP). The suffixes ‘S’ (solid: watery aerosols and particles) and ‘SL’ (solid and liquid: watery and oily aerosols and particles) provide additional information on product use. Products tested according to the new EN 149 norms from 2001 afford protection against both fine dust particles (S) and liquid aerosols (SL), hence there is no meaningful distinction between S and SL. In order to reduce breathing resistance, the masks are also available with an exhalation valve. (NB: infectious patients should not wear this type of mask.)
- The total leakage of a mask is calculated as the leakage due to inexact fit (between face and mask), leakage from the exhalation valve (if there is one) and leakage from the actual filter. The total leakage tolerance for Class FFP1 masks is no greater than 25 %, the requirement for FFP 2 masks is a maximum 11 % leakage, while FFP 3 masks should not exceed 5 % leakage. Average total leakage is a maximum of 22 % for Class 1, a maximum of 8 % in Class 2 and a maximum of 2 % in Class 3 masks — given an average particle diameter of 0.6 µm. Masks should be worn according to the manufacturers’ instructions for individual use. They must not be shared with other wearers and must not be used if they are damaged, soiled, moist or in any way contaminated.

21 A respirator is only effective if it is in contact with the face.



- Respirator masks alone do not afford 100 % protection. Technical and organisational measures must be provided.

Further measures for personal/individual protection

The traditional mouth-nose cover or surgical mask (foldable or moulded) does not provide the same protection as a

respirator mask. It has a far higher leakage rate and therefore offers less protection against the inhalation of infectious aerosols than an FFP respirator mask. However, it does reduce the release of infectious droplets into the environment.

Respirator FFP 2 and FFP 3 masks afford greater protection from infection. However, this depends to a considerable extent on the mask fitting properly. Achieving a good fit is affected by such factors as the shape and size of the wearer's face. A beard may also prevent a close fit. Consequently, respiratory masks should be made available in various sizes and the employer must ensure that all personnel are instructed in the correct application and how to wear masks correctly.

Experience has shown that acceptance of the masks depends on other key factors: the expected safety and protection afforded; costs; comfort; handling; effects on speech (communication); how they fit on the face and occlusion of face. Only if these criteria are met will the masks find sufficient acceptance.

It would be advisable to put all of the abovementioned measures into practice if there is a suspected or confirmed case of airborne infection in order to minimise the risk of infection among contact persons. Patients should at least wear a conventional mouth-nose cover (surgical mask, preferably moulded as it ensures a closer fit) when outside the isolation room as this reduces the amount of exhaled aerosols. The mask also serves as a warning to patients and personnel, reminding them of infection control measures. These masks are also simple to put on, they are relatively comfortable to wear and may be worn by the patient as long as they remain fully functional, i.e. have not become moist due to prolonged wear.

In situations presenting a low infection risk (e.g. brief contact time/no close contacts) it is sufficient for personnel to wear a FFP 1 mask.

FFP 3 masks should be worn when it is important to radically reduce the risk of infection spreading (infection dose of the respective pathogen(s) low and risk high).

Outside the isolation room and in other special situations (e.g. patient transport) patients posing a special risk to others should receive more protection (due to the proximity to others) in order to ensure that the risk of infecting contact persons is minimised (FFP 2/3 mask without exhalation vent) and to prevent contamination of the environment.

Fit test

The effectiveness of respiratory masks and respirators depends not only on the correct choice of equipment, but also to a large extent on correct use and application (i.e. fit). Filtering half masks must be put on exactly in accordance with the manufacturers' instructions. It is essential that the mask fits closely on the face (especially around the moulded part over the nose). A practice run to check whether the mask covers properly — the so-called fit test — is recommended. Any major leaks can be discovered by strongly sucking in air while holding both hands over the filter area. Men with beards are less likely to achieve a close fit and their masks are therefore more prone to leakage.

Precautionary measures

Most airborne infectious disease can be prevented through immunisation. Occupational health check-ups should establish the vaccination history of the personnel. Where full cover has not been provided by vaccination, a single booster dose with the appropriate vaccine is recommended. The costs must be borne by the employer. During occupational health consultations, workers should be instructed about the importance of wearing filtering face masks.

3.3.3. Risk of direct and indirect contact infection

Faecal-orally transmitted infection, including:

- hepatitis A virus
- shigella
- staphylococci
- amoeba.

The spread of non-visible, unknown or not yet diagnosed infectious pathogens represents a major healthcare concern among health workers and patients.

Risk assessment

The greatest risk is from infection spread via contaminated hands. Risk assessment and determination of the appropriate infection control measures should proceed systematically.

Areas of special exposure, including:

- internal clinics specialising in infectiology
- intensive care wards
- internal and surgical reception wards
- geriatric care.

Activities with potential risk of infection, including:

- change of dressings
- nursing care
- positioning of patients
- operation of equipment in the vicinity of patients with contact infections.

Transmission by contact

Direct contact involves transmission from the skin (or body surface) of one infected person to the body surface of a susceptible recipient (in this context, another patient or member of staff). Transmission may occur, for example, when staff attend patients (e.g. changing dressings or catheters).

Indirect contact arises through touching surfaces populated by microorganisms which have been contaminated, for example, by unwashed hands or contaminated gloves.

Percutaneous or permucous transmission (skin or mucous membranes) occurs through:

- wounds and injuries;
- softened, non-intact skin;
- splashes in the eyes.

Source

Patients, personnel and visitors can be the source of infectious microorganisms. The host (source) may be actively infected, the disease may still be in the incubation phase or the host may be a chronic carrier. The source may also be contaminated surfaces.

Degree of immunity

Resistance or immunity varies greatly from one person to the next and is influenced by such factors as age, medical treatment (e.g. antibiotics, corticosteroids and immune suppressant drugs), radiation or severe illness. Prior immunisation (vaccination) affords optimal resistance. Workers with weakened immune systems should urgently seek occupational medical advice or be subject to occupational medical examinations at close intervals.



22 A number of pathogens can survive for a long time on inert surfaces. Thorough disinfection after use is therefore very important.

Protective measures

Basic precautions

To reduce the risk of infection through contact, susceptible healthcare workers (with low resistance) should be physically separated (placed apart) from the source of infection. Every patient should be handled as if she or he were infectious.

Technical measures

At the workplace the following precautions should be taken when handling or working with biological agents.

- Work surfaces and the surfaces of equipment, apparatus and other devices should be easy to clean.
- Measures should be introduced to avoid the generation of aerosols and dust.
- Sufficient washing facilities must be provided.
- Personnel changing facilities should be kept separate from work areas.
- Suitable containers should be provided for collecting waste containing biological agents.





Organisational measures

- Daily cleaning of surfaces
- Cleaning devices in store
- Appropriate personal protective equipment in store
- Hygiene plan
- Manufacturers' instruction
- Avoidance of spray disinfection

23 Work surfaces, the surfaces of equipment, apparatus and other devices should be easy to clean.



Personal/individual protective measures

Proper disinfection of hands is the most important central step towards preventing the spread of contact infections. Hands should be washed when they are visibly dirty. In many instances, disinfection of the skin is sufficient. Owing to the damaging effects of hand washing on the skin, washing should be kept to a minimum. It should, however, take place:

- before patient contact;
- before a procedure;
- after a procedure or body fluid exposure risk;
- after patient contact;
- after contact with patient surroundings..

Essential personal protective equipment includes protective gloves, protective clothing, protective eyewear and masks/respirators. The wearing of gloves is essential where there is any direct contact with contaminated material. The choice of protective wear depends on the type of nursing/medical activity and the associated risk of contamination, as well as the virulence (or possible resistance) of the microorganism and its mode of transmission.

Gloves used when handling or in contact with biological agents must fulfil EN 455 test criteria, whereby it is important that latex gloves should be non-powdered and latex hypoallergenic. The type of glove chosen depends on the task for which the gloves are required and the material properties. It is important to remember that latex gloves are not always suitable wear for working with chemicals. Gloves should have cuffs that tuck over the wrist of a gown or protective coat.

Protective clothing — such as gowns and aprons (generally waterproof aprons) — has to be worn. Protective clothing is worn over uniforms or working clothes. The management is responsible for the provision of protective wear, which workers are obliged to wear.

Use of personal protective equipment (PPE)

Gloves should be worn whenever there is a likelihood of exposure to blood, secretions or excretions (e.g. when changing dressings, handling urine drainage systems).

Waterproof aprons should be worn when there is a likelihood of soiling or contamination of work clothes/uniforms with blood, secretions or excretions (e.g. changing dressings, handling urine drainage systems).

Protective coats or gowns (long sleeves with cuffs) should be worn if contamination of the arms or clothing (uniform) with infectious matter appears likely (e.g. attending incontinent patients or patients with diarrhoea, when dressing large infected wounds or when resistant bacteria are present).

Precautionary measures

Personnel should have medical check-ups as part of the employer's occupational health and safety commitment. The cost of such examinations must be borne by the employer. Undergoing a medical test is a condition of employment.

Immunisation (vaccination)

Workers should be vaccinated against the relevant infectious diseases. The employer must bear the costs of vaccination.

Transport of patients

Transporting contagious patients can pose the risk of contaminating a previously infection-free environment. The personnel responsible for the transport must be instructed in the proper procedures and measures beforehand. The same rule applies to the healthcare personnel in the receiving department or ward to which the patient is being transferred.

3.3.4. Description of good company practice: handling contact infections

In 2005, the Schramberg District Hospital in the Black Forest (Germany) implemented a concept which corresponds essentially to the Dutch and Scandinavian measures to reduce contact infections, in particular MRSA. This has resulted in a sharp reduction in contact infections.

Dr Christian Friz, Chief Physician, explains the procedures adopted in the hospital.

Interviewer: What instruments does the management in your hospital use to control infections?

Dr Christian Friz: In our hospital there is a quality management system for dealing with infections, including also an operating manual for handling contact infections.

Interviewer: Are there (surveillance) checks with respect to hand disinfection?

Dr Christian Friz: Yes, spot checks are made by the hygiene specialist. In addition, the consumption of disinfectants is measured annually. No increase has been registered to date.

Interviewer: Is the use of protective clothing also monitored?

Dr Christian Friz: Yes, this is also checked on a random basis and ward by ward by the hygiene specialist and the chief physician.

Interviewer: When are patients isolated?

Dr Christian Friz: If it is suspected or has been established that they have a highly infectious disease (e.g. norovirus, *clostridium difficile*, MRSA, tuberculosis), the patients are isolated. There is also cohort isolation (isolation of a number of patients) who exhibit the same clinical picture. The workers are trained intensively in how to handle the requisite hygiene measures.

Interviewer: Is the consumption of (disposable) gloves measured as a hygiene indicator in order to check compliance?

Dr Christian Friz: Yes, this is recorded in a waste report. This report encompasses the exact quantities of waste, including the number of gloves disposed of.

Another indicator we record once a year is the consumption of surface disinfectants. Here again an increase is evident.

Interviewer: Have you measured the consumption of antibiotics?

Dr Christian Friz: Yes, the dispensary gives precise figures for the consumption of antibiotics. This is low and relatively constant from year to year. What is unusually low is the consumption of vancomycin and linezolid.

Interviewer: Does your hospital exchange specialist information on infectious diseases continuously with other hospitals?

Dr Christian Friz: Yes, we are a member of MRSA Netzwerk Baden-Württemberg. The success of the protective measures is discussed there, and the latest research results are presented.

Good practice for preventing contact infections

1. Preventive measures are part of the quality management system.
2. Hand disinfection and the use of protective clothing are monitored.
3. Where it is suspected or has been established that there is a highly infectious disease, it must be checked whether the patients have to be isolated.
4. The workers are trained intensively in the handling of the requisite hygiene measures.
5. The consumption of (disposable) gloves is measured as a hygiene indicator and check of compliance.
6. To avoid multiresistant pathogens, antibiotics are only dispensed if there is a strict indication.
7. The hospital is part of a network with other hospitals to exchange specialist information on infectious diseases.

Best practice

Description of good company practice

Senior Physician Dr Jens Reichel, head of the Emergency Medical Faculty at the University Clinic of Jena, describes what preventive measures have been applied in the ambulance service when dealing with biological risks.

Interviewer: Are there written procedures for preventing needlestick injuries and are there any procedures for dealing with needlestick injuries that have occurred?

Dr Reichel: Yes, in accordance with the statutory regulations we have clear rules of conduct and, in the appropriate quality management documents, also procedures for handling instruments or relating to the conduct of staff in the case of needlestick injuries.

Interviewer: What improvements do you expect from safe products?

Dr Reichel: With the present protective mechanisms a needlestick injury of the kind we were familiar with up to two years ago is now impossible. Other instruments are no longer available. With respect to the peripheral venous catheter with the material group available to us, I have observed no difference in the time required as compared to earlier.

Interviewer: How is hazardous waste disposed of? Is the safe handling of waste products ensured for all persons who come into contact with them, such as doctors, nurses and cleaners?

Dr Reichel: We have appropriate waste boxes — disposable boxes in which the waste is disposed of in accordance with the requirements of the Biological Agents Ordinance. We have no problems in this respect.

Interviewer: Is immediate disposal in fracture- and puncture-proof containers always possible at the place of use?

Dr Reichel: We invariably have small sharps containers in all rucksacks and cases. These are also used as a matter of routine. In the emergency ward they have larger sharps containers.

Interviewer: Are there regular courses of training on the subjects of needlestick injuries, skin protection or risks of infection?

Dr Reichel: Yes — colleagues are given a refresher course once a year. However, we always do this in conjunction with various other measures, such as a refresher course on use of equipment. In the ambulance section we have someone responsible for hygiene, the hygiene officer, who has been trained in certified courses and who gives the instruction here.

Interviewer: How do you assess which risks are present? Does a safety specialist do this or a works doctor?

Dr Reichel: We have a works medical centre in the clinic. The workplace situation is assessed and evaluated once a year. The results concerning the situation and the measures taken are passed on to the employer.

Interviewer: Do you draw the attention of your staff and colleagues to the question of hand hygiene and skin care?

Dr Reichel: This is addressed in instruction sessions.

Interviewer: What personal protective equipment is available?

Dr Reichel: Coats, face masks, in the different hazard classes according to requirements. Class 2 is standard (MRSA) and Class 3 only in the case of highly infectious patients (H5N1, ebola viruses). But only in case something like this will occur. This includes the appropriate shoes or tie-up overshoes for boots which would provide complete protection. Goggles are used to differing degrees in the case of highly infectious patients.

Interviewer: When are workers informed about relevant occupational health and safety regulations?

Dr Reichel: Initial instruction is given when they take up their duties. In addition there are annual refresher courses. Protective and preventive measures are also specified in the quality manual.



Dr Jens Reichel, head of the Emergency Medical Faculty at the University Clinic of Jena.



Best practice

3.3.5. Special infections

As a rule, adherence to the infection control and protective measures outlined above will provide healthcare workers with adequate protection and minimise the relevant infection risks encountered in healthcare. However, there are a number of occupational risks of infection that require special attention, namely:

- tubercular infections;
- scabies;
- multiresistant nosocomial bacteria, such as MRSA and multiresistant pseudomonas;
- seasonal influenza.

1. Tuberculosis

Risk assessment

Healthcare workers are exposed to an increased risk if, for example, they are employed in laboratories testing Mycobacterium tuberculosis or in the medical or nursing care of tuberculosis (TB) patients in specialist clinics.

Areas of special exposure, including:

- tuberculosis clinics;
- special areas of geriatric care.

The incidence of notified active tuberculosis and of cases receiving treatment tends to be higher among older sections of the population. This suggests a higher incidence of latent tuberculosis (LTB) among personnel engaged in geriatric work and hence an increased occupational risk in these areas of healthcare work. Indeed, the prevalence of LTB is markedly lower among younger healthcare workers than among their more senior counterparts. This could be partly attributed to the longer period of exposure to occupational risk, but it could also be due to the usual age-related exposure to tuberculosis in the broader community.

Activities with potential risk of infection

These involve close contact with tuberculosis patients, and include:

- activities with custodial accomplishment or breath gymnastics;
- oral inspection, or dental or otorhinolaryngologist examination;
- sputum provocation, suction of the nose, mouth or pharynx with open systems, reanimation measures and bronchoscopy;
- autopsy;
- spending more than 40 hours with a patient with open tuberculosis in a closed room or means of transport

Precautionary measures

Personnel employed in activities that pose an increased risk of infection should be regularly monitored. These medical check-ups for TB should be confined to persons who come into close contact with patients with active tuberculosis (see below), including workers in specialist clinics and laboratories where testing is routinely carried out for the disease.

In countries where there is a low incidence of the disease, early diagnosis and prophylactic chemotherapy for latent TB infection (LTBI) forms a central part of the strategy for controlling and eliminating TB. This approach substantially reduces both the risk that LTBI will progress to active TB and the risk of transmission. The success of this public health strategy obviously depends on the reliability of the test method employed.

The encoding of the genome of *Mycobacterium tuberculosis* opened up the possibility of developing a new specific molecular biological test for the diagnosis of latent tubercular infection (LTBI).



24 Face masks covering the mouth are not suitable as respiration protection.

Screening method

Two such interferon-gamma release assays (IGRAs) are the QuantiFERON®-TB-Gold In-Tube and the T SPOT-TB™. These two new ex vivo test procedures offer a promising alternative to the Mendel-Mantoux tuberculin skin test for detecting LTBI. In the meantime, IGRA tests have been carried out in many studies of healthcare personnel. It emerged that the IGRA was the more accurate test for determining the presence of a tubercular infection. Furthermore, no cross-reactions with the BCG vaccination (in some countries no longer recommended) or with environmental mycobacteria have been reported. A positive IGRA indicates the need for a chest X-ray.

A therapy with positive IGRAs is optionally indicated in workers working with few hazards. Consultation and therapy have to be conducted by a specialist.

Who should be tested?

Persons who have had contact with open tuberculosis and have been exposed to a risk of infection or affection should be identified. It is recommended to include persons that had close contact (see above) to the index patient during the infectious period, otherwise during the last two to six months.

Questions after contact with open tuberculosis	Yes	No
Did you undertake nursing duties for the patient?	<input type="checkbox"/>	<input type="checkbox"/>
Did you carry out breath gymnastics?	<input type="checkbox"/>	<input type="checkbox"/>
Did you carry out an oral or an otorhinolaryngologic inspection/examination?	<input type="checkbox"/>	<input type="checkbox"/>
Did you carry out a tracheal suction?	<input type="checkbox"/>	<input type="checkbox"/>
Was the patient reanimated by you?	<input type="checkbox"/>	<input type="checkbox"/>
Did you carry out a bronchoscopy on the patient?	<input type="checkbox"/>	<input type="checkbox"/>
Has the patient coughed at you?	<input type="checkbox"/>	<input type="checkbox"/>
Did you carry out an autopsy on the patient?	<input type="checkbox"/>	<input type="checkbox"/>
Have you been in a room with the patient more than 40 hours?	<input type="checkbox"/>	<input type="checkbox"/>
Remarks		

Questions about individual risk	Yes	No
Are you older than 50 years?	<input type="checkbox"/>	<input type="checkbox"/>
Do you take medicaments?	<input type="checkbox"/>	<input type="checkbox"/>
Do you suffer from diabetes?	<input type="checkbox"/>	<input type="checkbox"/>
Have you had a stomach resection?	<input type="checkbox"/>	<input type="checkbox"/>
Do you have a history of tuberculosis?	<input type="checkbox"/>	<input type="checkbox"/>
Have you been vaccinated against tuberculosis?	<input type="checkbox"/>	<input type="checkbox"/>
Have you ever had a positive tuberculosis skin test?	<input type="checkbox"/>	<input type="checkbox"/>
Have you ever suffered from symptoms resembling those of tuberculosis (loss of weight, night sweat, cough, lost of appetite, exhaustion, subfebrile temperatures)?	<input type="checkbox"/>	<input type="checkbox"/>
Remarks		

2. Scabies

Scabies is a problem for hospital staff and their families, as well as for people who work in homes and community institutions. Embarrassment, misconceptions, non-exhaustive hygiene measures and sometimes inappropriate timing all make the battle to combat these unwelcome parasites a tough task for everyone involved.

Areas of special exposure include:

- internal clinics;
- geriatric care;
- facilities for the disabled.

Activities with potential risk of infection include

- activities involving bodily contact, such as nursing of sick people;
- change of dressings;
- positioning of patients;
- outpatient nursing.

Basically, everyone who cares for or attends an infected person faces the risk of infestation unless they are able to avoid close contact with the patient. This is not always possible in view of the type of duty (e.g. assisting with personal hygiene, supporting the patient to stand, walk or get in or out of bed). For example, an infestation of *scabies norvegica*, which produces scabs on affected areas of skin, contains big concentrations of mites.

Confined and unhygienic living conditions as well as poor health facilitate the spread of scabies. However, the mites can also be transmitted by sharing clothes or via dirty or insufficiently washed clothing, bed linen and mattresses, rugs, blankets, cuddly toys, pillows, cushions, towels, thermometers, blood pressure cuffs and textile clothing.

Prior to treatment

Bathe, washing the entire body (before applying an anti-mite cream or lotion). Before application, the skin must be dry and cool (normal body temperature, i.e. at least an hour after bathing.) It is advisable to cut nails short prior to starting the treatment. A bath is not necessary if an anti-mite spray (with the active agent S-Bioallethrin) is used.



25 Everyone who cares for or attends an infected person runs the risk of infestation.

3. MRSA

Staphylococcus aureus is responsible for most of the infections acquired in hospitals and care homes worldwide. Experts estimate that Methicillin-resistant *staphylococcus aureus* (MRSA) is an emerging problem in Europe. MRSA frequently does not respond to treatment with antibiotics, and therefore exhibits a high incidence of morbidity and mortality. Over the past decade, most European countries have seen a rise in the incidence of MRSA. There has also been an increase in the risk to healthcare personnel. A new preventive strategy and set of health and safety precautions is therefore required.

The bacteria are highly resistant to dry, warm conditions and can survive in inorganic environments (e.g. gowns, air, surfaces of equipment, instruments, medical devices, hospital fittings) for several months.

Areas of special exposure include:

- intensive care units (ICUs)
- areas with a high turnover of antibiotics
- internal clinics
- geriatric care.

Activities with potential risk of infection include:

- activities involving bodily contact, such as nursing
- change of dressings
- positioning of patients
- outpatient nursing.

26 Thorough preparations are necessary before undertaking medical duties. This includes wearing suitable protective equipment.



Clinical picture

The colonisation is symptom-free. MRSA does not interfere with the body, but lives on the surface.

If bacteria penetrate into the body they change into a pathogen. Manifestations include furuncle, carbuncle, pyoderma, abscesses (also of the organs), infected wounds and infections introduced by foreign bodies, empyema and sepsis (mortality rate: 15 %).

Mode of transmission/immunity

MRSA colonises the skin without causing infection or observable physical changes in the host, as opposed to other infectious bacteria, which enter the body and cause infection. Hence, the colonisation of humans through MRSA is not considered pathological and MRSA bacteria exist as a saprophytic colony on the skin — in coexistence with the host.

Allogenic strains can be responsible for intermittent or permanent colonisation (exogenous infection). The mode of transmission is often contact, especially contact with hands, or contamination via secretions from wounds and the respiratory tract,

intertriginous skin or blood (bacteriemia) or from medical equipment. Although airborne transmission is possible, it is of minimal significance. Impaired cellular resistance predisposes infection (e.g. diabetes mellitus, patients on dialysis). Similarly, implants of artificial materials (e.g. vein catheters, joint replacements), immunosuppression, viral cell damage (infection pathways, e.g. influenza A), physically impaired barriers (e.g. damage to skin and mucosa) can all facilitate colonisation. Colonisation does not induce effective immunity.

Risk to personnel from MRSA

As a result of contact with MRSA-colonised patients, the personnel may also be colonised (unnoticed), in particular in intensive care wards, but also in old people's nursing facilities.

Avoidance of colonisation is possible with the consistent application of protective measures as described in the section on contact infections (see page 84).

There is evidence that healthcare workers can also contract MRSA infections. This evidence underlines the importance of protective measures to avoid colonisation. Personnel with weak immune system or health care workers who are colonised should obtain advice in terms of occupational medicine.

Given the lack of epidemiological data, it is not possible to give a definitive assessment of the risk.

Decolonisation of MRSA carriers

If healthcare workers are colonised with MRSA, eradication therapy with antibacterial agents with proven clinical effectiveness should be used.

To eradicate MRSA nasal colonisation, an application of Mupirocin nasal cream is recommended (three times daily or at least three days in the nares, treating both sides). Once nasal decolonisation has taken effect, colonisation of other parts of the body is generally also reduced.

If the infection proves resistant to Mupirocin, preparations containing antiseptic agents or other topically applied antibiotics have proven effective.

If the skin is intact, antiseptic soap and lotions for washing the entire body and hair are recommended as a proven method for tackling MRSA colonisation of the skin.

To prevent recolonisation, it is recommended that during the eradication treatment, bed linen, clothing and all personal hygiene items (e.g. flannels, towels) be changed daily, especially after antiseptic body washes. Personal belongings such as glasses, razors and toothbrushes should be kept in the patient's room and disinfected or changed.

Persons who are in close contact with the affected worker (partner, family members) should be examined and, where indicated, measures undertaken to eradicate the bacteria.

Control tests should be carried out over a period of at least six months to monitor success of treatment (e.g. after three days, one week and one, three and six months).

The findings should be documented (genotyping).

Decontamination using Mupirocin nasal cream and antiseptic mouthwashes should not be continued for more than five to seven days. Antiseptic body washes could also

be considered. If adequate eradication methods have been used and failed elsewhere (in another hospital, clinic or home), there is generally no point in making further attempts. Persons in whom MRSA recurs tend to be patients/home residents with chronic colonised skin lesions or patients undergoing long-term invasive therapy.

Colonisation in hospitalised persons (nosocomial infections) is attributed to the arbitrary prescribing of broad spectrum antibiotics. It is responsible for a fast, asymptomatic colonisation of contact persons. MRSA has the same biological properties as *staphylococcus aureus*.

Reduction of risk for workers

All measures which can be taken to avoid MRSA colonisation or infections in patients will also reduce the risk of colonisation or infection of healthcare workers. A stringent infection monitoring is therefore necessary for MRSA.

4. Seasonal influenza

Influenza is a highly contagious viral disease, which typically occurs as epidemics during the cold months. This respiratory infection may include symptoms like fever, cough, pains and weakness. Annual outbreaks of influenza are due to minor changes in the virus. These changes enable the virus to evade the immunity developed by humans after previous infections or in response to vaccinations. Every year, some 100 million people are affected in Europe, Japan and the USA.

Preventive possibilities

Transmission is by droplet infection. All protective measures which can prevent transmission must therefore be taken (see airborne/droplet infection, page 80).

Immunisation is also effective and this must be carried out annually because the genetic inventory of influenza viruses is constantly changing. A study has shown that healthcare workers are not exposed to any greater risk of contracting infection as the influenza is moderately active. It is not known whether this applies if the influenza becomes highly active and a large number of infected patients have to be admitted to hospitals. Seasonal influenza risk in hospital healthcare workers is determined by household rather than occupational exposures according to results from a prospective cohort study in Berlin, Germany (Williams, C. J., B. Schweiger, G. Diner, F. Gerlach, F. Haamann, G. Krause, A. Nienhaus, and U. Buchholz; under review).

An **influenza pandemic** occurs when a radical change in influenza virus takes place. There have been three pandemics in the last century. The change is so radical that affected humans have no immunity against this new virus. With increased mobility of people, as well as overcrowded conditions, epidemics due to a newly emerging influenza virus are likely to spread quickly all around the world and risk eventually becoming a pandemic. It is therefore important to be prepared for this eventuality. Recent experience with swine flu shows how the new form of the A H1N1 virus has been able to spread internationally.

Pandemic emergency management plans

Introduction

An influenza pandemic can quickly overwhelm healthcare services, even bringing them to the verge of breaking point. In order to avoid the collapse of medical service provision due to the spread of exceptionally infectious pathogens, it is essential that an emergency plan exists.

The basic tenet of a medical pandemic emergency plan is to provide and maintain the ambulant care of influenza patients for as long as possible, admitting only the more severe cases to non-ambulant care. Similarly, patients should be discharged from hospital care back into ambulant care as quickly as possible. Non-ambulant cases should be allocated to locally designated hospitals equipped to care for patients with life-threatening complications. However, clinics and doctors' surgeries not primarily affected by this contingency plan should also review their preparedness during the inter-pandemic phase and draw up plans to prepare their institution and each of the wards or departments for a pandemic. It is vital that emergency planning be in place before the advent of a pandemic. Otherwise there would be an unnecessary waste of time which would put the health and safety of staff and patients at risk and result in higher staff absenteeism. This in turn could render effective planning impossible. Without prior planning it would also be virtually impossible to acquire the additional resources required to implement protection and medical prophylaxis.

A **pandemic emergency plan** must determine such issues as responsibility and key tasks, the physical isolation and/or separate movement or treatment of infected patients (i.e. quarantine), internal and external communication and information, additional hygienic, diagnostic and therapeutic measures, occupational health and safety precautions, inter-pandemic stockpiling of materials and equipment, and patient information.

Influenza pandemic

An influenza pandemic occurs when a new influenza virus (a subtype of the influenza A virus) appears against which the human population has no immunity, either from earlier epidemics or vaccination, and which results in worldwide epidemics with high mortality rates.

According to the WHO, the risk of a worldwide influenza pandemic is greater than ever before.

Pandemic management planning

Since 1999, the WHO has been trying to convince governments to engage in its global preparedness plan. This defines six phases of a pandemic:

- **Phase 1 and 2 (Inter-pandemic period)**
No new influenza virus subtypes have been detected in humans
- **Phase 3 and 4 (Pandemic alert period)**
Isolation of a new influenza subtype in humans (3)
Small cluster of infection but spread is highly localised (4)
- **Phase 5 (Pandemic alert period)**
Larger clusters of localised human-to-human transmission
- **Phase 6 (Pandemic)**
Increased and sustained transmission in the general population
For each phase specific measures are prescribed which should be applied as appropriate.

Example of a hospital-based contingency plan

A pandemic preparedness plan for hospitals must be designed and agreed for each of the departments and wards to form a coordinated plan. For example, organisational provisions must be made to isolate influenza patients from other patients at admission, in ambulances, in treatment rooms and theatres, on wards and in the intensive

care unit. Guidelines must be in place to determine whether and how elective surgery is carried out.

An in-house hospital pandemic plan should include the following measures:

- establishment of a crisis management team in the event of a pandemic, including nomination of the members;
- delegation of responsibility for emergency plans and implementation of measures in the event of a pandemic;
- preparation of a plan determining allocation of zones/rooms and/or a time schedule determining the use of amenities (e.g. whether or when an operating theatre can be used for influenza patients, or conversely for patients not affected by influenza);
- a hygiene contingency plan to be followed during a pandemic;
- stipulation of precautionary measures, for workers and patients;
- compilation of a communication plan (internal and external);
- compilation of an acquisition plan (ensuring sufficient stocks of personal protective equipment for personnel, disinfectants and disinfection materials, face masks for patients and staff, prophylactic medication);
- a diagnostic and therapy plan;
- guidelines on the education and instruction of staff, including documentation;
- compilation and preparation of sufficient patient information;
- regular review and monitoring of the pandemic management plan.

As the inter-pandemic phase can last for several years, it is recommended that the annual training and instruction of staff should include a review of the current situation (phase or period) and the relevance/suitability of the pandemic plan. Naturally, the instruction and information of healthcare staff should reflect the current period or phase.

27 Adequate personal protective equipment must be made available in the case of a pandemic.



3.4. Pregnancy

Protection of the pregnant worker (Council Directive 92/85/EEC ⁽²³⁾)

Pregnant women working in the health and social care sectors are exposed to an above-average risk of infection. This could have serious or even chronic effects on the health of the foetus, not to mention the potentially damaging consequences of any necessary therapeutic measures. It is general practice that pregnant workers should avoid contact with feverish patients in those cases where no clear diagnosis has established the cause of this symptom; the same applies to patients suffering from diarrhoea. If the patient has a diagnosed infection, the decision as to whether contact is hazardous or permissible should be judged case by case and with reference to the nature of the infection, its mode of transmission and the immunity and general health of the pregnant worker.

Under EU legislation, employers are obliged to assess workplace safety with respect to potential risks to pregnant workers and workers who are breastfeeding. Appropriate precautions should be introduced to ensure that the life and health of both mother and child are not at risk due to occupational risks.

The employer's obligations are:

- Assessment of the workplace in terms of potential health and safety risks to pregnant workers and workers who are breastfeeding (see Article 4 of Directive 92/85/EEC, as well as Annex 1)

Concerning biological risks, the employer shall assess the nature, degree and duration of exposure for all activities involving biological agents of risk groups 2, 3 and 4 within the meaning of Article 2, numbers 2, 3 and 4, of Directive 2000/54/EC, insofar as it is known that these agents or the therapeutic measures necessitated by such agents endanger the health of pregnant women and the unborn child and insofar as they do not yet appear in Annex II (see below).

If the results of the assessment reveal a risk, the employer shall take the necessary measures to ensure that, by temporarily adjusting the working conditions and/or the working hours of the worker concerned, the exposure of that worker to such risks is avoided. Based on the workplace risk analysis, the employer can compile a list of duties and activities which pregnant workers can carry out without risk (e.g. administration work). A list of such activities can help to reduce or eliminate the workplace risk to pregnant workers.

If the adjustment of her working conditions and/or working hours is not technically and/or objectively feasible, or cannot reasonably be required on duly substantiated grounds, the employer shall take the necessary measures to move the worker concerned to another job.

If moving her to another job is not technically and/or objectively feasible or cannot reasonably be required on duly substantiated grounds, the worker concerned shall be granted leave in accordance with national legislation and/or national practice for the whole of the period necessary to protect her safety or health. (see Article 5 of Directive 92/85/EEC).

Cases in which exposure is prohibited, concerning biological agents include:

- toxoplasma
- rubella virus

⁽²³⁾ Council Directive 92/85/EEC of 19 October 1992 on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding (tenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) (OJ L 348, 28.11.1992, pp. 1–8).

unless the pregnant workers are proved to be adequately protected against such agents by immunization. (see Article 6 and Annex II A, Directive 92/85/EEC).

In some countries, such as Denmark and Finland, exposure is also prohibited concerning parvovirus and varicella.

Pregnant workers employed in the healthcare sector are subject to the following work practice restrictions, which should be strictly observed:

- no direct contact with potentially infectious material;
- no handling of instruments that might cause sharps, needlestick or puncture injuries, especially if there is a likelihood of contact with body fluids because personal protective equipment (e.g. protective gloves) does not afford sufficient protection.

Pregnant workers must therefore not

- take blood specimens;
- give injections (including intramuscular and subcutaneous ones);
- be engaged in the disposal of contaminated cutting, injecting or drilling instruments;
- treat or dress infected wounds;
- shave patients with a razor;
- have contact with patients known to be infectious;
- work in medical laboratories if it involves contact with infectious body fluids, tissue or secretions/excretions.

In general: Pregnant workers may not carry out work which a doctor would certify as constituting a risk to the health or life of either mother or child.

3.5. Relevant European Union directives

Directive 2000/54/EC of the European Parliament and of the Council of 18 September 2000 on the protection of workers from risks related to exposure to biological agents at work (seventh individual directive within the meaning of Article 16(1) of Directive 89/391/EEC) ⁽²⁴⁾

Council Directive 2010/32/EU of 10 May 2010 implementing the Framework Agreement on prevention from sharp injuries in the hospital and healthcare sector concluded by HOSPEEM and EPSU ⁽²⁵⁾

Council Directive 92/85/EEC of 19 October 1992 concerning the implementation of measures to encourage improvements in the safety and health of pregnant workers, workers who have recently given birth and women who are breastfeeding (tenth individual directive within the meaning of Article 16(1) of Directive 89/391/EEC) ⁽²⁶⁾

Other EU instruments:

European social dialogue: Framework agreement on prevention from sharp injuries in the hospital and the healthcare sector from 17 July 2009 (<http://ec.europa.eu/social/main.jsp?langId=en&catId=89&newsId=558&furtherNews=yes>).

⁽²⁴⁾ OJ L 262, 17.10.2000, p. 21.

⁽²⁵⁾ OJ L 134, 01.06.2010, p. 66.

⁽²⁶⁾ OJ L 348, 28.11.1992, pp. 1–8.

3.6. Links

No	Title	Country/Region	Contents/Source
1.	Nosocomial infections a world wide problem	Netherlands	A company in the Netherlands focused on conceiving, developing, manufacturing and marketing advanced environmental friendly disinfection technology. www.infectioncontrol.eu
2.	Health in Europe: A strategic approach	EU	Healthcare-associated infections and antimicrobial resistance. Healthcare-associated, or nosocomial infections, which affect too many patients admitted to acute care, long-term and home care facilities, carry a tremendous burden of morbidity as well as healthcare and disability costs. Effective therapies for these infections are dwindling away due to the accumulation of multi-drug resistant bacteria in healthcare settings and their rapid emergence in the general population as well. http://ec.europa.eu/health/ph_overview/strategy/docs/R-077.pdf
3.	Infection control at the Hillingdon Hospital (London)	United Kingdom	Infection control to minimise the risk of infection related to healthcare by providing evidence-based preventive and management strategies for infection control. http://www.thh.nhs.uk/Departments/Infection_Control/infection_control.htm
4.	Website of the European Centre for Disease Prevention and Control	EU	The European Centre for Disease Prevention and Control (ECDC) was established in 2005. It is an EU agency with the aim of strengthening Europe's defences against infectious diseases. It is based in Stockholm, Sweden. www.ecdc.europa.eu
5.	Annual epidemiological report on communicable diseases in Europe 2008	EU	Annual epidemiological report on communicable diseases in Europe, 2008. http://ecdc.europa.eu/en/publications/Publications/0812_SUR_Annual_Epidemiological_Report_2008.pdf
6.	IPSE work packages	EU	IPSE (Improving Patient Safety in Europe) aims to resolve persisting differences in the variability of preventive practices and outcomes with respect to nosocomial infection and antibiotic resistance in Europe. The information contains a review of IPSE work packages: WP-1: European training for infection control doctors and nurses in connection with ESCMID WP-2: EU standards and indicators for public health surveillance and technical guidelines for the control of hospital-acquired infections (HAI) and antimicrobial resistance (AMR) WP-3: Event warning and rapid exchange on nosocomial infections (NI) and AMR WP-4: Technical support for sustaining and extending HELICS surveillance of nosocomial infections and control of HAI and AMR WP-5: Improving surveillance and controlling of antibiotic (AB) resistance in ICUs WP-6: Providing complementary tools for the study and control of AMR in ICUs WP-7: Feasibility study of surveillance of HAI in nursing homes of European Member States. http://helics.univ-lyon1.fr/index.htm
7.	Action plan to fight tuberculosis	EU	Framework action plan to fight tuberculosis in the European Union. http://ecdc.europa.eu/en/publications/Publications/0803_SPR_TB_Action_plan.pdf
8.	Inaktivierung und Entfernung von Prionen bei der Aufbereitung von Medizinprodukten	Germany	Inactivation and removal of prions in the preparation of medical products. http://www.rki.de/clin_091/nn_200238/DE/Content/Infekt/Krankenhaushygiene/Erreger__ausgewaehlt/CJK/CJK__pdf__04,templateId=raw,property=publicationFile.pdf/CJK_pdf_04.pdf

9.	Antibiotic resistance	Germany	Antibiotic resistance surveillance in Germany (ARS). With ARS a representative nationwide surveillance system of antibiotic resistance is to be established which covers both the inpatient care and outpatient care sectors. (13.7.2009) http://www.rki.de/cln_091/nn_206122/DE/Home/homepage__node.html?__nnn=true
10.	Tuberculosis infection control	WHO	Tuberculosis infection control in the era of expanding HIV care and treatment — Addendum to WHO guidelines for the prevention of tuberculosis in healthcare facilities in resource-limited settings. http://www.who.int/tb/publications/2006/tbhiv_infectioncontrol_addendum.pdf
11.	SARI	Ireland	SARI — A strategy for the control of antimicrobial resistance in Ireland. Report of the Subgroup of the Scientific Advisory Committee of the National Disease Surveillance Centre http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/StrategyforthecontrolofAntimicrobialResistanceinIrelandSARI/KeyDocuments/File,1070,en.pdf
12.	Exposure of employees to communicable diseases	USA	Preventive measures regarding the exposure of employees to community and nosocomial infections, e.g. Methicillin-resistant staphylococcus aureus (MRSA). http://www.osha.gov/SLTC/etools/hospital/hazards/infection/infection.html
13.	Interim guidance on planning for the use of surgical masks and respirators in healthcare settings during an influenza pandemic	USA	Interim guidance on planning for the use of surgical masks and respirators in healthcare settings during an influenza pandemic. http://pandemicflu.gov/professional/hospital/
14.	Use of blunt-tip suture needles to decrease percutaneous injuries to surgical personnel: Health and safety information bulletin	USA	The purpose of the bulletin is (1) to describe the hazard of sharp-tip suture needles as a source of percutaneous injuries to surgical personnel; (2) to present evidence of the effectiveness of blunt-tip suture needles in decreasing percutaneous injuries to surgical personnel, particularly when used to suture muscle and fascia and (3) to emphasise the European Agency for Safety and Health at Work's requirement and NIOSH's recommendation to use safer medical devices — in this case, blunt-tip suture needles — where clinically appropriate. http://www.cdc.gov/niosh/docs/2008-101/default.html
15.	Empfehlungen der Ständigen Impfkommision (STIKO) am Robert Koch-Institut	Germany	German recommendations on general immunisations http://www.rki.de/cln_091/nn_199596/DE/Content/Infekt/Impfen/STIKO/stiko__node.html?__nnn=true
16.	Multidrug-resistant organisms MRSA	Germany	Information of the Occupational Health and Safety Administration on multidrug-resistant organisms MRSA. This electronic aid (eTool) provides information to help stop the spread of MRSA among employees and others working in healthcare and other industries. http://www.osha.gov/SLTC/etools/hospital/hazards/mro/mrsa/mrsa.html
17.	Liste der sicheren Produkte	Germany	List of safe products — Germany. http://www.bgw-online.de/internet/generator/Inhalt/OnlineInhalt/Medientypen/bgw_20themen/M612-613-Li-Liste-sichere-Produkte,property=pdfDownload.pdf

18.	E-fact 40 — Risk assessment and needlestick injuries	EU-OSHA (European Agency for Safety and Health at Work)	The health of workers, particularly those in the health and welfare sectors, is at risk from exposure to blood-borne pathogens at work, often through an injury sustained by a worker. This e-fact gives information on the hazards and risks relating to needlestick injuries and on the assessment of such risks. http://osha.europa.eu/en/publications/e-facts/efact40
19.	E-fact 41 — Cleaners and dangerous substances	EU-OSHA (European Agency for Safety and Health at Work)	The Agency is producing a series of factsheets focusing on the communication of occupational health and safety-related information on dangerous substances including biological agents. http://osha.europa.eu/en/publications/e-facts/efact41
20.	Report — Expert forecast on emerging biological risks related to occupational health and safety	EU-OSHA (European Agency for Safety and Health at Work)	Biological agents are ubiquitous and in many workplaces workers face considerably harmful biological risks. The Community strategy 2002–06 called on the Agency to ‘set up a risk observatory’ to ‘anticipate new and emerging risks’. This report sets out to present the results of the forecast on emerging occupational safety and health biological risks, which is the second forecast of emerging risks carried out in this context. http://osha.europa.eu/en/publications/reports/7606488
21.	Framework Agreement — on prevention from sharp injuries in the hospital and healthcare	EU social dialogue	Employers and trade unions in the healthcare sector signed an EU-wide agreement on 17 July 2009 to prevent injuries from needlesticks and other sharp objects. The agreement aims to achieve the safest possible working environment for employees in the sector and protect workers at risk, to prevent injuries to workers caused by all types of sharp medical objects (including needlesticks) and to set up an integrated approach to assessing and preventing risks as well as to training and informing workers. http://ec.europa.eu/social/main.jsp?langId=en&catId=89&newsId=558&furtherNews=yes

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4

Musculoskeletal risks

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4.1. Risks for the development of musculoskeletal disorders

4.1.1. Introduction

Musculoskeletal disorders (MSD) are the most common work-related health problem in Europe, affecting millions of workers. MSDs are a reason for concern not only because of the health effects on the individual worker, but also because of the economic impact on the enterprise as well as the social costs to European countries. In some states 40 % of the costs of workers' compensation are caused by MSDs and up to 1.6 % of the gross domestic product (GDP) of the country itself ⁽²⁷⁾. MSDs reduce company profitability and add to the government's social costs.

The healthcare sector is one of the largest sectors in Europe. Approximately 10 % of workers in the European Union are employed in the health and welfare sector, with a significant proportion employed in hospitals ⁽²⁸⁾. The Health and Safety Executive of the UK (HSE) reports that one in four nurses has at some time taken time off as a result of back injury sustained at work ⁽²⁹⁾. They further report that over 5 000 manual handling injuries are reported each year which occur in health services. Approximately half of these happen during the handling of patients. The handling of patients is a major cause of these injuries, but it is not the only one. Ancillary staff can also suffer from injuries related to manual handling of loads. Stresses and strains arising from awkward or static postures when treating patients can also give rise to problems ⁽³⁰⁾. Some staff may have to adopt and hold awkward postures as part of their work, such as ultrasound operators and operating theatre staff.

The Fourth European working conditions survey (2005) has found that in the health-care sector of the workforce ⁽³¹⁾:

- women account for the majority of workers (79 %);
- direct demands from other people determine the pace at work (80 %)
- 61.8 % work at a very high speed;
- 48.7 % report that they have to work in tiring or painful positions;
- 43.4 % have to lift or move patients;
- 27.7 % have to carry or move heavy loads;
- nearly 80 % report standing or walking while working;
- 26.3 % report backache;
- 24.3 % report muscular pains.

⁽²⁷⁾ European Agency for Health and Safety at Work, Work-related musculoskeletal disorders: Prevention report, Office for Official Publications of the European Communities, Luxembourg, 2008.

⁽²⁸⁾ OSHA, 'E-fact 18: Risk assessment in healthcare'.

⁽²⁹⁾ HSE, Musculoskeletal disorders in health and social care.

⁽³⁰⁾ HSE, Musculoskeletal disorders in health and social care.

⁽³¹⁾ European Foundation for the Improvement of Living and Working Conditions, Fourth European working conditions survey, Office for Official Publications of the European Communities, Luxembourg, 2005.

Comparing differences between workers, the European Agency for Safety and Health at Work (EU-OSHA) interviews have shown that ⁽³²⁾:

- qualified and non-qualified employees are equally at risk;
- women are more at risk of injuries of the upper extremities than men;
- older employees complain more often about MSDs.

The challenge of work-related health problems, including MSDs, has been recognised and addressed at the European level by the adoption of a number of Council directives ⁽³³⁾, strategies and policies, and by the establishment of dedicated EU bodies such as EU-OSHA to support occupational health and safety activities across Europe. For example, the European Working Conditions Observatory of the European Foundation for the Improvement of Living and Working Conditions, in cooperation with the Portuguese EU Presidency, organised a conference in Lisbon on musculoskeletal disorders and organisational change in October 2007. It was concluded that no 'one fits all' solutions exist; nevertheless there is a need to strive for win-win solutions ⁽³⁴⁾.

In view of the results of the two-phase consultation of the European social partners under Article 154 of the Treaty on the Functioning of the European Union and of the outcomes of the preparatory study on the socioeconomic impact of a number of potential policy options designed to improve the prevention of work-related MSDs at EU level, the Commission currently intends to propose a new legislative initiative addressing all significant risk factors of work-related musculoskeletal disorders and laying down minimum health and safety requirements for protecting workers from exposure to these risk factors in all workplaces.

4.1.2. Nature of the risk

A risk may arise from anything — whether work materials, equipment, work methods or practices — that has the potential to harm. Workers can be at risk of MSDs in virtually every workplace. The risks in the healthcare sector are related to the following aspects of work

Technical factors include:

- poor ergonomic design of the building;
- adverse working environment (e.g. hot, cold, draughts from air conditioning);
- insufficient space for working activities which may lead to awkward postures and unsafe displacement of goods;
- unsuitable ergonomic design of the workplace, such as workplace arrangement, height and arm-reach;
- an uneven, unstable or slippery floor which may increase the risk of accidents.

Organisational factors may include:

- tasks that are too strenuous; the tasks are, for example, carried out too frequently or for too long a time or workers work too long without breaks;
- unsuitable shift rotation (see Chapter 5);
- time pressure; 56 % of workers in Europe feel under time pressure ⁽³⁵⁾;

⁽³²⁾ European Foundation for the Improvement of Living and Working Conditions, Fourth European working conditions survey, Office for Official Publications of the European Communities, Luxembourg, 2005.

⁽³³⁾ See Section 4.1.9. 'Relevant European Union directives', p. 137.

⁽³⁴⁾ European Foundation for the Improvement of Living and Working Conditions, 'Musculoskeletal disorders and organisational change: Conference report', Lisbon, 11 and 12 October 2007.

⁽³⁵⁾ European Foundation for the Improvement of Living and Working Conditions, Fourth European working conditions survey, Office for Official Publications of the European Communities, Luxembourg, 2005.



⁽³⁶⁾ Council Directive 90/269/EEC of 29 May 1990 on the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers (fourth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 156, 21.6.1990, pp. 9–13.

⁽³⁷⁾ European Agency for Health and Safety at Work, 'Factsheet 73 — Hazards and risks associated with manual handling of loads in the workplace'.

⁽³⁸⁾ European Agency for Health and Safety at Work, 'Factsheet 73 — Hazards and risks associated with manual handling of loads in the workplace'.

- lack of equipment (such as mechanical aids like hoists, trolleys or electrical beds) or provision of inadequate equipment;
- poor maintenance of the equipment;
- lack of training and follow-up training;
- lack of enough workers for the work to be done;
- poor design of the work flow;
- poor information processes;
- non-provision of suitable personal protective equipment, such as footwear and working gloves.

Factors due to the work task include:

- **manual handling of loads** carried out by one or more workers such as lifting, holding, lowering, pushing, pulling, carrying or moving loads ⁽³⁶⁾. The load may be either inanimate, such as a laundry box or a trolley table, or animate (a person or an animal). The criteria for assessing the risks of manual handling of loads where there is a risk of back injury in particular are clearly defined in Appendix I of Council Directive 90/269/EEC ⁽³⁷⁾. The risk of MSDs increases if the load is:
 - » too heavy: there is no exact weight limit that is safe — a weight of 20 to 25 kg is heavy to lift for most people;
 - » too large: if the load is large, it is not possible to follow the basic rules for lifting and carrying (such as to keep the load as close to the body as possible and therefore the muscles will tire more rapidly);
 - » difficult to grasp: this can result in the object slipping and causing an accident; loads with sharp edges or with dangerous materials can injure workers;
 - » unbalanced or unstable: this leads to uneven loading of muscles and fatigue due to the centre of gravity of the object being away from the middle of the worker's body;
 - » difficult to reach: reaching with outstretched arms, or bending or twisting the trunk takes greater muscle force;
 - » of a shape or size that obscures the worker's view, thus increasing the possibility of slipping/tripping, falling or collision;
- **manual handling of patients** which covers all activities where the weight or part of the patient's weight is raised, pushed, pulled, transferred or carried. The risk of MSDs increases if the patient is ⁽³⁸⁾:
 - » too heavy: there is no exact weight limit that is safe — a weight of 20 to 25 kg is heavy to lift for most people; in times where patients tend to be more and more bariatric the weight plays an even more important role in risk assessment;
 - » too large: if the patients' dimensions are too wide (e.g. tall or bariatric), it is not possible to follow the basic rules for lifting and carrying (such as to keep the patient as close to the body as possible) and therefore the muscles will get tired more rapidly;



- » difficult to reach because of insufficient space or the dimensions of the patient: reaching with outstretched arms, or bending or twisting the trunk takes greater muscle force;
- **awkward postures or movements** such as bending and/or twisting, raised arms, bent wrists, over reaching and over exertion;
- **repetitive activities/handling** (not likely to be found in healthcare);
- **prolonged standing** such as in the operating theatre at the operating table or in the kitchen, often combined with a bent over or awkward position;
- **sitting** while doing administrative work and documentation, often also combined with screen working.

Personal/individual factors are of peculiar relevance, and include:

- lack of experience, training or familiarity with the job ⁽³⁹⁾;
- individual behaviour: stress, hectic pace, fatigue, distraction, lack of responsibility, carelessness or habits that can result in a hazardous conduct (e.g. the non-use of handling aids, overloading, wearing of unsuitable clothing, footwear or other personal effects);
- physical ability to do the job: the risk assessment has to consider whether the worker is physically suited for the job; the worker may be at higher risk if:
 - » he or she is physically unsuited to carry out the task in question (due to physical dimensions and capacity such as height, weight or strength);
 - » they are of a certain age: the risk of MSDs is high for very young workers and increases with age as well as the number of years at work;
 - » they have a prior history of MSDs: if the worker has existing ill health (e.g. back injury) or is disabled the likelihood of being harmed by a hazard is even more pronounced.

Psychological and psychosocial factors include:

- high job demands, conflicting instructions and responsibilities, time pressure or the lack of control over the worker's own work, which are important factors in the onset and worsening of MSDs;
- interpersonal relationships, which play an important role: lack of respect and support, shortage of assistance, interpersonal conflict and harassment can have physical consequences; the release of stress hormones, for example, can lead to a tightening of the muscles and muscular problems.

Details on these categories are presented in Chapter 5, 'Psychosocial risks', page 171.

4.1.3. Basic criteria for a specific risk assessment for the prevention of MSDs

Employers are obliged to assess the risks for health and safety resulting from workplace hazards for the musculoskeletal system of workers who may be affected. It is recommended to include visitors, contractors, members of the public and patients.

⁽³⁹⁾ Articles 5 and 6 of Council Directive 90/269/EEC of 29 May 1990 on the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers (fourth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 156, 21.6.1990, pp. 9–13.

Risk assessment helps to find out who is at risk and to decide on adequate preventive measures and risk monitoring. EU Framework Directive 89/391/EEC highlights the key role played by the risk assessment and sets out basic provisions that must be followed by every employer ⁽⁴⁰⁾. Member States, however, have the right to enact more stringent provisions to protect their workers (please check specific legislation of your country).

Important to note

The risk assessment should be based on a holistic approach including technical, organisational and personal/individual factors (T-O-P). The total load on the body should be considered, including psychosocial aspects such as stress or interpersonal conflicts and forms of aggression (e.g. harassment).

Risk assessment is not a single action but must proceed as a continuous process of at least five steps.

Step 1 — Identifying hazards and those at risk

Decide who might be harmed and how. Who comes into the workplace? Are they at risk? Do you have any control over them? Consider the risks for MSDs; focus on manual handling activities (loads or patients), prolonged standing/sitting and repetitive actions. For MSDs, it is important to visit the workplaces to look at what could cause harm as well as to consult and involve the workforce. Do not forget to consider long-term hazards and less obvious risks such as organisational and potentially hidden psychosocial factors. Particular attention should be paid to gender issues and to special groups of workers who may be at increased risk or have particular requirements (e.g. migrant workers, pregnant women or nursing mothers, very young or elderly workers or untrained staff, workers with functional disabilities). In addition, factors such as patient dignity, safety and other rights as well as the need to maintain or restore the patient’s functional abilities and medical indications must be taken into account. Checklists and accident protocols may be good for additional information. But keep in mind that a risk assessment should never be based only on checklists. Checklists carry the risk of overlooking potential hazards that are not listed. You will find detailed information about identifying risks in the sections ‘Nature of the risk’, page 109, and ‘Work situation with the greatest exposure’, page 116.

⁽⁴⁰⁾ Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, OJ L 183, 29.6.1989, pp. 1–8.

⁽⁴¹⁾ Royal College of Nursing (RCN), ‘Guide for manual handling assessments in hospitals and the community’.

⁽⁴²⁾ USA-OSHA, ‘The ergonomics guidelines for nursing homes’.

⁽⁴³⁾ The European Senior Labour Inspectors Committee (SLIC), ‘Lighten the load, Recommendations for the risk assessment in the case of manual handling of loads’.

For help in manual handling assessments in hospitals see also the ‘Nursing Guide for manual handling assessments in hospitals and the community’ published by the UK’s Royal College of Nursing ⁽⁴¹⁾ and USA-OSHA’s ‘The ergonomics guidelines for nursing homes’ ⁽⁴²⁾, with checklists for assessing and controlling risks, assessment forms and selected suggestions for measures. In addition, the European Senior Labour Inspectors Committee (SLIC) has given recommendations for risk assessment in the case of handling/pushing/pulling of loads ⁽⁴³⁾.

Furthermore, attention must be paid to the different ways in which manual handling activities are performed. In particular, the manual handling of patients frequently involves combined activities. The duration and frequency of the handling of patients or loads may greatly vary depending on the type of action. Therefore the resulting physical strain largely depends on the working method. Handling techniques vary in efficiency.

Research study

Lumbar load during patient-handling activities ⁽⁴⁴⁾

Laboratory investigations were conducted regarding the biomechanical load on the lumbar spine of healthcare workers during patient-handling activities which are presumed to result in high lumbar loads for the nursing staff. The aim of the study was to describe quantitatively the subject's lumbar load by means of several indicators, to evaluate the lumbar-spine overload risk, to support the assessment of work-related prerequisites in the evaluation of occupational diseases, to examine measures for work design and to derive potentialities for biomechanical substantiated prevention with regard to workplace, working method, or work equipment. The results of the study show that a reduction in the lumbar load can be achieved by an optimised mode of execution (back-friendly working combined with a patient resource-orientated working way). The additional use of small handling aids such as slides and gliding boards is strongly recommended to achieve a vital load reduction for the lumbar spine, particularly if load-intensive activities are performed by older nurses.



01 Optimised mode of execution with a sliding and anti-slip mat: transfer to the head of the bed.



02 Conventional mode of execution: transfer from laying to sitting at the edge of the bed

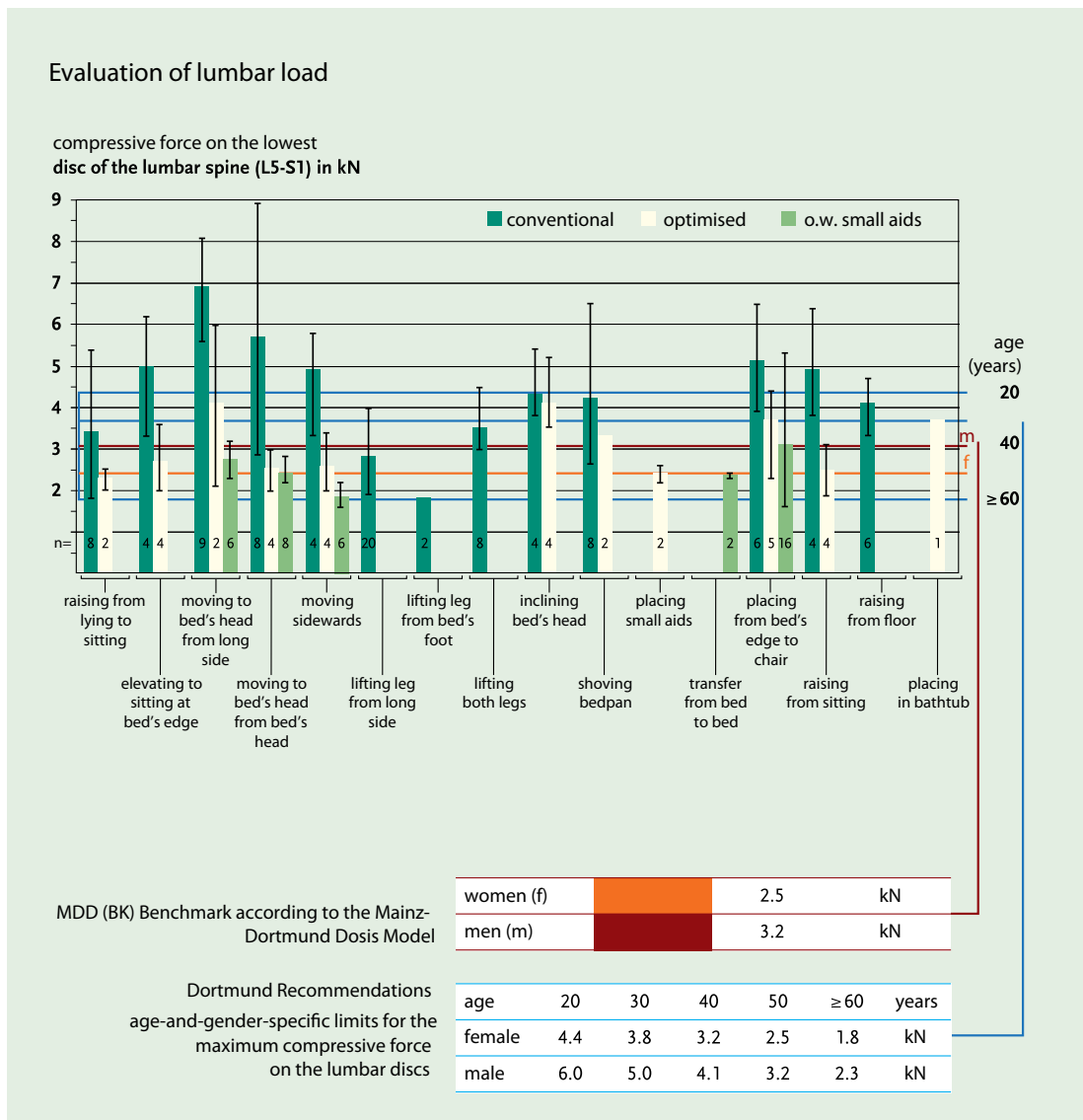


03 Conventional mode of execution: transfer to the head of the bed



04 Optimised mode of execution: transfer from bed to toilet chair

⁽⁴⁴⁾ Jäger, M. et al., 'Biomechanical analysis of patient-transfer activities for the prevention of spine-related hazards of healthcare workers', in *Healthcare Systems Ergonomics and Patient Safety HEPS 08*, Strasbourg, 2008

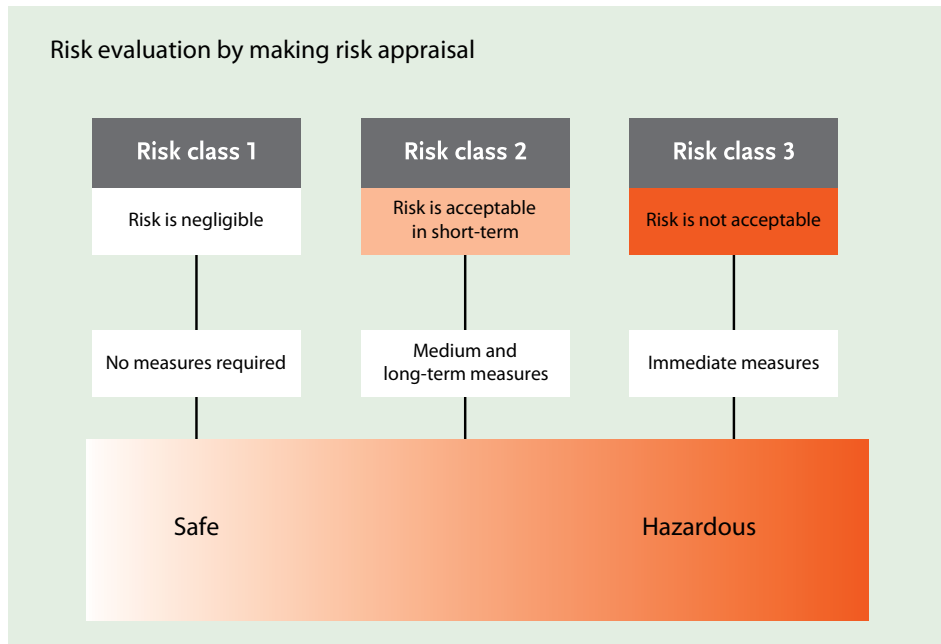


Step 2 — Evaluating and prioritising risks

How does one evaluate and prioritise risks for the development of MSDs? A well-accepted and practical model is to evaluate the risk depending on likelihood and seriousness ⁽⁴⁵⁾. Consider each detected hazard individually and determine whether preventive action should be taken. In other words, determine whether a potential hazard could possibly be ignored, might be acceptable, or definitely is not acceptable. The degree of risk acceptability depends on (a) the likelihood that hazardous situation, an accident, or a physical strain might arise and (b) on the seriousness of the possible consequences of the accepted risk. In order to decide whether a risk situation is acceptable, one should consider three classes of risks.

- **Class 1 risks** comprise situations which are generally and normally acceptable such as routine (but potentially dangerous) situations occurring in everyday life.
- **Class 2 risks** comprise all those risks that must, in the long run, either be reduced or eliminated altogether.
- **Class 3 risks** are completely unacceptable and require immediate protective actions. In extreme cases, it may be necessary to stop the work as soon as this risk is noted.

⁽⁴⁵⁾ Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege (BGW), 'Gefährdungsbeurteilung'.



Step 3 — Deciding on preventive action — T-O-P

Consider the risks and set targets for improvement. The advantage of setting targets is that the necessary preventive measures to be determined become clear. In this way it is also possible to conduct systematic monitoring and reviews.

In order to begin with the risk and target setting procedure, define your preventive targets in writing by determining when, for example, a hoist should be used and at which point a sliding mat should be used. By describing the currently existing situation (T-O-P) it is easy to recognize the existing deficits — in comparison with the desired situation.

In order to set your targets, first look at the relevant directives to determine minimal preventive targets. Furthermore, keep in mind the technical standards. Check whether the precautions already taken are adequate to deal with the risks. If not, decide if they can be improved or which additional precautions need to be taken. Remember that technical measures take priority over organisational measures and that organisational measures take priority over measures concerning the personal/individual factors (see also 'Preventive and protective measures', page 124).

Step 4 — Taking action

Implement preventive measures according to your prioritisation plan. What should be done by whom and by when, and on what time schedule? Who should be involved?

Step 5 — Documentation, monitoring and review

Document your findings and preventive actions; regularly review and update the assessment. Is the number of days of sickness absence reducing? Are fewer potential hazards being identified during safety inspections? Is the number of accidents reducing? If new workers start work, if any significant changes such as the introduction of new equipment or procedures take place or if an accident happens, make sure existing precautions and management arrangements for preventing MSDs at work are still adequate to deal with the risks.

Important to note

Council Directive 90/269/EEC ⁽⁴⁶⁾ sets out the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers. Article 3 stipulates the following:

The employer shall take appropriate organisational measures, or shall use the appropriate means, in particular mechanical equipment, in order to avoid the need for the manual handling of loads by workers.

Where the need for the manual handling of loads by workers cannot be avoided, the employer shall take the appropriate organisational measures, use the appropriate means or provide workers with such means in order to reduce the risk involved in the manual handling of such loads, having regard to Annex I.

4.1.4. Work situations with the greatest exposure

Work situations with the greatest exposure to risk are manual handling activities such as lifting, holding, carrying, pushing and pulling of loads. A special form is the manual handling of patients. The amount of exposure depends on the individual load (e.g. weight, dimensions, gripping conditions), the body posture and the motion sequence needed to perform the handling activity (e.g. upright, twisted, bent, crouched), the duration and frequency (repetition) of the task to be performed, and the ergonomic design of the workplace (e.g. even level flooring, sufficient space for movement, no physical obstacles).

In addition, prolonged standing and sitting are high exposure situations regularly found in healthcare tasks (see also ‘Effects on health and safety’, page 121).

Manual handling — Lifting, holding and carrying of loads

There is a wide range of manual handling of loads in healthcare activities. Medical cases, laundry sacks, crates of water, disposables, medical devices, cleaning equipment, and many other items have to be handled every day. Nearly all groups of workers are involved: medical staff, nurses, service staff, back-up staff, kitchen staff, cleaners, laundry workers and suppliers.

Particularly high exposure conditions exist during the following situations:

- where the load is too heavy and/or the dimensions are too wide (e.g. medical cases not adapted to the ability of the worker performing the task);
- where the handling activity requires twisting or bending or handling far from the body;
- where there is not enough room for unrestricted movement during the task;
- where the removal and deposit of objects are above shoulder height or below knee level;
- where there is a need to handle with gloves (e.g. bad gripping conditions, toxic or irritant substances, chemicals);
- where there is no time for adequate breaks or task rotation which results in continuous strain without recovery.

All these situations induce a high strain for the musculoskeletal system, particularly in the back and in the shoulder/arm area. The result may be early fatigue and thus may give rise to musculoskeletal disorders in the corresponding areas.

⁽⁴⁶⁾ Council Directive 90/269/EEC of 29 May 1990 on the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers (fourth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 156, 21.6.1990, pp. 9–13.

Manual handling — Pushing and pulling of loads

Pushing and pulling of loads is another type of manual handling operation regularly performed in the healthcare sector. It includes the pushing and pulling of beds, trolleys, equipment for diagnostics and therapy and cleaning machines. A wide range of people are involved, from nurses to medical staff, service staff, transport workers, ambulance staff, back-up staff and others. The amount of exposure depends on the weight of the load (transporter plus goods), the forces required for speeding up and slowing down, the technical conditions of the vehicle (wheels, castors, breaks), the complex motion sequences during pushing and pulling and unforeseeable difficulties (need for sudden stops, changes of direction etc.).

Exceptionally high exposure results from the following situations:

- use of unsuitable equipment (transporters too small or too large, worn or defective wheels, no breaks, defective breaks, unsuitable handling height);
- the load being too heavy and/or the object too large (high forces for starting and stopping, poor stability, limited sight, awkward pushing with one hand and stabilising the object with the other hand);
- ramps, uneven flooring, soft surface (carpet), confined spaces, doors and doorsteps (high forces, repeated acceleration and deceleration, starting and stopping);
- unforeseen obstacles that cause sudden changes of direction or abrupt stops (high forces for stopping, restart, steering activities);
- distance, duration, frequency and direction of the task (long distance, long duration, uphill or downhill transport) having clear effects.

Pushing and pulling activities primarily affect the musculoskeletal system of the back, the knees, the hips and the hand/arm/shoulder region. Difficulties arise from crude or incomplete solutions which may result in permanent overloading of the musculoskeletal system. In addition, there is a substantial potential for accidents due to transporters getting 'out of control'.

Manual handling — Handling of patients

Healthcare activities involve the repeated handling of patients; these tasks can be variable, dynamic, and unpredictable in nature. They may be complex activities. The transfer of a patient is an activity comprising numerous individual steps. All these steps are difficult to identify or cannot be described and calculated with the processes available. In addition, factors such as patients' dignity, safety and other rights as well as the need to maintain or restore the patients' functional abilities and medical indications must be taken into account.

Besides the nursing staff, there are numerous professional groups in healthcare that are concerned with the handling of patients. These include occupational therapists, physiotherapists, providers of diagnostic services (e.g. X-ray), operating theatre staff and ambulance transport staff.

Risks can arise above all from the following factors.

- The patient or the part of the body to be moved is too heavy and/or the dimensions are too wide.
- The handling activity requires twisting or bending, overexertion/overstretching or handling far from the body.

- The working method/sequence of motions (e.g. with a jerk, momentum, fulcrum, work with raised shoulders, bending the knee joints more than 90 °).
- There is not enough room for unrestricted movement during the task.
- There is a need to handle with gloves (e.g. bad gripping conditions).
- There is no time for adequate breaks or task rotation, which results in continuous strain without recovery.
- The handling is done in high frequency or over long duration.

High exposure situations occur in activities such as:

- moving a patient in the bed (e.g. for pneumonia and bedsore prophylaxis or inserting supports);
- washing and personal hygiene (in bed, at the wash basin, in the shower chair, in the bath);
- dressing/undressing a patient;
- changing continence materials or introducing/removing a bedpan;
- treatment (e.g. changing bandages);
- raising/lowering the head or leg area of the bed;
- repositioning a patient in a chair/wheelchair (forwards or backwards);
- inserting/removing materials such as sheets, pillows, slings or sliding mats;
- transferring a patient from the bed (e.g. onto a chair/wheelchair, a stretcher or into another bed) and back;
- lifting a patient from the floor into a chair/bed;
- assistance in toileting;
- assisting a patient when walking and standing up/sitting down.

05 Patient handling in the operating theatre.



06 Electrically powered adjustable shower chair.



The activities listed are only a selection of examples and the list may be extended depending on the professional group involved. The conditions are generally aggravated due to immobile patients, bariatric patients or miscalculation of the body weight or weight of the body parts by the handler. One particular risk exists when the work setting layout and/or organisational conditions are unsuitable. There may be space restrictions (building, furniture) which hinder the movement activity, or the level of assistance required for patient handling is not guaranteed. Adequate handling aids (technical aids such as electrically adjustable beds, lifts and small aids such as sliding mats, roll boards and slide boards) are of major relevance for the degree of exposure ⁽⁴⁷⁾. Last but not least, the ability and willingness of the patient to understand and cooperate as well as the medical conditions that influence the choice of the method for handling clearly affect the exposure level.



07 08 Bariatric patients.

Prolonged standing or standing in bent/awkward positions

Prolonged standing and standing in a stooped/bent position are part of daily routine in the healthcare sector. These can be found, for example, in operating theatres and kitchens and during ultrasound operations and physiotherapy. The amount of exposure primarily depends on the duration and frequency of the task. In addition, the amount of bending, twisting or other strenuous postures due to the medical conditions are major factors. Furthermore, the ergonomic design of the workplace has a high impact for the development of MSDs.

Particularly high exposure will be found in the following situations:

- long periods of standing at the operating table, often combined with static loading of the arm and shoulder muscles due to holding hooks or instruments;
- prolonged standing in bent over positions during therapeutic or diagnostic procedures (massage, bathing activities, ultrasonic testing);
- prolonged standing during long-lasting treatments, manoeuvres such as the application or changing of bandages, intravenous infusions and feeding (mostly with fixing the arm or leg or the whole body of the patient in a certain position);
- prolonged standing by kitchen staff during meal preparation;
- prolonged standing and walking by cleaners during their work
- prolonged bedside activities, involving standing for nurses, medical staff and service staff (particularly if there is no possibility of changing position or of alternating between supporting and non-supporting leg);

⁽⁴⁷⁾ Jäger, M. et al., 'Biomechanical analysis of patient-transfer activities for the prevention of spine-related hazards of healthcare workers', in *Healthcare Systems Ergonomics and Patient Safety HEPS 08*, Strasbourg, 2008 (cf. figure 'Lumbar load during patient-transfer activities' in Section 4.1.3).

- daily routine activities with unadjusted working heights (bed, table, worktop, laboratory bench), which result in increased bent positions, working with raised shoulders or other poor positions.

09 Standing in the operating theatre.



Prolonged sitting

Healthcare services involve an increasing amount of administrative work, which is mostly performed in sitting at a desk or in front of a PC. In addition, today's diagnostic and therapeutic equipment is configured with monitors requiring a seated position. A wide range of people are involved in these tasks, including nurses (particularly head nurses), medical and diagnostic staff, laboratory and administration staff and data entry workers. At first glance, sitting appears to be comfortable because the legs and feet are relieved of any load. However, while one is concentrating on the work, the body suffers increasingly. The spinal column moves out of its natural shape and bends into a rounded back and shoulders, leading to headaches or back pain. The front edge of the seat may press against the thigh, which results in restricted blood circulation in the legs. Constrained digestive organs may cause digestion problems. The heart and lungs are compressed and the body does not get enough oxygen. This leads to poor performance and fatigue.

Particularly high exposure results from the following conditions:

- prolonged sitting for many hours without breaks or interruptions by other tasks (office work, administration, data processing, laboratory tasks, microscope work, etc.);
- prolonged sitting with a bent or twisted trunk while giving care (support in eating, toileting) and diagnostic or therapeutic measures;
- longlasting endoscopic surgery or diagnostics, particularly when specifically awkward postures have to be adopted;
- poor ergonomic design of the workplace (worktop too high or too low, restricted room for sitting, poor layout causing overreaching, no space for the feet, confined view to the screen, bad lightning);
- inappropriate work chair (seat height and depth, armrest and backrest not adaptable to the user's needs).



10 Ergonomically designed counter.

4.1.5. Effects on health and safety

This chapter focuses on work-related MSDs, likely to be caused or intensified by work and the circumstances of its performance. Often, activities such as housework or sports may also be involved but a clear differentiation is not always possible.

The term musculoskeletal disorders (MSDs) denotes health problems of the locomotor system. MSDs are complex work-related health conditions due to their multifactorial aetiology, various risk factors and their combinations. They are impairments of body structures such as muscles, joints, tendons, ligaments, nerves, bones or a localised blood circulation system caused or aggravated primarily by the performance of work and by the effects of the immediate environment where the work is carried out. Most MSDs are cumulative disorders. The symptoms may vary from discomfort and pain to decreased body function and invalidity.

When loads or patients are handled or other types of physical work are performed, three systems within the human body that are ideally attuned with one another interact.

1. The muscles generate the necessary force.
2. The bones, ligaments and joints transfer the force to the load/patient to be handled.
3. The heart circulation and breathing guarantee the provision of energy.

Each of these systems can be overloaded if it is exposed to repeated high loads or low-intensity loads over a long period of time or if the working method is inappropriate. Problems occur, in particular, if the mechanical workload is higher than the load-bearing capacity of the components of the musculoskeletal system. Injuries of muscles and tendons, ligaments, and bones are typical consequences. In addition, irritations at the insertion of muscles and tendons and of tendon sheaths as well as functional restrictions and early degeneration of bones and cartilages may occur.

There are two fundamental types of injuries. One is acute and painful, the other chronic and lingering with steadily increasing continuous pain. The first type is caused by brief but considerable inappropriate mechanical load, leading to a sudden failure in structure and function such as:

- tearing of the muscles due to lifting a heavy load;
- bone fracture due to a sudden force;
- blocking of a vertebral joint due to a violent movement;
- protrusion/dislocation of a vertebral disc due to bending forward or heavy lifting.

The second type of injury results from continuous overload, leading to increasing complaints and impairment of function such as:

- wear of the intervertebral discs;
- degeneration of articulations or the vertebral bodies;
- fractures of the spinal processes;
- overstretching of ligaments;
- tendosynovitis;
- muscle tension.

MSDs are dominated by back injuries. Within the EU 27, about 25 % of workers complain of backache and about 23 % report muscular pain. MSDs are the greatest cause of absence from work in practically all Member States with significantly more workers (38.9 %) affected in the new Member States ⁽⁴⁸⁾. The cardiovascular system may also be harmed by physical strain. Strenuous physical work, especially in combination with continuous psychological and psychosocial strain, may result in high blood pressure. Additionally prolonged standing leads to a shift of blood to the legs with particular loading of the venous system (when walking, the contraction of the muscles supports the flow from the blood back from the legs to the heart). Circulatory disorders, dilatation of the veins and varicosis may be possible consequences. The risk of thrombosis rises remarkably. Another consequence of continuous standing is the increased strain on the muscles, tendons and ligaments of the feet. The overload of these structures may result in flattening of the foot arch and development of a flat or splay foot.

The abdomen may also be harmed through strenuous physical work. Performing a heavy lift, carrying, pushing and other high-strain physical activities are connected with a considerable increase in intra-abdominal pressure. This may result in herniation. Men, in particular, are at risk of an inguinal hernia and women of a prolapsed womb.

11 12 Injuries of muscles, tendons, ligaments and bones are typical consequences of an overload of the musculoskeletal system.



⁽⁴⁸⁾ European Foundation for the Improvement of Living and Working Conditions, Fourth European working conditions survey, Office for Official Publications of the European Communities, Luxembourg, 2005.

Providing information and training

The last rank in the prevention hierarchy is taken by personal/individual-related measures. Human behaviour is governed by knowledge, ability and motivation. Here, knowledge means the cognitive level, ability the psychomotoric and motivation the affective-emotional level. Knowledge is achieved by information, ability is attained by practice and experience and motivation arises through emotion. Knowledge and ability largely determine action. The more pronounced knowledge and ability are, the greater the chances are for motivation.

Very frequently preventive actions are restricted or start at the personal/individual-related level. These actions are intended to put the workers in a position of behaving safely — in a back-friendly way. However, the effectiveness of personal/individual-related measures alone is low and the cost of achieving sustainability is very high. Only when all the possibilities at the technical and organisational levels are exhausted should action be initiated at the personal/individual level.

- Information should be provided about the risks of MSDs. For example, staff must be trained in order to increase awareness of the ergonomic factors and to recognise and avoid unsafe working conditions. Furthermore, workers must be persuaded to support prevention and to realise the outcome of neglecting preventive measures. They should be made aware of the benefits of adopting safe working practices in terms of reduced suffering and lost wages.
- All workers should be trained in preventive and back-friendly working methods.
- Regular training in the use of equipment and correct and back-friendly handling techniques for inanimate loads must be provided. Each task and load demands individual conduct geared to the respective circumstances of the workplace for, for example, the manual handling of loads and the pushing of beds and wheelchairs ⁽⁴⁹⁾.
- Healthcare workers and other staff handling patients must be trained in preventive and back-friendly patient handling working methods ⁽⁵⁰⁾.
- Healthcare workers and other staff handling patients must be regularly trained in the use of patient handling devices (mechanical and handling aids) ⁽⁵¹⁾.



⁽⁴⁹⁾ Council Directive 90/269/EEC of 29 May 1990 on the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers (fourth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 156, 21.6.1990, pp. 9–13.

⁽⁵⁰⁾ Council Directive 90/269/EEC of 29 May 1990 on the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers (fourth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 156, 21.6.1990, p. 9–13.

⁽⁵¹⁾ Council Directive 93/42/EEC of 14 June 1993 concerning medical devices, OJ L 169, 12.7.1993, pp. 1–43.

⁽⁵²⁾ International Social Security Association (ISSA), 'Back-protecting work practices in healthcare: training and prevention concepts in Europe', Experts' Workshop, Paris, 2002.

13 Suitable footwear.



- Healthcare workers and other staff handling patients should be trained to promote the patients' resources and to enable the patient to participate more actively in the process of moving. The physical strain for the healthcare worker can thus be reduced and the basic principle of taking care of a person by stimulating and using the patient's resources as much as possible will be resumed. Such a method of patient handling also complies with the goal of maintaining a sense of dignity and self-control for the patient ⁽⁵²⁾.

- Personal protective equipment must be provided. The use of suitable footwear (see also 'Prevention of accidents due to slips, trips and falls', page 157) and protective equipment such as working gloves must be ensured ⁽⁵³⁾.
- Workers must receive health surveillance appropriate to the health and safety risks they incur at work, and such measures must be introduced in accordance with national law and/or practices. The health surveillance measures must be such that each worker, if he or she so wishes, may receive health surveillance at regular intervals ⁽⁵⁴⁾.

4.1.6. Preventive and protective measures

European Union directives make employers and management staff responsible for managing health and safety, including assessment and prevention of risks, consulting workers (men and women), coordination on safety with contractors, giving priority to collective measures to eliminate risks and providing information and training.

Important to note

According to Council Directives 89/391/EEC and 90/269/EEC, employers must ensure that workers receive information about the risks they might be open to while working while, for example, handling loads/patients, particularly if tasks are not performed correctly. Furthermore the employer must inform the workers about adequate protective measures and ensure that workers receive proper training on how to work in a safe and back-friendly way (for detailed information see page 123).

Information and training should be provided before the worker takes up the work. It is recommended that information and all training activities should take place at least once a year to promote sustainability and efficiency.

⁽⁵³⁾ Council Directive 89/656/EEC of 30 November 1989 on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace (third individual directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 393, 30.12.1989, pp. 18–28.

⁽⁵⁴⁾ Article 14(1) of Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, OJ L 183, 29.6.1989, pp. 1–8.

⁽⁵⁵⁾ Article 6.2 of Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, OJ L 183, 29.6.1989, pp. 1–8.

When an attempt is made to resolve work-related MSDs problems, a wide range of solutions (technical, organisational and personal/individual) need to be considered and a hierarchy of preventive principles must be respected ⁽⁵⁵⁾. Owing to their greater effectiveness, technical measures have priority over organisational measures. Organisational measures have priority over personal/individual (behaviour-related) measures. To achieve sustained effects, prevention must be designed to be holistic; it must embrace measures from all three of the abovementioned levels. Collective protective measures should be given priority over individual protective measures. A coherent overall prevention policy should be part of the company strategy of the healthcare facility. Only an overall organisational company culture of risk prevention and health promotion — and therefore of occupational health and safety management — has any prospects of success. This definitely involves a concept carried out at and sponsored by the management level and including the workers.

Because of the multiple causes of MSDs, they cannot all be avoided by preventive measures at the workplace. So it is still essential to encourage early reporting of symptoms. For workers who already have MSDs, the challenge is to maintain their employability, keep them working and, if necessary, reintegrate them into work. Rehabilitation and reintegration into work of workers with MSDs should form a regular and integral part of workplace-related MSDs policy.

14 15 Ergonomic workplace design: adjustable sink.



Technical measures

To achieve the prevention of MSDs and to ensure sustainability if possible target **elimination**:

- consider whether a risk (e.g. manual handling of loads/patients) can be avoided;
- check whether the load/patient needs to be moved at all;
- think about mechanisation, such as automatic opening doors where goods or patients have to be transported;
- improve the layout of the workplace; for example, to avoid workers performing tasks requiring high force or awkward/static working postures, the physical strain situation can be held within acceptable limits by appropriate design of the work place.

If the risk of injury/strain cannot be avoided it needs to be **reduced**:

- combat the MSD risks at source and consider how far the risk must be reduced;
- adapt the work to the individual — especially the design of workplaces (e.g. ergonomic working height, adjustable worktops, standing aids) and the choice of work equipment;
- adapt to technical progress: devices (mechanical aids) such as electrically powered adjustable beds, lifts, stretchers, trolleys and vacuum lifting devices or mechanical handling equipment in storing or in the operating theatre must be provided. Mechanical aids should definitely be provided if the risks identified in the assessment can be reduced or eliminated by this means. The current state of technology must be taken into account. For patient handling, small devices (handling aids) to reduce or increase friction (e.g. transfer boards, transfer belts, glide boards, sliding mats) are essential, as well as powered sit-to-stand or standing aids and hoists, preferably ceiling-mounted lifts.



- 16** Electrically powered adjustable bed.
- 17** Electric support for pushing a bed.
- 18** Ceiling-mounted lift.



Organisational measures

These should only be considered if it is not possible to eliminate or reduce MSDs risks. Organisational measures include the following.

- Provide sufficient staff for the work to be done.
- Ensure the ergonomic design of the workflow by planning the work or implementing safe systems of work.
- Make sure there is a balance between mechanical load and the individual load-bearing capacity of the musculoskeletal system of the workers.
- Check how time pressures can be reduced.
- Reduce the physical demands of the job by decreasing the levels of force, repetition and awkward postures; this often necessitates the use of handling devices or adjustable beds and tables and the choice of ergonomic working methods. Staff should be trained on how to deal with an emergency in case of malfunctioning equipment. Adequate maintenance programmes should be ensured.
- Implement a systematic training concept for manual handling activities; look for training standards in your country ⁽⁵⁶⁾.
- Ensure sustainability by implementing multipliers that provide training and advice (see also 'A success story — the implementation of peer-leaders to promote back-friendly working ways', page 131).
- Consider job rotation to reallocate tasks between workers to reduce prolonged standing or, for example, bending and twisting in the operating theatre.
- Implement a reasonable shift rotation system, rotate forward and allow enough days off work.
- Provide a certain variety in the work to be done.
- Provide room for individual decisions on how and when tasks have to be accomplished.
- Introduce breaks of sufficient length.

19 Breaks to relax and renew energy are indispensable.



⁽⁵⁶⁾ International Social Security Association (ISSA), 'Back-protecting work practices in healthcare: training and prevention concepts in Europe', Experts' Workshop, Paris, 2002.

An example of the prevention of back disorders among nursing staff

The Ergonomics Working Group of the International Social Security Association (ISSA), Health Services Section, has been examining the subject of the prevention of back disorders in healthcare since 1998. At a workshop in 2006, basic principles for prevention of workplace-related back diseases in healthcare which could be applied throughout Europe were agreed ⁽⁵⁷⁾.

1. Recommendations for designing or redesigning facilities (technical measures)

- The project owner must make the project's ergonomic requirements clear from the start of the construction programme.
- There must be extensive consultation between architects and future users during the design and construction phase.
- To prevent back pain in healthcare staff, designers of healthcare premises must pay particular attention to the layout of certain critical areas, such as patients' rooms, bathrooms, storage spaces, corridors and elevators, at the 'heart' of the service.
- An assessment must be made after implementation of any changes as part of the continuous improvement of working conditions.

2. Recommendations for organisational measures of prevention

- A process must be defined for prevention in the field of ergonomics. In particular, the prevention of back problems as part of occupational health and safety must be written into the mission statement of all healthcare establishments.
- A staff position should be set up associated with the risk and quality management to take responsibility for the process.
- The process of prevention in ergonomics must be applied to all areas and departments in the same way. The special needs of the accident and emergency department and the operating theatre must also be given particular attention.
- An assessment of ergonomic risks should be carried out in all areas and departments. When necessary, organisational structures and procedures should be adapted to allow for organisational development. Staffing levels, ratios and duty rosters should be drawn up accordingly.
- Once structures and procedures have been analysed, the process to be defined must be broken down into separate processes and addressed in separate projects that include specialists, to ensure a participative management. Project development and project management should report to the risk and quality management department.
- The ergonomics risk analysis must be performed by a specialist.
- Staff must be given training in ergonomics where necessary. Particular attention is to be paid to staff of subcontractors.
- Training providers or ergonomics officers plus regular reporting will ensure the creation of a network across all departments.



⁽⁵⁷⁾ The Ergonomics Working Group of the International Social Security Association (ISSA), 'Recommendations: Prevention of low-back pathologies in healthcare professions', 2006.

- For the process of prevention in the field of ergonomics internal criteria and indicators must be defined and regularly monitored.
- Optimum equipment conditions constitute an essential factor in the ergonomic design of structures and procedures.
- In order to carry out effective prevention in the field of ergonomics, sufficient financial resources must be provided.

3. Recommendations for technical equipment/mechanical and handling aids (organisational measures)



Mechanical and handling aids are indispensable for healthcare workers, therapists and patients; they are an important part of a comprehensive occupational health system.

- An appropriate number and adequate choice of mechanical and handling aids must be available. Healthcare staff must be properly trained in how to use them correctly. They should also be trained in how to deal with an emergency in case of malfunctioning equipment. Adequate maintenance programmes should be ensured. Improvement of the acceptance of such devices by all professions must be established. The prerequisites that enable acceptance, appropriate and safe use of mechanical and handling aids must be guaranteed. Beds that can be electrically, or at least hydraulically, adjusted, with an electrically adjustable head part, are the basis of ergonomically efficient care. Fully electrically operated beds are preferable to hydraulically operated beds.



20 21 Transfer from bed to wheel chair with the help of a glide board.

- Whenever possible, lifting should be avoided. If lifting is the only solution use a hoist. Handling aids support patient mobility and thus effectively reduce loads on healthcare workers. The minimum requirement in each ward should be determined by the care needs. In all cases, however, the basic equipment for each ward should include two of the following: anti-slip mat, sliding mat, glide board and transfer belt.



22 23 24 25 26 27
Step by step: handling a patient with the help of a sliding mat.



4. Recommendations for vocational education and continued training in back-protecting work practices (organisational measures)

- Training must be integrated in a safety culture of the organisation. Risk assessment is fundamental.
- To be able to convince the management of the importance of the training, the trainers must know the negative and positive drivers. The result of the training should be measured quantitatively and qualitatively.
- The trainer must know the training level of the healthcare workers and their workplace environment. Further support is required in the field so that acquired knowledge is implemented.
- Basic and continued training should include the following five basic principles.
 1. Training in individual risk assessment of the care situation (task, patient, environment, aids)
 2. Training in back protection during manual handling and use of handling aids
 3. Problem-solving training to deal with difficult patient handling situations
 4. Analysis and training of psychomotoric capabilities of patients and healthcare workers
 5. Continuing professional development.



- The initial training should include basics in back protection working methods and should enable patient handling that is safe for both nursing staff and patient.
- The continued training should include brushing up, consolidating and extending basic knowledge and skills as well as developing problem-solving skills. It should form part of a continuing professional development process.
- In order to avoid vertical lifting and shifting without gliding aids, knowledge of the use of technical aids and analysis of the patient's resources are required.



5. Recommendations for healthcare workers: basic principles for patient handling (personal/individual behaviour measures)

- Before every care activity the nurse should conduct an individual risk assessment with regard to physical load situations. Before every transfer the nurse must consider in what way the load can be reduced and establish an appropriate procedure. The nurse should take his/her own limits into account. After the performance of the care activity, the efficiency should be reviewed and the solution strategy modified where necessary. An exchange of views with colleagues is another possibility for improving the procedure.
- The safety of the nursing staff and the patient must always take priority over objectives of care actions which promote/activate patient resources.
- Aids must always be used when a care activity cannot be designed without any risk.
- The nurse must obtain information about all the patient's abilities (mental and physical) and exploit and promote these in every nursing activity in order to ease the load on himself/herself.
- The nursing staff must keep their knowledge and abilities up to date and ensure they are physically and mentally fit.
- The nursing staff should wear movement-friendly clothing and safe shoes which provide hold (closed at the front and back, anti-slip soles) in order to be able to work in a back-friendly manner without the risk of falling.

A systematic review of the scientific evidence of the effectiveness of preventive measures showed ⁽⁵⁸⁾ the following.

- There is strong evidence that technical ergonomic measures can reduce the workload on the back and the upper limbs and moderate evidence that these measures can also reduce the occurrence of MSDs.
- There is moderate evidence that a combination of several kinds of interventions (multidisciplinary approach) including technical, organisational and personal/individual measures is better than single measures.
- There is some evidence that a participative approach which includes the workers in the process of change has a positive effect on the success of an intervention.
- Physical training (including vigorous exercise at least three times a week) can also reduce the recurrence of back pain and neck/shoulder pain.
- There is strong evidence that training in working methods in manual handling is not effective if it is used as the only measure to prevent lower back pain.

Important to note

A success story — The implementation of peer leaders to promote back-friendly working ways

Important to note

There are several concepts for ensuring sustainability in back-friendly working in European countries ⁽⁵⁹⁾. In the Netherlands, ergo coaches are well known and found in the working world throughout the country. The government is giving financial support to this endeavour, and it has shown broad success. In Belgium, Germany and France, knowledge has been transferred into each workforce by training so-called peer leaders, in accordance with the individual needs of the enterprise and in consideration of the individual tasks, for more than 10 years. Since there is no government support, in these countries progress is much slower. Nevertheless, more and more back experts and ergonomic experts (Germany) and *animateurs/animateurices pour la manutention des malades/des charges* (Belgium and France) are starting to fulfil task. Peer leaders are specifically trained workers. They have in-depth knowledge of ergonomics, back-friendly working methods and suitable equipment. They coach their colleagues during the daily working routine as they work together, thus helping to promote safe working conduct. Furthermore they advise co-workers and team leaders on how to prevent MSDs or accidents and help to ensure the ergonomic design of work stations or decide on the most appropriate equipment.

The concept of peer leaders is established in both the care sector in other professions where there is a strong need for back-friendly working methods.

For more information see:

<http://www.ergocoaches.nl>

<http://www.backexchange.eu>

<http://www.inrs.fr>

<http://www.backexchange.eu> (which contains advice on contacting national experts).

Another approach to the prevention of MSDs is the back care advisor found in the United Kingdom. This is an external expert who provides advice in such a way as to promote organisational development with the aim of preventing MSDs. For more information see: http://www.nationalbackexchange.org/roles_of_a_back_care_advisor/index.html

⁽⁵⁸⁾ European Agency for Safety and Health at Work, Work-related musculoskeletal disorders: Prevention report, Office for Official Publications of the European Communities, Luxembourg, 2008.

⁽⁵⁹⁾ See also: International Social Security Association (ISSA), 'Back-protecting work practices in healthcare: training and prevention concepts in Europe', Experts' Workshop, Paris, 2002.

4.1.7. Behaviour in critical situations — Recommendations for workers

Lifting, holding, carrying and putting down a load — Recommended handling techniques

Before lifting a load, you need to plan and prepare for the task. Is it really necessary to lift the load? Can you avoid lifting? Can you get help? If lifting cannot be avoided, make sure that:

- you know where you are going;
- the area in which you are moving is clear of obstacles;
- you have a good secure grip on the load (suitable gloves);
- your hands, the load and any handles are not slippery;
- if you are lifting with someone else, make sure that both of you know what you are doing before you start.

You should use the following technique when lifting a load.

- Create and maintain a stable base.
- Put your feet around the load, with your body over it (if this is not feasible, try to get your body as close as possible to the load).
- Have your lumbar spine, hips and knees moderately bent at the start of the lift.
- Use the muscles of your legs when lifting.
- Straighten your back, try not to twist or lean sideways.
- Pull the load as close as possible to your body.
- Lift and carry the load with straight downward turned arms.
- Move smoothly.
- Put the load down and then adjust its position.
- Handle items stored above eye level by using steps/ladders.

28 Load close to the body.

29 Correct technique.



Pushing or pulling of loads — Recommended handling techniques

It is important that:

- any pushing and pulling is done using the body's own weight; put your feet in step position and lean forward when pushing and backwards when pulling;
- you push equipment rather than pull, when possible;
- you keep your arms close to the body and push with the whole body and not just arms;
- you ensure you have good visibility and that the load is stable;
- you remove unnecessary objects to minimise weight;
- you avoid obstacles that could cause abrupt stops;
- you have enough grip on the floor to be able to lean forwards/backwards (suitable footwear?) (see also 'Prevention of accidents due to slips, trips and falls', page 157);
- you avoid twisting and bending your back;
- you avoid awkwardly pushing with one hand and holding freestanding equipment with the other;
- the wheels should be an appropriate size;
- routine maintenance is performed on all equipment so that handling devices are well maintained and they run easily and smoothly;
- you take defective equipment out of service;
- floors are hard, even and clean.



30 Aligning a bed.
31 Pushing a bed.

Patient handling — Recommended handling techniques

Remember no fixed rules exist for optimum patient handling. Standards exist only to a limited extent, since optimum patient handling can mean something different in each situation, for each patient/healthcare worker and for each type of care action. Nevertheless there are some basic principles which should be taken into account.

Basic principles for back-friendly patient handling

Before handling a patient, always make a quick review of the handling activity you will be carrying out. You need to plan and prepare for the task. Make sure that you reduce the strain on your musculoskeletal system.

- Arrange your environment in such a way that you have sufficient space and an ergonomic height (of, for example, the bed).
- Make sure that the brakes of the bed, the trolley or the wheelchair are properly set.
- Reduce the load, use handling aids and work with two or more colleagues.
- If you work with two or more colleagues, it is absolutely necessary to communicate about the handling action, to coordinate the process and also to inform the patient.
- Handle the patient as close to your body as possible and keep your body as upright as possible.
- Do not work in jerks or with raised shoulders.
- Bend your knees instead of your back and initiate motion by standing in a step position and shifting your weight from one leg to the other.
- If the effort is too great, try another solution, use a handling aid and/or work with two or more people.

32 Step position: shifting the weight.

33 Transfer of a paralysed patient with the help of a ceiling-mounted hoist.



Basic principles for a patient resource-oriented working method

A patient resource-orientated working method can reduce the strain for the carer even further. Such a method will balance any functional deficits in the patient and reduce the risk of harm to the patient and the carer.

- The motion pattern and the movement speed should be induced by the patient, and the carer should adjust himself/herself to the patient's way of moving.
- The interaction between patient and carer should be designed in a harmonious way, to induce orientation and control for the patient.
- Small steps allow the patient to act on their own initiative and thus strain for the carer will be reduced.
- Whenever possible, keep the patient's weight within their own body structures; move the patient by shifting the weight step by step following the natural movement pattern instead of lifting the weight.
- Offer your support by using the natural movement patterns.
- Make sure to use a safe and impulse-induced contact with the patient and never grasp the patient at their joints.



34 A safe impulse-induced contact with the patient.

Prolonged standing or standing in bent/awkward positions — Recommended behaviour

The ergonomic design of the workplace (ergonomic height, adjustable worktops, use of standing aids) as well as back-friendly working postures result in a reduction of the strain for the musculoskeletal system and therefore have a positive impact.

In order to make it easier on the back, the following principles should be observed.



35 Desk, chair and microscope can be adapted to the user's needs.

- The ergonomic working height, i.e. the worktop, should be roughly 5 cm below elbow height for someone standing upright; individually adjustable worktops are best.
- The strain from activities performed while standing should be reduced whenever possible by means of a standing aid; it should be adjustable and set to suit the height of the user.
- Wearing support stockings may be an important measure in long-term exposure to standing in order to support the venous system.
- Wearing appropriate footwear prevents the development of a flat or splay foot.



36 37 38 Ergonomic working height.



Prolonged sitting — Recommended behaviour

39 Adjusted seat, back, feet, armrest, desk and microscope.



Fixed rules for optimum sitting exist only to a limited extent since optimum sitting can mean something different in each situation and for each type of work — maximum freedom of movement or perfect view of the screen and files, sometimes even intended relaxation. The aim must be to avoid adverse effects through sitting as much as possible. That applies principally to prolonged periods of sitting. Anyone who sits down to telephone, have a brief chat or a short break will hardly suffer from sitting-related physical or mental negative effects — in such cases it is simply a question of comfort. However, after about half an hour one or another unpleasant sensation may occur.

In order to avoid adverse effects, one should introduce a short break approximately every half hour and change position as often as possible. The work chair must be individually adapted to fit the user with the aid of various adjustments. The most important adjustment features are seat height and inclination, seat depth, armrest height, back height and inclination, as well as the dynamic setting of the back.

The ratio of the height of the worktop to the seat height is of equal importance. In normal working posture, the forearms should be parallel with the thighs. The forearms and hands must rest comfortably supported on the tabletop without the shoulders being raised. If the soles of the feet are no longer in full contact with the floor, a height-adjustable footrest is required or — if at all possible — the height of the worktop must be lowered. There must be enough room for the workstation ⁽⁶⁰⁾.

40 Sitting: documentation in a nursing ward.



41 Adjustable worktop.



⁽⁶⁰⁾ Council Directive 90/270/EEC of 29 May 1990 on the minimum safety and health requirements for work with display screen equipment (fifth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 156, 21.6.1990, pp. 14–18.

4.1.8. Main messages and conclusions

Important to note

Working conditions must be such that the health of workers is not endangered. The resources of healthy workers should be reinforced. Workers at risk must be supported by protective measures. Workers who have already MSDs must be helped back into work. A participatory approach is particularly promising. Often measures of risk prevention and health promotion need to be linked in order to achieve the goal.

4.1.9. Relevant European Union directives

Requirements set out in the European directives that are relevant to the prevention of MSDs include the following **employers'** responsibilities:

1. Following a general **framework** to manage health and safety, including assessment and prevention of risks; giving priority to collective measures to eliminate risks; providing information and training; and consulting workers (men and women), coordination on safety with contractors (Council Directive 89/391/EEC) ⁽⁶¹⁾
2. **Consulting the workforce** is a requirement; using their knowledge helps to ensure that hazards are correctly spotted and workable solutions implemented; ensure a gender-neutral approach (Council Directive 89/391/EEC) ⁽⁶²⁾
3. Council Directive 90/270/EEC on the minimum safety and health requirements for work with display screen equipment contains detailed references about the **design of workstations** with display screen equipment ⁽⁶³⁾
4. Ensuring that **workplaces** are well **maintained** (Council Directive 89/654/EEC) ⁽⁶⁴⁾
5. Ensuring that, as far as possible, **workplaces** receive sufficient natural **light** and are equipped with artificial lighting adequate to protect workers' health and safety (Council Directive 89/654/EEC) ⁽⁶⁵⁾
6. Providing suitable ergonomic **work equipment** with a gender-sensitive approach to reduce/avoid hazards ⁽⁶⁶⁾
7. Council Directive 90/269/EEC sets out minimum **health and safety requirements for the manual handling of loads**, particularly where there is a risk of back injuries for workers ⁽⁶⁷⁾

⁽⁶¹⁾ Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, OJ L 183, 29.6.1989, pp. 1–8.

⁽⁶²⁾ OJ L 183, 29.6.1989, pp. 1–8.

⁽⁶³⁾ Council Directive 90/270/EEC of 29 May 1990 on the minimum safety and health requirements for work with display screen equipment (fifth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 156, 21.6.1990, pp. 14–18.

⁽⁶⁴⁾ Council Directive 89/654/EEC of 30 November 1989 concerning the minimum safety and health requirements for the workplace (first individual directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 393, 30.12.1989, pp. 1–12.

⁽⁶⁵⁾ OJ L 393, 30.12.1989, pp. 1–12.

⁽⁶⁶⁾ Directive 2009/104/EC of the European Parliament and of the Council of 16 September 2009 concerning the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC — Codification of Directive 89/655/EEC, as amended by Directives 95/63/EC and 2001/45/EC); OJ L 260, 3.10.2009, pp. 5–19.

⁽⁶⁷⁾ Council Directive 90/269/EEC of 29 May 1990 on the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers (fourth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 156, 21.6.1990, pp. 9–13.

8. Providing **personal protective equipment** (e.g. protective footwear, working gloves for a good grip) appropriate for the risks involved and where they cannot be avoided by other means. It should be comfortable, fit the wearer correctly, be well maintained and should not lead to any increase of other risks (Council Directive 89/656/EEC on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace) ⁽⁶⁸⁾
9. Article 14.1 of Council Directive 89/391/EEC deals with workers' **health surveillance** ⁽⁶⁹⁾
10. Directive 93/42/EEC regulates all aspects concerning the operation of **medical devices** ⁽⁷⁰⁾

⁽⁶⁸⁾ Council Directive 89/656/EEC of 30 November 1989 on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace (third individual directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 393, 30.12.1989, pp. 18–28.

⁽⁶⁹⁾ OJ L 183, 29.6.1989, pp. 1–8.

⁽⁷⁰⁾ Council Directive 93/42/EEC of 14 June 1993 concerning medical devices, OJ L 169, 12.7.1993, pp. 1–43.

⁽⁷¹⁾ OJ L 183, 29.6.1989, pp. 1–8.

11. Maintaining healthy and safe working conditions is not only a **management** responsibility. **Workers** also have duties (Council Directive 89/391/EEC) ⁽⁷¹⁾:
 - » to follow appropriate systems of work laid down for their safety;
 - » to make proper use of equipment provided for their safety;
 - » to cooperate with their employer on health and safety matters;
 - » to follow instructions in accordance with given training;
 - » to inform the employer if they identify hazardous handling activities or other risks for MSDs;
 - » to ensure that their activities do not put others at risk.

NB: The minimum requirements set by Council directives have been implemented in national legislation that may include additional requirements which should be checked.

4.1.10. Description of good company practice

4.1.10.1. Prevention of musculoskeletal disorders in St Elisabeth Hospital, Tilburg, the Netherlands

St Elisabeth Hospital in Tilburg is 180 years old. It started as a nursing home run by nuns. Today, there are 3 100 employees. Care is given to 44 000 in-patients per year, 347 000 polyclinic patients (including out-patient care) and 16 000 patients in day treatment. In an interview, Ms Christel van Neerven, head of the occupational health and safety department, and Ms Monique Pullen, adviser on occupational health and safety, describe the hospital's activities for the prevention of musculoskeletal and slips-and-trips risks, including the application of the system of ErgoCoaches.

What prompted you to tackle the subject of MSDs or slip and trip accidents?

The analysis of our work incapacity figures and the data from our occupational physician showed that back problems and neck or shoulder problems are the major causes of work incapacity. So our own figures were the signal for us to tackle the subject. And the risk inventory and survey that we carried out showed that physical complaints predominate. Additional information came from feedback from employees returning to work from leave due to incapacity for work. Managers are recommended to hold such feedback discussions, and this year we plan to implement new training and management development for all managers on this subject.

On the basis of all that information put together, we decided to direct increased effort to the topic of MSDs. The strategy is to get as much insight as possible as to where the real problems are. To do this we carry out two-hour interviews on each floor, each with two employees nominated by the team leaders responsible. Owing to the wide variety of functions and specialisations, the questions are activity-guided concerning, for example, work tasks, the type of activities, duration, as well as the mental load and so on. The questions are based on guidelines from the government concerning the risks behind these activities. Afterwards we accompany the interviewees to observe at the workplace. The aim is to compare the situation by objective observation.

How do you proceed? Do you form project groups? What is the time schedule?

We apply a basic risk inventory covering all the risks in healthcare but additionally our specific procedure for musculoskeletal risks (interviews and observation). Initially we prepare a project plan. What we are going to do and why? Who is responsible for what? The plan is presented to management and to workers' representatives for their agreement. After that, the heads of the departments and the team leaders are addressed to make an appointment for the survey, together with additional information regarding the goals and the methods. The employees are not directly involved in that work, but when we formulate a policy on the subject we always confer with them because it is they who work with the risks and they can provide very good information.

Once the survey is complete, we provide a report and discuss it with the team leaders or the heads of the floor. The team leaders are obliged to talk about it with all employees. The investigation team supports this discussion and provides explanations if necessary. The manager of the floor decides which of the recommended measures will be taken. Sometimes there is a top-down decision where the higher management decides whether the measures will be applied in further departments too, or in the whole hospital.

What goals have you set regarding musculoskeletal measures? How do you measure goal achievement? Is it integrated into a quality management (QM) system?

The goals are to improve working conditions, increase work satisfaction and improve work quality, and integrate the topic into the general procedures. Further objectives are to improve nursing quality, personal development and reduce the number of days of work incapacity. We check whether goals have been achieved by means of our data and by specific questions in the survey we do. Checks are repeated every couple of years in the same way to see if the situation has improved. External criteria such as patient falls, complications (e.g. bacterial infections) or other indicators for improvement of quality of care have not yet been included but are planned. In addition, we implement specific training measures in musculoskeletal topics. The trained employees are ErgoCoaches who advise co-workers and team leaders on ergonomic working and work design. And we carry out inspections to find out whether we are successfully taking care of our employee's occupational health. All the measures are integrated into the Dutch quality management system for hospitals (MYAZ) which combines occupational health and safety measures with good quality management. Audits take place every year on a section of the hospital, and we highlight the subjects or topics to be included.

Can you explain the system of ErgoCoaches in more detail?

ErgoCoaches are employees specifically trained in ergonomics and back-friendly working methods.

What measures do you take besides ErgoCoaches? Do you have measures at a technical, organisational and personal level?

Activities take place at all those levels. At the technical/structural level we have measures such as redesigning rooms, the ergonomic design of workplaces, modification of structural arrangement and design (location, door sills, material storage, automatic doors, etc.). Current special features are the ergonomic design of counters which previously were lower and created a lot of neck and shoulder problems, or the height-adjustable tables on microscope workplaces in the lab which allow the employees to work in sitting or standing positions. We also have technicians who help the employees to adjust the table and chair to the right height.



42 Ergonomically designed counter at the children's centre.

At organisational level we take measures such as adjusting the nursing system, improving work procedures, improving cooperation between occupational groups, acquiring ergonomic equipment, testing and procuring aids (support tools and technical aids) and drawing up a continuous training scheme for nurses, integration in the quality management manual. Cleaning workers and kitchen staff are also included and given instructions on how to organise their work in an ergonomic way. The training for ErgoCoaches and training in ergonomics for floors are important elements in that respect. It is the responsibility of the team leaders to check and ensure that everybody receives frequent training. Once a year the team leaders must set out a full programme of the training courses they require during the next year.

On a personal level, we conduct many training courses and human resources development measures (continuous training, access to concepts, qualification of multipliers or

mentors, trainer qualification), and we advocate the use of personal protective equipment (workwear, working shoes), small and technical aids, health promotion and self-care measures. Training is mostly internal, with responsibility held by the team leaders and the ErgoCoaches. Support tools (sliding films, rollboards, lifters) are provided on a regular basis, including training on how to use them. With regard to working shoes, we suggest certain requirements but they are not compulsory. Special work shoes are compulsory in the operating theatre, emergency room and for patient transport. With respect to health-related offers, we are in partnership with a sports and fitness centre which charges our staff reduced fees. We offer also internal courses in yoga, and we run a meditation class provided by one of our intensive care nurses. Many teams from the hospital take part in the Tilburg 10-mile run.

Where do you find the expertise? Do you have external partners? How do you fund the various measures?

We have a network of top clinical hospitals and a network of workers in occupational safety and health (OSH). We share knowledge and information. We meet three times a year, and we develop and utilise artefacts together. The network began nine years ago from our idea. It began with just five or six colleagues but now 23 hospitals have joined in. We have also agreements with external partners, such as providers of furniture and lifts, so as to make the products more suitable for use in the hospital. There is also a network of ErgoCoaches in Tilburg and the surrounding villages.

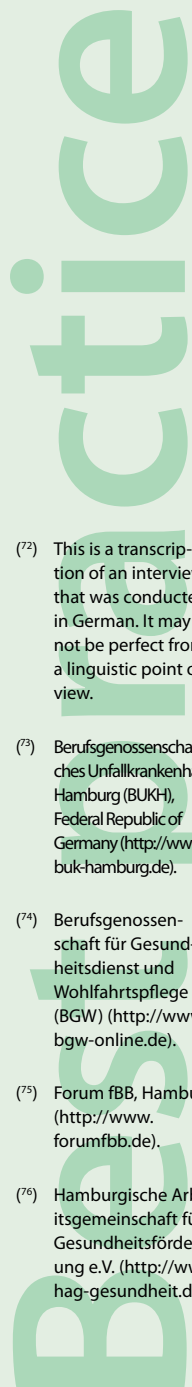
As regards funding, each department has its own budget. The OSH department also has a budget, which we can use for projects throughout the entire hospital, such as training for the ErgoCoaches. Part of our budget was used to finance a new member of staff who then trained the ErgoCoaches. The overall hospital budget is used to pay for any measures covering the whole hospital such as construction and renovations.

What is your experience of implementing the measures? Do you receive support from higher management? Are there difficulties?

We focus on communication. Firstly, we bring the management into the survey and recommendations process. This means that they are never surprised by what we advise. Secondly, we give feedback about what they are doing well. We talk to them so that we can keep it that way, and discuss what additional measures can be taken and in which areas they can do something else. This way we obtain high acceptance of our procedures. We also speak with the employees and the team leaders to understand what lies behind any complaints. Sometimes the employees feel that an activity is very difficult, but the evaluation shows that it is not actually so difficult. So the cause of the complaint may be in a different area.

When we begin a measure there are always some people willing to make use of it. We start with a small group and they can help to convince others. We also make agreements with the team leaders, for example to ensure that everybody takes sufficient time to use it. Or we start with a floor which is interested in doing something new.

At the beginning of our work there was a prejudice about occupational health and safety: 'It costs a lot of money, but it doesn't get us anywhere'. So we made an effort to let them constantly see results, and to give occupational health and safety a face that everyone could talk to. Small things — such as doors that do not close properly, problems with floors and problems with computers — take priority over making policy. Policy is also important, but at this stage, concrete results were more important. This approach differed from what many others do. They start with the strategy and do not directly approach the people, committing a great deal to paper, yet with no-one ever realising what is being done.



Do you assess the effectiveness of measures? How do you ensure sustainability?

We carry out internal quality management audits. These audits are performed every year. And every few years we are subjected to an external audit. Moreover, we evaluate by talking informally to the team leaders. Are things changing? Can you manage? Do you need more assistance? Can we do anything? Furthermore, we look at absenteeism figures and the number of workers who have left due to work-related health issues, with the aim of finding them another job they can do.

The basis for sustainability is formed by the regular follow-up to the risk assessment which is performed every two years. Questions are included in the survey in relation to the measures taken. The results show which measures were effective and which were not. In addition, we talk to the team leaders and we make our own observations. If measures do not work well we try to modify them. We discuss the problem together with the team leader and also together with the employees. We ask for the reasons why they are not using something in order to discover what is appropriate to the particular floor. We make changes, having taken what they say into consideration. If we did not do so, the measure would not be used.

Twice a year, we organise ergo coach meetings. These are an opportunity to network, exchange ideas, and so on. Sometimes solutions are developed on one floor which is useful for other floors too. We help with transferring information. When we introduce new tools or technical aids we have trial periods before we buy. The employees need to evaluate the tools. We can give advice, but they have a responsibility too.

4.1.10.2. Prevention of musculoskeletal disorders in the Berufsgenossenschaftliches Unfallkrankenhaus Hamburg (BUKH), Germany ⁽⁷²⁾

The BUKH ⁽⁷³⁾ has a total of 1 637 employees. Already back in 2000, a long-term project was started in order to intensify continuously the occupational health and safety of employees. The project commenced in the nursing sector with approx. 600 healthcare workers. The kick-off was a staff survey. This revealed the high physical exposure in this sector as well as the desire of the nursing staff to be able to pursue their occupation for as long as possible. Health circles helped to put the problems into concrete terms and work out initial solutions.

The task was to find a way to design the work environment and workflows to be more ergonomic, purchase suitable handling devices and raise the qualification level of the nursing staff. Focus was set on the objective to take sustainable action in order to reduce days lost due to illness, prevent occupational diseases, improve the quality of care and increase the job satisfaction and well-being of the nursing staff. To this end, a coordinated package of measures was compiled from e.g. risk assessment, selection and purchase of handling devices and initial instruction of executives and healthcare workers. All the players involved in occupational health and safety, i.e. the executive staff, occupational physician, occupational health and safety practitioner, health promotion representative and the staff representative as well as the quality management representative and those responsible for human resources development, participated with the support of external experts (Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege (Institution for Statutory Accident Insurance and Prevention in the Health and Welfare Services)) ⁽⁷⁴⁾ and Forum fBB Hamburg ⁽⁷⁵⁾. In 2007, the BUKH was awarded the Hamburg Health Promotion Prize for its workplace health promotion measures ⁽⁷⁶⁾.

⁽⁷²⁾ This is a transcription of an interview that was conducted in German. It may not be perfect from a linguistic point of view.

⁽⁷³⁾ Berufsgenossenschaftliches Unfallkrankenhaus Hamburg (BUKH), Federal Republic of Germany (<http://www.buk-hamburg.de>).

⁽⁷⁴⁾ Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege (BGW) (<http://www.bgw-online.de>).

⁽⁷⁵⁾ Forum fBB, Hamburg (<http://www.forumfbb.de>).

⁽⁷⁶⁾ Hamburgische Arbeitsgemeinschaft für Gesundheitsförderung e.V. (<http://www.hag-gesundheit.de>).

In a first step the risk assessment was refined with detailed situation analyses and subsequent health circles. Seven wards were selected as model wards and the nursing staff received a three-day ergonomics basic-training for patient handling according to the Ergonomico concept ⁽⁷⁷⁾ (initial instruction and training according to the German load handling ordinance — Lastenhandhabungsverordnung — based on Council Directive 90/269/EEC). In order to achieve the objectives set, it had been decided to pursue an integrative approach in the seminar concept (linking of occupational health and safety — preventive/back-friendly patient handling — **with** patient orientation — patient resource-oriented work method **with** the use of handling devices). In order to promote integration of the transfer of what had been learned into everyday nursing practice, practical support and coaching for the participants was offered on the wards at the same time. Handling devices were tested, selected, purchased and adapted to suit the section and its needs.

⁽⁷⁷⁾ Ergonomico Concept, Forum fBB, Hamburg (<http://www.forumfbb.de>).



Dirk Greunig, representative for occupational health and safety and the QMS



Susanne Hoser, spokeswoman for the back experts

It already became very apparent in the second staff survey (2004) that the measures initiated were showing exactly the positive effect that had been set as the objective. The project was then expanded to include other wards and sections. On one hand, all nursing sections were incorporated into the programme and, on the other, individual ergonomics training was developed and successfully performed for e.g. the operating theatre, the emergency as well as sectors such as storage and transport, the patient pick up-and-drop service, the cleaning service, central sterilisation, medical documentation, administration, the canteen service and also for the in-house child daycare centre.

In 2004, the next phase already started in the nursing section: Sustainability with regard to the implementation of the ergonomic working way and the use of handling devices was to be promoted further. With the aid of external support from Forum fBB, the concept for raising the qualifications of suitable and interested nursing staff to become back experts was developed and implemented. These back experts foster the patient resource-oriented and back-friendly working method as well as the use of handling devices in their function as collegial multipliers and instructors.

A guideline to support this task was developed by the back experts and a safe patient handling policy established on the basis of the specifications in the Lastenhandhabungsverordnung. The project was integrated into the quality management by preparing an appropriate procedural instruction for the implementation of the Lastenhandhabungsverordnung in the care and handling of patients.

In 2007, 93 % of the nursing staff had attended ergonomics basic-training for patient handling according to the Ergonomico concept. A recent staff survey in 2008 showed that 93 % of the employees know how to work in a back-friendly manner, 83 % of the employees feel equipped with the necessary handling devices, 76 % of them have been instructed in the use of the handling devices and 77 % of the trained workers say that their physical load-related complaints have diminished.

You can find further details in the following interview conducted at the BUKH, some extracts of which are given below.

Best practice

Interviewer: What prompted you, as an establishment, to tackle this issue back then?

Mr Greunig: Firstly, we had absenteeism rates, which were relative high in the nursing section. Secondly, we had the confirmation from the occupational physician who said ‘Something’s developing here.’ And thirdly, we looked at the demographic development a few years ago and discovered that we have in the nursing section a relative high level of older workers with an average age of 44/45 years. At that time, we still had a steering circle for health promotion in which various employees from all hierarchical levels and all professional groups were members. This committee developed a concept for the prevention of back disorders with external support (BGW and Forum fBB). The health promotion representative managed and moderated the entire project and built up the system with the back experts.

Interviewer: You just said ‘There was a steering circle for health promotion at that time’; so it doesn’t exist anymore?



The Berufsgenossenschaftliches Unfallkrankenhaus Hamburg.

Mr Greunig: It doesn’t exist anymore because our approach is to link everything. We want to merge both groups, the steering circle for health promotion and the committee for occupational health and safety to form one joint occupational health and safety committee.

Interviewer: And so, in fact, the model being pursued is to link classic occupational health and safety and health promotion. So it wasn’t the case here in your establishment of tackling the problem in the classic sense and then forming a steering circle which dealt with the whole subject matter of health in general in your hospital and that then led to a sub-project dealing with the issue of prevention of back disorders. What goals were pursued at that time? Reducing days lost due to illness? Increasing staff satisfaction?

Mr Greunig: That definitely. And also the preparations for the demographic change. Keeping employees at work for as long as possible because you could not replace them simply. But also the quality of care for patients. If you as a patient are transferred to another bed using a lift, this is more gentle and safer than if an employee bends his or her back.

Interviewer: Once again, that is a crucial point; you are not only doing such things for the patients or the employees but you also see that it has positive aspects for both groups.

Mr Greunig: And then there’s the aspect of human resources development. We built up the system with the back experts. For them that is terrific motivation at the workplace. They are needed. They are taken seriously. They have a field where they can put their expertise into practice just as they want. That is extremely good for their professionalism and fosters loyalty to the establishment. They are bounded in their team and are better accepted there in everyday work when they point out things than when someone comes along, takes a look for a couple of minutes, gives a hint and then disappears again.

Interviewer: Is that an experience you have also made, Ms Hoser?

Ms Hoser: Sometimes, yes. I frequently see the difference that there are back experts who have not done this voluntarily but have been delegated. Then there are difficulties. But, in principle, that's the way things are. This is something that rewards the back experts very well, that also provides us with further training.

Interviewer: What did all that involve in terms of further training? Basically, it's a two-stage model. On the one hand, the employees are trained and, on the other, there is this function as Back experts.

Ms Hoser: We underwent ergonomics training for patient handling according to the Ergonomico concept, basic and advanced seminars, as well as training on handling devices for handling and positioning patients, kinaesthetics, basic and advanced seminars, a basic Bobath seminar as well as a seminar focusing on training and instruction of colleagues, all lasting 3 days. Four of the Back experts also attended a seminar on the subject of moderation and presentation in order to fulfil these tasks independently as part of the back experts task group which is meeting regularly. The qualification of the Back experts also includes the sit in and assistance in the Ergonomics Basic-Training for Patient Handling or other qualification seminars. That means: after the seminars to obtain qualifications, there is again the possibility of refreshing one's knowledge and ability as well as trying out things under supervision in the role of a back expert. We regularly attend Ergonomico refresher seminars and seminars with different thematic priorities such as e.g. patient positioning.

Interviewer: That's quite a lot of knowledge and expertise that you acquired. Is it also called up by the employees?

Ms Hoser: Yes, they come even more and more frequently but it also varies. My colleagues notice that such an examination of the issue also brings about changes and they ask quite specific questions in an everyday context. There are also different procedures on the different wards. The aim is also to hold follow-up instructions where you create a small training unit in the transitional period on certain subjects in which all employees acquire input. And that is then implemented. That will then be incorporated into everyday work. That is then such a case when the back experts are on site and you can work together; questions are then asked and things are tried out.

Interviewer: The crucial aspect here is that back experts are employees who work quite normally on the ward and, to this extent, can therefore be talked to frequently.

Ms Hoser: The system offers the possibility of sitting down together to talk over patient handling or regarding certain patients to consider whether what we are just doing is advisable or whether it makes sense to reconsider how the task could be performed more effectively. For example, using another handling device so that patient handling also becomes more gentle and more pleasant for the patient and not just for the nursing staff. One supportive aspect is that we as back experts are not alone. As a rule, there are two back experts per ward and also in the operating theatre, in the anaesthetic recovery room and in the emergency unit.

However, I view that slightly as a difficulty. We naturally have a comprehensive field of tasks owing to our procedural instruction. And due to the fact that we have perfectly normal work rotas connected with the usual volume of work there is a lack of freedom to some extent to create free space/time to work out something on the ward, to say e.g. I am doing that now, I am reading the minutes or I am preparing a presentation for my colleagues, this is often slightly problematic. But of course the benefits clearly outweigh the disadvantages.

Best practice

Interviewer: You also mentioned the procedural instruction. The whole system is firmly anchored in the entire establishment as a procedural instruction in the quality management for the activities of the back experts, including the subject of instruction.

Ms Hoser: Including the subject of instruction and cooperation with other professional groups.

Interviewer: What about other measures? For example, you just mentioned handling devices.

Mr Greunig: There is no section which does not have at least one or two mobile lifts. In many sections there are additional ceiling lifts as a standard feature. We have retrofitted the establishment quite a lot in this respect.

Ms Hoser: Owing to the fact that there is also a back experts' task group — we meet six times a year for a whole day — and that the contact among the back experts is intensive, naturally there is always consultation. It is known who has which handling devices and they are lent out. There is also cooperation at the level of the back experts. The lifts are what is most visible but there are also smaller handling devices such as sliding mats, anti-slip mats, glide boards and special material for supporting the patient's position, which are used and also increasingly accepted by my colleagues.

Mr Greunig: There is a back experts' task group which tested and selected new patient beds. Interdisciplinary considerations were made to determine which bed is suitable and which is not. For example, we now only purchase beds with an electric height adjustment feature and various other electrical features which support back-friendly working or a group which has looked into the testing and selection of devices for helping to position patients and for decubitus prophylaxis.

Interviewer: Is there a snowball effect? Can you notice internally that other professional groups or departments are becoming attentive?

Ms Hoser: Yes, we've noticed that. The employees in the occupational therapy department, who also work with handling devices, come and ask. There is of course inharmoniousness as well because they work in a different way than we do.

Interviewer: So everyone is pulling together?

Ms Hoser: We were aware that we all had to pull together and that it is advisable to promote that attitude. But there are certainly also many possibilities of coordinating that and there are good approaches and wards where that works well.

Interviewer: But once again in both directions. When I think of the patient, it is more pleasant for him if everyone who comes to him thinks and acts in the same way. And the same applies, of course, to the staff. What other measures are there which have been taken? We have already mentioned handling devices and improved cooperation with other professional groups. What else is there?

Mr Greunig: The office equipment as a whole. We now always buy only desks which have an electric height adjustment feature, for the sitting and standing positions. The new reception counter is also designed in a way that fosters dynamic working. On the technical side we are trying to offer the employees a lot. That is also agreed in writing with the purchasing department so that they no longer have any selection possibilities. What we also do is we develop support instruments; for example we are creating a database which shows how much our hospital can cope with in terms of patients: our problem is that more of our patients are bariatric but we

didn't know what our material could withstand. There is now a database where it states what our material can cope with, from the operating table right down to the lift. For example, we are also re-equipping operating theatres so that 300 kg patients can be treated. It is also important that all purchasing processes have to be presented by the purchasing department to the occupational health and safety department. The experts there examine every item of equipment beforehand to see whether it is suitable at all or whether it will create additional problems or risks for the users. This procedure is laid down in written work instructions in accordance with the managing director and the quality manual.

We also have, for example, employees who need special support. Here we have developed a procedure for the selection of individually adapted handling devices; there exists a work instruction signed by the managing director. To put it in clear words: 'When I have a health problem at work, how will it be dealt with?' That is now regulated very precisely and also to whom to turn to. The person responsible then has the right to say this employee then needs special gloves, a special chair or desk or something else.

Interviewer: You just said that there is a special person to contact.

Mr Greunig: In our hospital this is the occupational physician.

Interviewer: Perhaps we could now look at the individual employee. Have there been any measures for the individual employee? The ergonomics training is obligatory for all employees and they should all participate. Is there anything more for the employees?

Ms Hoser: We also have in-service training for human resources development which all interested employees and multipliers such as mentors can attend.

Mr Greunig: We have established quality objectives so that everyone can see what we have done. Here it states, for example, how many employees we have trained. Everyone can see this, and that the management wants us to do this. And that results in a great deal for the employees who can then tell their supervisors 'That's what the managing director wants'.

Interviewer: Another major issue is the subject of suitable footwear for nurses. What have you done in that respect?

Mr Greunig: At the end of last year we held an extra footwear day; we invited various suppliers of suitable footwear and every employee was able to obtain information about what safe footwear in a hospital really is. That starts off with footwear which the hospital buys, for the operating theatre, for example. Here, we are currently trying to change the purchasing guideline so that the situation becomes clearer.

Ms Hoser: It has also proved for many people that a shoe that firmly fits is also more pleasant to work in. On many wards the employees have been sensitised by the back experts and by the ergonomics training seminar to such an extent that they know which shoes to wear. There are wards where all the employees wear suitable footwear for the nursing profession.

Interviewer: The BGW (Institution for Statutory Accident Insurance and Prevention in the Health and Welfare Service) also makes a clear statement on this. To what extent does your hospital follow these recommendations?

Ms Hoser: They are part of the ergonomics training seminar and also stipulated in the guideline of the back experts. A work instruction is in preparation.

Best practice

Interviewer: What experience have you had in the implementation of measures with the support of your external trainers/consultants?

Ms Hoser: I found the cooperation with external trainers/consultants, who introduced experience from other establishments and other projects, very helpful. This is one aspect which speaks in favour of externals because in this way the network aspect also has an impact.

Mr Greunig: An external also has more solutions in his mind which he has already seen elsewhere. Every solution does not suit every establishment. You have to adapt it.

Ms Hoser: When you have been working in a hospital for a long time, you get a tunnel vision at some point and you no longer ask certain questions. Externals can tackle things without prejudice.

Mr Greunig: The external also has the advantage that he can say things which might hurt but then he disappears again afterwards.

Interviewer: That is the big advantage of externals. And you sometimes listen more to them.

Ms Hoser: Even if someone asks me something I cannot answer, I ask someone else, i.e. the external who is available in the background.

Interviewer: The whole project also costs money, was it completely financed by your own funds?

Mr Greunig: The health protection department has a fixed budget which is increased every year.

Interviewer: Positive experience is available, what happened when something didn't work? You said that among the back experts there was the one or other who was pushed into it and didn't do it on his own motivation.

Ms Hoser: That is a difficulty, but anyone who does not feel at home with this position can say: 'Sorry, that's not for me, I am leaving this position.' There is now an increasing number of back experts who do the job out of conviction and who are also aware that it is not always easy. There is also the back expert task group. I find this network extremely important: for us it helps in crisis situations to know colleagues on other wards and to be able to say 'I can't make any progress, what do you do in this situation?' Incorporating this network into occupational health and safety is very important. There have already been problems at the hierarchical level. There is of course the procedural instruction but that is one of many which arrive on the desks of the ward and departmental managers. Here, it would be helpful if someone came to our aid and said 'Yes, that's what we want' and gave us even more backing. However, there are also wards where there is full support.

Mr Greunig: The next major problem we are trying to solve is the matter of releasing people from duty, to ensure they are given freedom to prepare themselves, e.g. before holding papers and attending seminars. That was not possible for a long time. This affects, for example, the back experts and the instructions concerning fire prevention and emergency management. In order to get this under control, we defined last year with the hospital management a catalogue of training courses with the corresponding time codes and target groups who are supposed to attend. This includes compulsory courses, non-compulsory courses or those which are important for the hospital. So that we can now claim such contingents of time in employment plan negotiations.

That is the objective, i.e. that appropriate resources are immediately allowed for when planning positions. Previously, internal and external trainings were always held additionally, as a voluntary performance, and we want to get away from this to the following way: which trainings do we need, which ones do we want and how much do they cost in time and money. We want such contingents of time incorporated into the next employment plan so that employees are planned in a way that it is possible to make them available for their additional tasks.

Interviewer: As a result, the activities are also placed on an equal footing with normal ward duty. Apart from the staff survey, are there any tools to check the effectiveness?

Mr Greunig: We have evaluated the back prevention project and ultimately long since transferred it to standard practice.

Interviewer: What were the crucial aspects, what could you give as advice to other establishments?

Mr Greunig: The most important thing is — never give up! What doesn't work today may perhaps look completely different in three months' time. Things are often initially blocked and in six months people have become used to the idea and then it works. A good information management is absolutely essential. To ensure that everyone has the same information (e.g. via the intranet) and can cope with it. For example, regular newsletters, as brief as possible; if they are longer than one page no one will read them. What we have learned is that events which we have held several times to mark themes such as health and safety do not produce any major results. The volume of work on the wards is so enormous that no one can get away any more. Instead we are now going to staff meetings, for example, to inform the team or we organise short on-site trainings for the employees. We have an electronic system with which we can organise trainings for all employees, where we determine for every new employee which trainings he/she needs. The employee has a route card stating when they went to which training, who held it, and an appropriate reminder can be issued if the training is still missing or if something serious has happened — we then know who needs subsequent training. This system is very helpful to manage our human resources development.

Interviewer: And you have mentioned that the ward managers are not always convinced, so you should always get the executives on board.

Ms Hoser: Definitely. Here, you also need to know how to integrate these measures into the corporate objectives. To make it clear that it is wanted. That doesn't happen on its own and doesn't work without some effort.

Mr Greunig: And putting the executives in a position to manage it by means of executive training. Many executives actually do not know what their role is in occupational health and safety. What this involves. The executives must be put in a position to lead (!) so that everyone knows exactly 'what is my task'. Process management is extremely important here. It is aimed at all employees from the top management level down to the most humble employee. And also to determine who is advisor or coach and who bears the responsibility.

Interviewer: Thank you for the interview and I wish you lots of success for any further steps.

4.1.10.3. Prevention of musculoskeletal disorders at Derby City Council Social Services, United Kingdom

Derby City Council Social Services employs 1 800 staff to provide care services in residential and community settings. At the outset there were many problems such as poor manual handling practices, disaffected employees, low priority with management and too many accidents. Handling Movement and Ergonomics Ltd (HME) ⁽⁷⁸⁾ provide specialist moving and handling training. HME and Derby have worked together since 1999 to develop and implement a programme that has transformed employees' skills and service delivery culminating in a National Training Award in 2007.

HME advised Derby to implement a programme based on guidance from the UK's Health and Safety Executive ⁽⁷⁹⁾ (Figure 43 (below)) and national care standards ⁽⁸⁰⁾, since these are legal requirements.

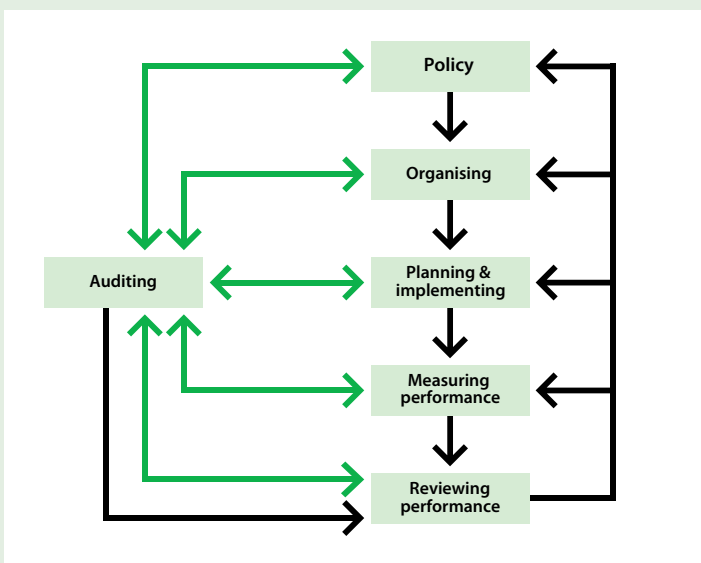
The success of this approach is based on the involvement of the whole organisation and not just training employees. Following the introduction of risk assessment and good management systems appropriate training courses were arranged for service managers, frontline managers and employees. These were based on standards set in the UK by the National Back Exchange ⁽⁸¹⁾ and the All Wales National Health Service Manual Handling Passport and Information Scheme ⁽⁸²⁾. Costs were maintained at previous levels equal to 1.5 trainer posts and efficiencies made to enable extra training and improved facilities and materials to be introduced.

Audits now show that proper management of moving and handling has become the norm. Managers maintain management files containing all necessary records including risk assessments and handling plans. Immediate action is now taken by managers when poor practices are identified.

Employees are now clear about their responsibilities and follow individual handling plans that are compiled for each service user. Manual handling accidents were reduced from 70 in 1999 to 34 in 2005.

Derby has set a benchmark for other organisations and this approach has now been used in other health and social care services and has proved adaptable to both large and small organisations ⁽⁸³⁾.

- ⁽⁷⁸⁾ <http://www.hse.gov.uk>
- ⁽⁷⁹⁾ <http://www.opsi.gov.uk>
- ⁽⁸⁰⁾ <http://www.nationalbackexchange.org>
- ⁽⁸¹⁾ http://www.wales.nhs.uk/documents/NHS_manual_handling_passpor.pdf
- ⁽⁸²⁾ Good practice example provided by Rosemary Rogers, Director, Handling at Movement and Ergonomics Ltd (HME).
- ⁽⁸³⁾ For a copy please contact Darren. allsobrook@derby.gov.uk
- ⁽⁸⁴⁾ <http://www.hme-limited.com>



43 A steering group (MHSG) was formed and this revised the moving and handling policy ⁽⁸⁴⁾, compiled a comprehensive moving and handling management system and devised a comprehensive training plan.

Best practice

4.1.11. Links

No	Title	Country/Region	Contents/Source
1.	Preventing back injury in healthcare	USA	A short guide to the prevention of back injuries in healthcare. The guide concludes that injuries can be prevented by eliminating tasks that require lifting. http://www.afscme.org/issues/1320.cfm
2.	Schwere Arbeit — leicht gemacht, ein Leitfaden für die stationäre Altenpflege	Austria	This guideline is based on an evaluation of Austrian care facilities carried out in 2004. It gives recommendations and examples of good practice that will help to reduce the physical workload of healthcare workers. http://www.arbeitsinspektion.gv.at/NR/rdonlyres/7F88360F-B923-4DF3-98DF-6CB4D1920EBE/0/altenpflege.pdf
3.	Arbeitsplätze für Behinderte und Leistungsgewandelte	Germany	This publication gives advice on specific ergonomic requirements of workplaces for workers with physical impairments. (4.7.2009) http://www.baua.de/de/Publikationen/Broschueren/Gesundheitsschutz/Gs03.html?nn=667406
4.	The ups and downs of sitting	Germany	The time span between sitting down and getting up has steadily grown longer in our modern society. And continuous sitting over several hours, as more and more people are forced to, even at their workplace, is a problem. After all, people are designed to move, and without movement not only does the cardiovascular system suffer, but also and in particular the support and motor apparatus degenerates. The possibilities for injecting more movement and dynamism into daily office routine are many and varied, ranging from adjustable office furniture and mobile office designs down to a work organisation that renders the office chair increasingly superfluous. Some of this is presented in this brochure with the recommendation that you imitate it. (4.7.2009) http://www.baua.de/nn_21604/de/Publikationen/Broschueren/A66,xv=vt.pdf?
5.	Standing until you drop? When work keeps you on your toes	Germany	Many workers still have to stand throughout their working day. Studies have shown that continuous standing causes an unbalanced load on the human organism and is responsible for numerous disorders of the cardiovascular system and the musculoskeletal apparatus. This brochure presents possibilities for relieving the burden on the workers in standing occupations and for designing work so that it is healthier, more humane and more productive. (4.7.2009) http://www.baua.de/de/Publikationen/Broschueren/A60.pdf?__blob=publicationFile&v=7
6.	Up and down, up and down — How dynamic sitting and standing can improve health in the office	Germany	The aim of this brochure is literally to get you jumping to your feet. And not only while you're reading it, but several times a day. The focus is on the 'dynamic office', in other words basic information is given on how to design the office workplace by appropriate work organisation and with 'dynamic' furniture to make it more motion-friendly. http://www.baua.de/cae/servlet/contentblob/717578/publication-File/48508/A65.pdf
7.	BGW-Leitfaden: Prävention von Rückenbeschwerden in der stationären Altenpflege	Germany	A guide to reduce MSDs in homes for elderly people, technical, organisational and personal measures are integrated. http://www.bgw-online.de/internet/generator/Inhalt/OnlineInhalt/Medientypen/bgw_20forschung/EP-LRue-11_Leitfaden_Praevension_von_Rueckenbeschwerden_stat_Altenpflege,property=pdfDownload.pdf

No	Title	Country/Region	Contents/Source
8.	Bewegen von Patienten — Prävention von Rückenbeschwerden im Gesundheitsdienst	Germany	A guide to reduce MSDs in the healthcare sector. http://www.ukgm.de/
9.	BGW Themen: Spannungsfeld Rücken	Germany	This guide shows how to integrate technical, organisational and personal measures to prevent MSDs. http://www.bgw-online.de/internet/generator/Inhalt/OnlineInhalt/Medientypen/bgw_20themen/M655__Spannungsfeld_20R_C3_BCken.property=pdfDownload.pdf
10.	Preventing musculoskeletal disorders in the workplace	WHO (English, French and Spanish versions)	Disorders of the musculoskeletal system represent a main cause of absence from occupational work. Musculoskeletal disorders lead to considerable costs for the public health system. Specific disorders of the musculoskeletal system may relate to different body regions and occupational work. For example, disorders in the lower back are often correlated to the lifting and carrying of loads to the application of vibration. The purpose of this document on the prevention of MSDs is to inform about the risk factors and to influence the actions of employers and the behaviour of workers in such a way that risks of physical loads, dangerous to health or unnecessarily fatiguing, are avoided or diminished. http://www.who.int/occupational_health/publications/muscdisorders/en/
11.	Back in care — Preventing back pain and back injuries in caregivers	New Zealand	A well-illustrated leaflet for employees that summarises the more comprehensive publication and gives practical advice on how to look after your back. http://www.osh.dol.govt.nz/order/catalogue/29.shtml
12.	Back in care — Preventing musculoskeletal injuries in staff in hospitals and residential care facilities	New Zealand	Provides a comprehensive approach for managing the risk of back injury in the health sector. Includes all the stages of identifying, assessing and controlling hazards, and then evaluating effectiveness. http://www.osh.dol.govt.nz/order/catalogue/261.shtml
13.	L'Association paritaire pour la santé et la sécurité du travail du secteur affaires sociales (ASSTSAS).	EU-OSHA (European Agency for Safety and Health at Work)	Ce qu'est l'ASSTSAS? Une association sectorielle paritaire vouée exclusivement à la prévention en santé et en sécurité du travail dans le secteur de la santé. http://osha.europa.eu/data/provider/oshinfo_463/?searchterm=
14.	E-fact 9: Work-related musculoskeletal disorders (MSD): an introduction	EU-OSHA (European Agency for Safety and Health at Work)	Factors contributing to MSDs include use of force, repetitive work, work in awkward postures, vibration, work in cold environments, and prolonged sitting or standing. They are also affected by levels of stress, autonomy and support from colleagues, individuals' prior medical history, physical capacity and age, and social factors such as leisure activities. These factors may act singly or in combination. Employers are required to assess the risks that their workers face, including the risk of developing MSDs, and act on them. http://osha.europa.eu/en/publications/e-facts/efact09
15.	E-fact 11 — European legal requirements relating to work-related musculoskeletal disorders (MSDs)	EU-OSHA (European Agency for Safety and Health at Work)	This web summary provides information on European legal requirements relating to MSDs, including international conventions and standards, European directives and European standards, and examples of specific legislation in Member States. http://osha.europa.eu/en/publications/e-facts/efact11
16.	E-fact 15 — Work-related musculoskeletal disorders (MSDs) and the pace of work	EU-OSHA (European Agency for Safety and Health at Work)	Pace of work is one of the major causes of ill health in the workplace, and the available evidence shows that it is accelerating. This web summary provides information on the relationship between the pace of work and MSDs, and its control. http://osha.europa.eu/en/publications/e-facts/efact15

No	Title	Country/Region	Contents/Source
17.	Management of equipment for the manual movement of patients	EU-OSHA (European Agency for Safety and Health at Work)	Equipment for the manual moving of patients is vital for the prevention of MSDs in hospital workers. http://osha.europa.eu/data/case-studies/management-of-equipment-aids-for-the-manual-movement-of-patients/?searchterm=
18.	EUR-LEX	EU-OSHA (European Agency for Safety and Health at Work)	EUR-LEX is the website containing all legal information for the European Union and the relevant occupational health and safety directives for the European Union. http://eur-lex.europa.eu/
19.	Factsheet 10 — Work-related low back disorders	EU-OSHA (European Agency for Safety and Health at Work)	This factsheet highlights the key findings of an Agency report. The report is limited to low back disorders although some of the findings may be applicable to other types of work-related back problems. http://osha.europa.eu/en/publications/factsheets/10
20.	Factsheet 29 — Health and safety good practice online for the healthcare sector	EU-OSHA (European Agency for Safety and Health at Work)	The health and welfare sector has the second highest incidence of work-related MSDs. This factsheet provides a basic introduction to occupational health and safety and how to find information for the sector on the Agency's website. http://osha.europa.eu/en/publications/factsheets/29
21.	Factsheet 4 — Preventing work-related musculoskeletal disorders	EU-OSHA (European Agency for Safety and Health at Work)	Advice for the prevention of work-related MSDs. http://osha.europa.eu/en/publications/factsheets/4
22.	Factsheet 71 — Introduction to work-related musculoskeletal disorders	EU-OSHA (European Agency for Safety and Health at Work)	MSDs are the most common work-related problem in Europe. Almost 24 % of the EU-25 workers report suffering from backache and 22 % complain about muscular pains. http://osha.europa.eu/en/publications/factsheets/71
23.	Factsheet 72 — Work-related neck and upper limb disorders	EU-OSHA (European Agency for Safety and Health at Work)	Many workers, in a wide range of jobs, develop work-related neck and upper limb disorders and they are the most common form of occupational disease in Europe, accounting for over 45 % of all occupational diseases. http://osha.europa.eu/en/publications/factsheets/72
24.	Factsheet 75 — Work-related musculoskeletal disorders: Back to work	EU-OSHA (European Agency for Safety and Health at Work)	This factsheet highlights the key findings of the 'Back to Work' report. It comes in two parts: a literature review on the effectiveness of work-related interventions, and an overview of policy initiatives in Europe and at the international level. http://osha.europa.eu/en/publications/factsheets/75
25.	Factsheet 78 — Work-related musculoskeletal disorders: prevention report — A summary.	EU-OSHA (European Agency for Safety and Health at Work)	The key findings of the Agency's prevention report are split into two parts: a review of the research literature focused on work-related interventions preventing MSD risks and 15 case studies demonstrating how problems have been solved at the workplace level. http://osha.europa.eu/en/publications/factsheets/78
26.	Magazine 10 — Lighten the Load	EU-OSHA (European Agency for Safety and Health at Work)	MSDs are the most common of all reported work-related health problems in the European Union. Manual load handling, working in prolonged and/or awkward postures and repetitive movements are all risk factors for MSDs, as are non-biomechanical factors such as stress. This magazine includes articles from the Member States, stakeholders and MSD experts on various MSD-related issues — such as case studies, workplace interventions, campaigns, statistics, surveys and opinion articles. http://osha.europa.eu/en/publications/magazine/10

No	Title	Country/Region	Contents/Source
27.	Report — Work-related musculoskeletal disorders: Back to work report	EU-OSHA (European Agency for Safety and Health at Work)	MSDs are the most common work-related health problem in Europe. Tackling them means taking action in the workplace. First, there are preventive steps that have to be taken. But for workers who already have MSDs, the challenge is to maintain their employability, keep them working and, if necessary, reintegrate them into the workplace. This report focuses on the retention, reintegration and rehabilitation of workers with MSDs. It comes in two parts: a literature review on the effectiveness of work-related interventions, and an overview of policy initiatives in Europe and at the international level. http://osha.europa.eu/en/publications/reports/7807300
28.	Report — Prevention of work-related musculoskeletal disorders in practice	EU-OSHA (European Agency for Safety and Health at Work)	MSDs are the most common work-related health problem in Europe, affecting millions of workers. The 'Lighten the Load' campaign featured the Good Practice Awards, which recognise organisations that have made outstanding and innovative contributions to tackling MSDs. The awards promote and encourage practical solutions in workplaces and share this good practice around Europe. This publication contains the summaries of 20 working examples of how companies and organisations from across the EU have taken action against MSDs. http://osha.europa.eu/en/publications/reports/TE7606536ENC
29.	E-fact 42: Checklist for the prevention of lower limb disorders	EU-OSHA (European Agency for Safety and Health at Work)	Work-related lower limb disorders (LLDs) are impairments of bodily structures such as a tendon, muscle, nerve, joint or bursa caused or aggravated primarily by the performance of work and by the effects of the immediate environment where the work is carried out. They can affect the lower extremities, mainly hip, knee and feet. This checklist concerns hazards for injury or development of disorders to the lower limb and is targeted at people engaged in workplace hazard identification. In addition, this checklist offers examples of preventive measures that can help to reduce LLD risks. http://osha.europa.eu/en/publications/e-facts/efact42
30.	Méthode d'analyse des manutentions manuelles	France	The manual handling of patients is among the most strenuous tasks in the work of healthcare workers. This publication contains methods for the risk assessment of patient handling of healthcare workers and proposes measures of prevention. http://www.inrs.fr/inrs-pub/inrs01.nsf/intranetobject-accesparreference/ED%20862/\$file/ed862.pdf
31.	Muskuloskeletal health of cleaners	United Kingdom	This research report looks at musculoskeletal disorders and the work of cleaners using floor polishing machines, mopping and other repetitive work. http://www.hse.gov.uk/research/crr_pdf/1999/crr99215.pdf
32.	Getting to grips with manual handling	United Kingdom	This short guide provides guidance on the problems associated with manual handling and sets out best practice in dealing with them. The advice is intended for managers of small firms or similar organisations. But many of the general principles are relevant to all workplaces whatever their size. http://www.gov.uk/pubns/indg143.pdf
33.	Musculoskeletal disorders — Advice for employers	United Kingdom	The information on these web pages will help employers to understand what they may need to do to comply with the law relating to MSDs and manual handling, how they can protect their employees and those they care for from injury and how they can better help employees who have back pain or other MSDs. http://www.hse.gov.uk/healthservices/msd/employers.htm

No	Title	Country/Region	Contents/Source
34.	Leitfaden zur erfolgreichen Durchführung von Gesundheitsförderungsmaßnahmen im Betrieb	Germany	This guideline is mainly aimed at management, OSH experts, occupational physicians and further company stakeholders and gives advice on how to prevent musculoskeletal disorders at work. It contains examples of risk assessment, checklists and experts' methods for the evaluation of physical strain among the workers. http://www.inqa.de/Inqa/Redaktion/Zentralredaktion/PDF/Publikationen/inqa-3-leitfaden-muskel-skeletterkrankungen,property=pdf,be reich=inqa,sprache=de,rwb=true.pdf
35.	BGW Forschung: Sachmittelausstattung in der stationären und ambulanten Altenpflege	Germany	This brochure outlines the results which a group of experts developed to reduce different loads in homes for elderly people. (4.7.2009) http://www.bgw-online.de/internet/generator/Inhalt/OnlineInhalt/Medientypen/bgw_20forschung/EP-SPfl__Sachmittelausstattung_20in_20der_20station_C3_A4ren_20und_20ambulanten_20Altenpflege,property=pdfDownload.pdf
36.	A back injury prevention guide for healthcare providers	USA	Healthcare workers are hurting their backs while lifting, transferring and otherwise moving patients or residents. The costs are enormous. The direct costs in workers' compensation, medical treatment and vocational rehabilitation are very high. In California, back injuries account for the largest proportion of incurred losses in the workers' compensation system. This booklet is designed to provide general guidance for employers and employees. Its practical suggestions are focused on orderlies, attendants, nurses, nursing assistants and others who actually lift and move patients and residents. http://www.dir.ca.gov/dosh/dosh_publications/backinj.pdf
37.	Ziehen und Schieben ohne Schaden	Germany	Pushing and pulling loads can also cause high strain on the musculoskeletal apparatus. This brochure gives practical advice on how to avoid physical strain when pushing or pulling loads and how to avoid accidents at work. http://www.baua.de/de/Publikationen/Broschueren/A25.pdf?__blob=publicationFile
38.	Heben und Tragen ohne Schaden	Germany	Manual handling of loads is among the most common reasons for musculoskeletal disorders. This brochure gives practical advice on how to avoid physical strain when handling loads manually. http://www.baua.de/de/Publikationen/Broschueren/A7.pdf?__blob=publicationFile
39.	Drop 'inappropriate' footwear codes and reduce back and foot problems, says TUC	United Kingdom	Good practice — United Kingdom. http://www.tuc.org.uk/newsroom/tuc-15188-f0.cfm
40.	Rückengesund — Fit im OP	Germany	Guide for employers and workers to prevent MSD in the operating theatre. http://www.unfallkasse-berlin.de/res.php?id=10155
41.	Nurses' early exit study	Germany	The NEXT Study was aimed at investigating the reasons, circumstances and consequences surrounding premature departure from the nursing profession. Of particular interest was the question of what consequences this step has for the person involved as well as for their healthcare institution and for healthcare in general. Findings can be downloaded from the website. http://www.next.uni-wuppertal.de/

4.1.12. Literature

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4.2. Prevention of accidents due to slips, trips and falls ⁽⁸⁵⁾

4.2.1. Introduction

Why is it so important to tackle slips and trips risks? Slips and trips often result in falls. Slips, trips and falls are the greatest cause of accidents in all workplaces. In European Union Member States, they have been identified as the main causes of accidents that result in more than three days of absence from work ⁽⁸⁶⁾. The Health and Safety Executive of the Government of the UK (HSE), for example, reports up to 2 000 injuries to workers in healthcare attributed to slips and trips each year ⁽⁸⁷⁾; the Allgemeine Unfallversicherungsanstalt of Austria (AUVA) reports that 30 % of all occupational accidents are due to trips, slips or falls ⁽⁸⁸⁾. According to the European Agency for Safety and Health at Work (EU-OSHA), accident risks are higher for those workers that work in small and medium enterprises, particularly those in enterprises with fewer than 50 workers ⁽⁸⁹⁾. In hospitals, nurses have the most and doctors the fewest slip and trip accidents ⁽⁹⁰⁾.

The cost of accidents due to slips and trips is enormous. It was estimated that in 2003 they cost employers in the UK over GBP 500 million (EUR 585.3 million) and society over GBP 800 million (EUR 936.4 million) ⁽⁹¹⁾, and cost EUR 122.1 million in Austria ⁽⁹²⁾.

Slips and trips are the most common form of major injury affecting nurses, housekeepers, carers, ambulance staff and cleaners/domestic staff ⁽⁹³⁾. And it is not just workers who slip or trip; members of the public (which includes patients) are also at risk, with almost 62 % of major injuries being caused by slips and trips ⁽⁹⁴⁾.



44 Staircases: adequate surfaces in good condition, continuous handrails and optimum lighting are prerequisites for preventing slip and trip accidents.

⁽⁸⁵⁾ Falls refer to low falls of less than 2 metres.

⁽⁸⁶⁾ European Agency for Safety and Health at Work, 'The state of occupational health and safety in the European Union – Pilot study', 2000.

⁽⁸⁷⁾ HSE, 'Slips and trips in the health services'.

⁽⁸⁸⁾ AUVA, 'Verhütung von Sturzunfällen am Boden/mit Leitern'.

⁽⁸⁹⁾ European Agency for Safety and Health at Work, 'Factsheet 14 — Preventing work-related slips trips and falls'.

⁽⁹⁰⁾ BGAG-Report 1/05, 'Entstehung von Stolper-, Rutsch und Sturzunfällen'.

⁽⁹¹⁾ HSE, 'Workplace Newsletter: Slips and trips'.

⁽⁹²⁾ AUVA, 'Verhütung von Sturzunfällen am Boden/mit Leitern'.

⁽⁹³⁾ HSE, 'Workplace Newsletter: Slips and trips'.

⁽⁹⁴⁾ HSE, 'Workplace Newsletter: Slips and trips'.

4.2.2. Nature of the risk

Slip and trip accidents can happen for a number of reasons. There are almost always several triggers which combine to create a hazard. A distinction is made between four types of causes of accidents.

Technical factors include:

- flooring (e.g. inadequate surfaces or surfaces in poor condition, spills, wet, slippery floors, poor condition of routes);
- obstructions that are a common cause for tripping accidents; they may originate from construction, changes of level, trailing cables and others;
- ramps;
- stairways: lack of or defects on handrails, slip-resistant coatings and markings on the front edges of steps that can cause slips and trips on stairs;
- lighting (natural or otherwise): poor lighting making it difficult for all floor areas and potential hazards such as obstructions, doorsteps and spills to be seen clearly;
- entrances without canopies;
- leaking machines.

Environmental factors include:

- loud or unfamiliar noises (sudden distractions), the weather (rain, snow, black ice, wind), humidity, condensation or sand.

Organisational factors include:

- insufficient housekeeping and/or cleaning systems
- inappropriate maintenance management
- lack of equipment or the provision of inadequate equipment
- lack of safety signs
- poor maintenance of the equipment
- the non-provision of suitable personal protective equipment (e.g. safety footwear with slip-resistant soles and sufficient hold).

Factors created by the work include:

- tasks (e.g. the carrying of large boxes or the pushing of containers) that reduce the sight range and can therefore cause accidents, or may create contamination on the floor (such as fluids (disinfecting agents, medical products), swarf, crumbs, food and drink, cardboard).

Personal/individual factors are of peculiar relevance, and include:

- individual aspects: a major cause of accidents is human-related:
- physical attributes: if workers have a physical problem that stops them from seeing, hearing, or walking in a regular manner, it can increase the likelihood of an accident (e.g. vision, balance, age, disability that affects gait and ability to walk).

4.2.3. Basic criteria for a specific risk assessment for the prevention of slip, trip and fall accidents

Employers are required to assess the hazards and risks to workers who may be affected by their work. This helps to find out what needs to be done to control the risk. It is also required in order to satisfy the regulations ⁽⁹⁵⁾.

Risk assessment is not a single action but must proceed as a continuous process of at least five steps.

Step 1 — Identifying hazards and those at risk

Decide who might be harmed and how. Who comes into the workplace? Are they at risk? Do you have control over them? Consider the risks for slips, trips and falls; focus on hazards around the workplace. Include external people (visitors, contractors, members of the public) and patients who may be affected. To identify problem areas it is important to visit the workplace; also include outdoor areas. Look at what could cause harm as well as consulting and involving the workforce. Identify key areas such as uneven or defective floors, stairs without slip-resistant coating, poor lighting, trailing cables crossing pedestrian routes, obstructions, spillages and wet floors due to cleaning. Do not forget to consider long-term hazards and less obvious risks such as organisational and potentially hidden psychosocial factors. A holistic approach (including technical/environmental, organisational and personal/individual factors) promises the most efficient risk identification. Particular attention should be paid to gender issues and to special groups of workers who may be at increased risk or have particular requirements (e.g. workers with disabilities, migrant workers, pregnant women, very young or elderly people, untrained staff).

Include findings on near-miss investigations in your consideration: checklists ⁽⁹⁶⁾ and accident protocols (monitoring the details on, for example, what happened, what was the cause, measures taken by the management, absence because of the occurrence, etc.) may be an additional help to identify potential risk factors.

For detailed hints on the identification of risks see 'Nature of the risk', page 158, and 'Work situations with the greatest exposure', page 160.

Step 2 — Evaluating and prioritising risks

This step comprises the evaluation of the risks identified in step 1. The procedure consists of determining the probability of triggering an accident, the possible extent, the frequency of occurrence and the number of workers who may be affected. On the basis of the results the risks must be prioritised according to their importance. Eliminating the risk carries the highest rank in the prevention hierarchy. A detailed description for step 2 can be found under 'Basic criteria for a specific risk assessment', page 159.

Step 3 — Deciding on preventive action — T-O-P

Consider the risks and set targets for improvement. The advantage of setting targets is that the determination of the necessary preventive measures becomes clear. In that manner, too, monitoring and review become systematically executable.

In order to begin with the risk and target setting procedure, define your preventive targets in writing by determining exactly what needs to be done, when and by whom. Description of the currently existing situation (T-O-P) allows one — in comparison with the set target situation — to easily recognise the existing deficits.

⁽⁹⁵⁾ Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, OJ L 183, 29.6.1989, pp. 1–8.

⁽⁹⁶⁾ AUVA, 'Verhütung von Sturzunfällen am Boden/mit Leitern'.

In order to set your targets, first look at the given directives to determine minimal preventive targets. Furthermore, keep in mind the technical standards. Check whether the precautions already taken are adequate to deal with the risks. If not, decide whether they can be improved or which additional precautions need to be taken. Remember that technical measures take priority over organisational measures and that organisational measures take priority over measures concerning the personal/individual factors (see also 'Preventive and protective measures', page 161).

Step 4 — Taking action

Implement preventive measures according to your prioritisation plan. What should be done by whom and by when? Time schedule? Who should be involved?

Step 5 — Documentation, monitoring and review

Regularly review and update the assessment. Check whether the number of accidents is reducing. Are fewer potential hazards being identified during safety inspections? If any significant changes such as the introduction of new equipment or procedures take place or if an accident happens, make sure that existing precautions and management arrangements for preventing slips and trips at work are still adequate to deal with the risks. If not, decide whether they can be improved or what additional precautions need to be taken.

45 Corridor with an intact and clean surface, that has no obstacles, is tidy and has good lighting of all areas.



4.2.4. Work situations with the greatest exposure

In nearly all work situations — whether in the kitchen, in housekeeping or in caring as well as in the operating theatre or in storing and transportation of goods — slip and trip accidents can occur. Even workers in the administrative field are reported to be at risk of slips and trips.

The main causes behind such accidents in healthcare are:

- slipping on a surface that is wet or contaminated with another substance;
- tripping over an obstruction;
- slipping or tripping on surfaces such as steps, ramps, pavements and roads;
- tripping over an uneven floor surface.

4.2.5. Effects on health and safety

Slips, trips and falls are the most common causes of major injuries at work. They occur in almost every workplace, with 95 % of major slips resulting in fractured bones. Consequences vary greatly, and injuries are mainly caused to the bones, joints and muscles. The spectrum of the results of accidents ranges from minor injuries like a twisted ankle to a craniocerebral trauma. In the long run MSDs are often the outcome. Other adverse effects like infections or skin injuries should also be considered.

Slips and trips while handling loads can result in major injuries. While handling patients, slips and trips can result in injuries to the nursing staff and the patients may also be affected as a result of the nursing staff's lack of stability.

4.2.6. Preventive and protective measures

Since there are very many preventive and safety measures in the organisational and personal/individual behaviour field, reductions in the occurrence of slips and trips can often be gained for little or no cost. The employer and supervisors must ensure a safe environment and maintenance of workplaces and routes. Health and safety specialists and safety officers have a vital role in the prevention of accidents due to tripping, slipping and falling. They must provide advice on the setting up and maintenance of workplaces, routes and sanitary and other ancillary rooms. These specialists must advise the employer and, if required, architects and building planners in accordance with the statutory requirements. They must also insist on organisational action and the provision of suitable equipment, such as steps and ladders which are required to prevent risks of tripping and slipping, and they in particular they must insist on maximum order at the workplace.

The following factors must be observed.

Technical measures

- Flooring: Floors should be checked for damage on a regular basis and maintenance carried out when necessary. In any location the floor surface must be suitable for the type of activity/work that will be taking place on it. Different types of flooring are required for sanitary rooms, wards, operating theatres, kitchens or entrance halls of a hospital.
- Stairways: Handrails, slip-resistant coatings for steps, high visibility and non-slip marking of the front edges of steps as well as sufficient lighting can help to prevent accidents on stairs.
- Other changes of floor levels, such as ramps, should be avoided. When they are inevitable (e.g. for wheelchairs, carts or trolleys) they need to be well marked, with an appropriate use of safety signs, as they are often difficult to see ⁽⁹⁷⁾.
- Lighting: Good lighting levels should be ensured. The functioning and position of lights should ensure that all floor areas are evenly lit and all potential hazards (e.g. obstacles, spills) can be seen clearly. Lighting levels need to allow safe passage through the premises. Exterior lights may be required as outdoor areas must be adequately lit.

Environmental measures

- Environmental influences cannot always be eliminated but appropriate precautions are possible at technical, organisational and personal/individual levels.



⁽⁹⁷⁾ Council Directive 89/654/EEC of 30 November 1989 concerning the minimum safety and health requirements for the workplace (first individual directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 393, 30.12.1989, pp. 1–12.



Organisational measures

- Responsibilities for ensuring health and safety in different work areas must be clearly set out.
- Checks are essential to ensure that working practices and processes are being carried out properly.
- Records should be kept of activities such as cleaning and maintenance work.

46 Appropriate cleaning procedures keep the floors clean and tidy.

47 Warning sign after wet cleaning.



- Good housekeeping: The work environment should be kept clean and tidy, with floors and access routes kept clear of obstacles. Equipment must be placed in such a manner that cables do not trail in the way of pedestrians. The use of cable covers helps to securely fix cables to surfaces. Obstructions must be removed. If this is not possible, suitable barriers and/or warning signs must be used

- Cleaning and maintenance: Appropriate cleaning procedures (e.g. half and half cleaning practices for corridors, materials that allow dry or damp cleaning) must be established. Appropriate times for cleaning (e.g. early in the morning) should be identified. Regular cleaning and maintenance will minimise risks. Rubbish must be moved regularly and work areas kept clear. Spills must be cleaned up immediately. Cleaning methods and equipment must be suitable for the surface being treated. During cleaning and maintenance work, care should be taken not to create new slip and trip hazards. Warning signs need to be used where the floor is wet or slippery (e.g. humidity or sand) ⁽⁹⁸⁾. Where necessary, alternative routes should be arranged.

- Equipment such as steps and ladders must be selected and workplaces/tasks adapted in a manner that enables hazards to be prevented or controlled.

- Footwear: Workers need to have footwear that is suitable for their working environment and their working conditions ⁽⁹⁹⁾ (see also 'Personal protective equipment', page 164). Workers must be made to maintain the shoes and keep the soles free from contamination. Shoes need to be replaced regularly before the profiles have worn smooth (depending on the work generally at least twice a year). Where overshoes are required, good quality reusable ones should be used where possible, cleaning them between use. Disposable overshoes can be slippery, and are easily split.

⁽⁹⁸⁾ Council Directive 89/654/EEC of 30 November 1989 concerning the minimum safety and health requirements for the workplace (first individual directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 393, 30.12.1989, pp. 1–12.

⁽⁹⁹⁾ Council Directive 89/656/EEC of 30 November 1989 on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace (third individual directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 393, 30.12.1989, pp. 18–28.

- Information and instruction: Workers must be regularly informed about the accident risks and instructed concerning safe conduct. Safe conduct needs to be supervised and imposed through line management.

- Procedures for visitors and patients should be set.



48 Cleaning practices.
49 Cleaning methods must be suitable for the surface being treated.

Personal/individual behaviour measures

- How people act and behave in their work environment can greatly affect slips and trips. It is the employer's obligation to ensure maximum order at the workplace, to eliminate these causes for accidents at source and to maintain a safe conduct. Information, instruction and supervision can help to reinforce such a safe conduct of workers. It is the worker's responsibility to cooperate with the employer.



Where possible, the aim should be to eliminate risk at source (e.g. use of appropriate floor material, levelling uneven floor surfaces). The next preferred option is substitution (e.g. using an alternative method of floor cleaning), followed by separation (e.g. using barriers to keep workers away from wet floors). The next prevention measure is protection (e.g. wearing footwear with nonslip soles). The final measure is provision of information for the workers. The use of personal protective equipment and provision of information should be a last form of protection after all organisational and technical measures have been exhausted.

Important to note

Put in a management system

Plan:

Work with your workers (representative sample of men, women, elder and disabled workers) and possibly with patients and visitors to identify potential problem areas and set goals for improvement.



Train:

Give your workers the knowledge to identify and take action over potential risks.



Organise:

Make workers responsible for specific areas, including cleaning and contract staff, as far as this is reasonable and legal.



Control:

Ensure working practices and processes are being carried out properly and keep a record of all cleaning and maintenance work.



Monitor and review:

Talk to your workers (representative sample of men, women, older and disabled staff) and possibly to patients and visitors so they can provide feedback on how measures are working. If necessary take fresh action.

50 Steps enable secure working.

51 Suitable footwear varies according to the task and the environment.



4.2.7. Personal protective equipment

The type of job (e.g. kitchen, manual handling of loads, operating theatre, caretaking), the type of floor, the typical floor conditions (e.g. wet, slippery, oily), slip-resistant properties of the soles and the individual comfort, durability and any other safety features required, such as toe protection or support, must be taken into account for the selection of the appropriate footwear for the different tasks in healthcare ⁽¹⁰⁰⁾. Gender aspects should be included by selecting protective equipment according to individual needs. The final choice may have to be a compromise.

52 An example of footwear suitable for nurses.



⁽¹⁰⁰⁾ Council Directive 89/656/EEC of 30 November 1989 on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace (third individual directive within the meaning of Article 16(1) of Directive 89/391/EEC, OJ L 393, 30.12.1989, pp. 18–28.

Top tips

- Specify the main surfaces and contaminants which cause slip risks in your workplace and seek your supplier's advice on suitable footwear. Some generally slip-resistant footwear may not be suitable in specific demanding conditions; e.g. footwear that performs well in the wet (bathroom) might not be suitable on oily surfaces (kitchen) or where there are sticky food spillages which clog up the cleats (kitchen).
- Check with your supplier whether the footwear you are interested in has been tested for slip-resistance; where footwear has been tested, the coefficient of friction (CoF) test values must be available. The higher the CoF, the better the slip-resistance. Look out for results higher than the minimum requirements set out in Annex A of EN ISO 20345/6/7:2004 (A1:2007) — the standards for safety, protective and occupational footwear. Footwear once tested and certified is stamped with the CE mark. The manufacturers provide user information indicating the applications for which the footwear is suitable.
- You can commission additional slip testing through the supplier — for example, on surfaces/contaminants found in your workplace.
- Consider asking the supplier to provide trial pairs to help you make the right choice, and do not select footwear on the basis of brochure descriptions or laboratory test results alone.
- Footwear trials should involve a representative sample of the workforce (men and women, possibly workers with foot problems) and must last long enough to produce meaningful results.
- Ensure that you buy footwear which will do the job — this will not necessarily be the cheapest, but it may be more comfortable or attractive — ensuring that staff wear it, and it may last longer.
- Have a system for checking and replacing footwear before it becomes worn and dangerous.

The employer must provide footwear for all work situations where a special risk is identified ⁽¹⁰¹⁾ — for example, in the kitchen, in transportation activities, in the operating theatre or in the cleaning sector.

However, in general footwear for the nursing staff is not regarded as being personal protective equipment. Nevertheless, it must, like all personal safety/protective/occupational footwear, comply with certain requirements to avert accidents due to slipping, tripping or falling and ensure safe and back-friendly working.

- The sole tread pattern and sole compound are both important for slip-resistance. Generally, a softer sole and close-packed tread pattern work well with fluid contaminants and an indoor environment. A more open pattern works better outdoors or with solid contaminants. Slip-resistance properties can change with wear; some soles can deteriorate with wear, especially when the cleats become worn down.
- A shoe with a closed toe protects the forefoot from injuries.
- A shoe with a closed back, provided with a firm heel cap, guarantees high stability. The heel cap protects both the heel and the tendons, ligaments and joints. It gives the foot lateral hold due to the firm heel guidance. Cushioning prevents injuries to all endangered parts of the foot, such as the Achilles tendon.
- The width of the shoe must be adjustable so that the shoe width can be adapted to the foot. However, the shoe must sit firmly on the foot to prevent the foot from 'swimming'.
- An anatomically formed insole supports the arch of the foot and therefore absorbs shocks/impacts.
- A shock absorbing system reduces the effect of impacts providing relief of strain to the joints and spinal column.

⁽¹⁰¹⁾ Council Directive 89/656/EEC of 30 November 1989 on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace (third individual directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 393, 30.12.1989, pp. 18–28.

- The shoe should be flat heeled: a heel of maximum 2cm in height has a positive effect on the body statics (posture and balance). The contact surface of the shoe should be as large as possible.
- The shoe material should be water-repellent, hard-wearing and easy to clean. Breathable material such as leather or other materials absorbs the moisture of the foot and conveys it to the outside. The use of socks made of breathable fabric (e.g. micro fibre or wool) has a supporting effect.
- Other criteria apply depending on the workplace.

4.2.8. Behaviour in critical situations — Recommendations for workers

Support preventive measures.

Clean as you go.

Avoid contamination.

Have a ‘see it, sort it attitude’ when it comes to housekeeping.

Do not ignore or move warning signs.

Walk appropriately according to the circumstances.

Make a habit of safe and careful conduct in critical situations.

Report any detected hazard (e.g. contamination) immediately if you cannot intervene yourself.

Respect safety instructions including the wear of suitable footwear.

Maintain your footwear.

Help others.

4.2.9. Main messages and conclusion

Important to note

Working conditions must be such that the health of workers is not endangered. Healthy workers should stay healthy and their resources should be reinforced. Endangered workers must be supported by protective measures.

Workers who have suffered an accident due to slipping or tripping must be helped back into the working systems.

A participatory approach is most likely to be successful. Often measures of risk prevention and health promotion must be linked to be effective.

4.2.10. Relevant European Union directives

Requirements stipulated by European directives that are relevant to the prevention of slips, trips and falls include the following **employers’** responsibilities:

1. Following a general **framework** to manage health and safety, including: assessment and prevention of risks; giving priority to collective measures to eliminate risks; providing information and training, consulting workers (men and women), coordination on safety with contractors (Council Directive 89/391/EEC) ⁽¹⁰²⁾

⁽¹⁰²⁾ Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, OJ L 183, 29.6.1989, pp. 1–8.

2. **Consulting the workforce** is a requirement. Using workers' knowledge helps to ensure hazards are correctly spotted and workable solutions implemented. Ensure a gender neutral approach (Council Directive 89/391/EEC) ⁽¹⁰³⁾
3. Ensuring that **workplaces** are well **maintained** and **cleaned** (Council Directive 89/654/EEC) ⁽¹⁰⁴⁾
4. Ensuring that, as far as possible, **workplaces** receive sufficient natural **light** and are equipped with artificial lighting adequate to protect workers' health and safety (Council Directive 89/654/EEC) ⁽¹⁰⁵⁾
5. Ensuring that **workplace floors** are fixed, stable and level, have no bumps, holes or slopes and are not slippery (Council Directive 89/654/EEC) ⁽¹⁰⁶⁾
6. Providing **safety and/or health signs** where hazards can not be avoided/reduced adequately by preventive measures (Council Directive 89/654/EEC) ⁽¹⁰⁷⁾
7. Providing suitable ergonomic **work equipment** with a gender-sensitive approach to reduce/avoid hazards (Council Directive 89/655/EEC) ⁽¹⁰⁸⁾
8. Providing **personal protective equipment** (e.g. protective footwear) appropriate for the risks involved and where they cannot be avoided by other means. It should be comfortable, fit the wearer correctly and be well maintained and should not lead to any increase in other risks (Council Directive 89/656/EEC) ⁽¹⁰⁹⁾
9. Maintaining a healthy and safe working environment is not only a **management** responsibility. **Workers** also have duties (Council Directive 89/391/EEC) ⁽¹¹⁰⁾:
 - to follow appropriate systems of work laid down for their safety;
 - to make proper use of equipment provided for their safety;
 - to cooperate with their employer on health and safety matters;
 - to follow instructions in accordance with given training;
 - to inform the employer if they identify hazardous activities or other risks for slips, trips and falls;
 - to take care to ensure that their activities do not put others at risk.

⁽¹⁰³⁾ OJ L 183, 29.6.1989, pp. 1–8.

⁽¹⁰⁴⁾ Council Directive 89/654/EEC of 30 November 1989 concerning the minimum safety and health requirements for the workplace (first individual directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 393, 30.12.1989, pp. 1–12.

⁽¹⁰⁵⁾ OJ L 393, 30.12.1989, pp. 1–12.

⁽¹⁰⁶⁾ OJ L 393, 30.12.1989, pp. 1–12.

⁽¹⁰⁷⁾ OJ L 393, 30.12.1989, pp. 1–12.

⁽¹⁰⁸⁾ Council Directive 89/655/EEC of 30 November 1989 concerning the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 393, 30.12.1989, pp. 13–17.

⁽¹⁰⁹⁾ Council Directive 89/656/EEC of 30 November 1989 on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace (third individual directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 393, 30.12.1989, pp. 18–28.

⁽¹¹⁰⁾ OJ L 183, 29.6.1989, pp. 1–8.

The minimum requirements set out by European directives have been implemented in national legislation that may include further requirements which should be checked.

- The safety features of footwear, including slip-resistance, are tested according to a set of European test standards written into EN ISO 20344:2004 (A1:2007).
- The performance specifications are given in an associated set of personal protective equipment (PPE) standards, namely: EN ISO 20345:2004 (A1:2007) for safety footwear; EN ISO 20346:2004 for protective footwear; and (A1:2007) EN ISO 20347:2004 (A1:2007) for occupational footwear.

4.2.11. Links

No	Title	Country/Region	Contents/Source
1.	Cleaning activities and slip and trip accidents in NHS Acute Trusts — a scoping study	United Kingdom	This research project explores cleaning operations as a contributory factor to slip and trip accidents. Staff at five NHS Acute Trusts were interviewed in order to gain an initial understanding to meet the objectives of the research. http://www.hse.gov.uk/research/hsl_pdf/2006/hsl0680.pdf
2.	E-fact 37 — Slips, trips, falls and cleaners	EU-OSHA (European Agency for Safety and Health at Work)	This examines why cleaners are especially at risk from these types of accidents and outlines the steps that can be taken to prevent them happening. It also lists the relevant legislation protecting cleaners. http://www.osha.europa.eu/en/publications/e-facts/efact37
3.	Factsheet 14 — Preventing work-related slips trips and falls	EU-OSHA (European Agency for Safety and Health at Work)	Advice for the prevention of work-related slips, trips and falls for all types and sizes of enterprises. http://osha.europa.eu/en/publications/factsheets/14
4.	Internet portal: Preventing slips and trips in the workplace	EU-OSHA (European Agency for Safety and Health at Work)	Portal page on slips and trips from UK enforcing authority. Page covers: Slip assessment, causes of slips, further resources. http://osha.europa.eu/data/links/osh_link.2007-01-30.4725634453/view
5.	Employers — Preventing slips and trips — risk assessment	United Kingdom	Information for employers about the hierarchy of measures to control slip and trip risks. Main points are contamination getting on the floor, adverse environmental effects, floor conditions and footwear for assessing slip risks, but also control of walkways, housekeeping and maintenance for assessing trip risks. Links are given to more information on causes of slips and trips, cleaning, footwear and relevant laws and regulations. http://www.hse.gov.uk/slips/employersriskas.htm
6.	What can I do to prevent slips and trips? — Workers	United Kingdom	A useful checklist for workers to improve safety in the workplace as regards the prevention of slips and trips. Links to more information on assessing slip and trip hazards, cleaning and slip prevention at work. http://www.hse.gov.uk/slips/workers.htm
7.	'Shattered Lives' campaign	United Kingdom	Homepage of the 'Shattered Lives' campaign. http://www.hse.gov.uk/shatteredlives/
8.	Procuring slip-resistant footwear for use at work	United Kingdom	Hints on the selection of footwear with respect to slip-resistance for use at work. Top tips, key points on soles and walking surfaces, and slip resistance tests are given. Further information includes links to footwear case studies, footwear test results and corresponding standards. http://www.hse.gov.uk/slips/footprocure.htm
9.	Providing suitable slip-resistant footwear for work	United Kingdom	Information for suppliers and manufacturers on the key role they play in supplying suitable footwear, case studies on appropriate use in different environments, slip resistance test methods, and information to be provided indicating that the footwear meets the specific requirements. Links are given to procurement of slip-resistant footwear, case studies and additional footwear test results. http://www.hse.gov.uk/slips/manufactfoot.htm

No	Title	Country/Region	Contents/Source
10.	Slips and trips — Where do I start?	UK	Basic information on what needs to be done in risk assessment and managing health and safety. Explanation of the five step procedure of risk assessment and identification of the elements a good management system should involve. Links to websites on causes of slips and trips and preventive measures. http://www.hse.gov.uk/slips/start.htm
11.	Watch your step	United Kingdom	Homepage relating to slips and trips. http://www.hse.gov.uk/watchyourstep/
12.	Architects/Designers	United Kingdom	Information about books and practical guidance for those who design, procure and manage flooring in buildings in order to make the floors safe against slipping. Links to the written documents. http://www.hse.gov.uk/slips/architects.htm
13.	Role of manufacturers and suppliers of flooring	United Kingdom	Advice to employers on how to test and interpret the manufacturer's data on slip resistance of flooring material to enable them to choose the right product which will perform its intended use and is suitable for preventing slips and trips. Links to assessing slip resistance and respective slip and trip case studies. http://www.hse.gov.uk/slips/manufactfloor.htm
14.	Stop slips in kitchens — Get a grip	United Kingdom	Information on campaigns to raise awareness and understanding about slips and trips. The two latest campaigns 'Shattered Lives' and 'Stop slips in kitchens' are presented in more detail. A link list is given for further information on current and past campaigns. (4.7.2009) http://www.hse.gov.uk/slips/kitchens/footwearguide.pdf
15.	What causes slips and trips?	United Kingdom	Information on the multiple causes of slip and trip accidents. Flooring, contamination, obstacles, cleaning, people or human factors, environment and footwear are considered, each with a detailed description and case studies. A slip and trip potential model highlights the role the factors can play in contributing to a slip and trip accident. A list of 31 links allows further information on causes for slips and trips. (4.7.2009) http://www.hse.gov.uk/slips/causes.htm
16.	Les chutes de plain-pied en situation professionnelle	France	Report on an ongoing study of accidents involving slips, trips and falls on the level. Because these accidents occur in varied situations and since they are rarely the subject of in-depth analysis, the initial work focus on the detailed analysis of accidents with a view to characterising accident-producing situations. The second stage will encompass studies on the balance regulation strategies adopted by the individual within a system modelling the work situation, and application of the knowledge in the context of prevention projects. Partial results of the years 2003 — 2005 are presented. http://www.inrs.fr/inrs-pub/inrs01.nsf/IntranetObject-accesParReference/ND%202206/\$File/ND2206.pdf
17.	BGW Themen: Dresscode Sicherheit	Germany	This brochure shows the importance of suitable clothes, shoes and personal safety equipment. There is often a lack of motivation among the workers to wear these things. http://www.bgw-online.de/Internet/generator/Inhalt/OnlineInhalt/Medientypen/bgw_20themen/M658__Dresscode_20Sicherheit,property=pdfDownload.pdf
18.	BGW Themen: Vorsicht Stufe	Germany	This brochure shows causes of slips and trips and possibilities to reduce these accidents. (4.7.2009) http://www.bgw-online.de/Internet/generator/Inhalt/OnlineInhalt/Medientypen/bgw_20themen/M657__Vorsicht_20Stufe,property=pdfDownload.pdf

4.2.12. Literature

Allgemeine Unfallversicherungsanstalt (AUVA), 'Verhütung von Sturzunfällen am Boden/mit Leitern', 2006 (http://esv-sva.sozvers.at/mediaDB/MMDB109668_Sturzunf%C3%A4lle%20Checklisten.pdf).).

European Agency for Health and Safety at Work, 'Factsheet 14 — Preventing work-related slips, trips and falls', 2001 (<http://www.osha.europa.eu/en/publications/factsheets/14>).

Hauptverband der gewerblichen Berufsgenossenschaften (HVBG), 'BGAG-Report 1/05: Entstehung von Stolper-, Rutsch und Sturzunfällen', 2005 (http://www.dguv.de/iag/de/publikationen/_dokumente/report2005_01.pdf).

Health and Safety Executive of the Government of the UK, 'Workplace newsletter: Slips and trips', 2004 (<http://www.hse.gov.uk/slips/index.htm>).

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5

Psychosocial risks

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Annex

5.1. Introduction

To ensure good quality care, healthcare staff should be safe and healthy at work as well as highly motivated to do a good job. Moreover, according to the World Health Organisation (WHO) definition of health, they should be in a state of complete physical, mental and social well-being as well as feeling empowerment to use their own health potentials and to deal successfully with the (high) demands of their workplace. But is this really the case?

One finding of the NEXT (nurses' early exit) study ⁽¹¹⁾ was that nurses are not satisfied with their job. According to the study, 15.6 % of nurses in Europe think frequently and seriously (several times a month) of leaving the profession early.

The NEXT study also shows that it is not the profession itself which leads to the desire to leave the job, but the quality of work in the particular workplace. Healthcare workers require a work environment where they are safe and healthy and are enabled to cope successfully with the daily demands of their work. If you like what you do and you are proud of it, then you can more easily deal with the demands of your environment.

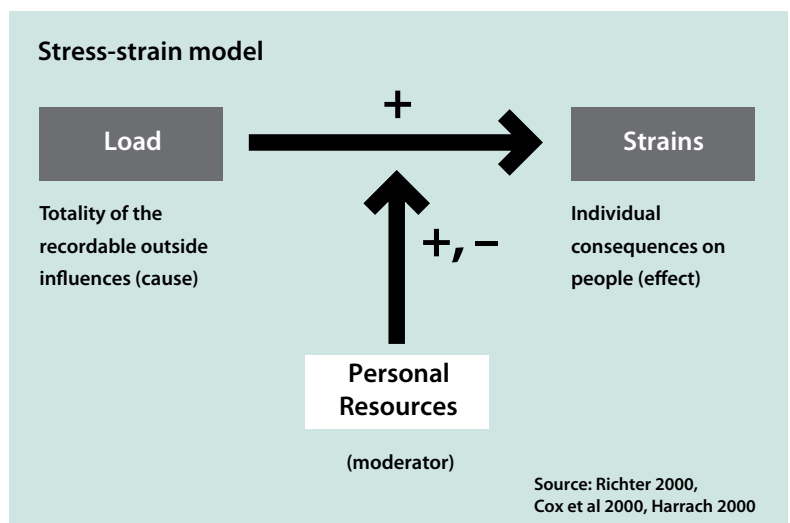
Reasons why the profession is not attractive at the present time include: poor career opportunities; difficult working hours; low pay; and high physical and mental loads and strains.

High absenteeism and early retirement rates are possible consequences. Alongside the personal suffering of those affected, the negative effects on the economic situation of the facilities and the loss of specialist skills must be prevented or reduced by correction, i.e. retrospectively, by measures of organisation and personnel development.

This chapter will describe different psychosocial risks at work as well as the concept of mental workload. General recommendations and practical tools will be presented to reduce psychosocial risks at work and to build the basis for a healthy work environment according to the WHO definition.

The following is a simple model to describe the relationship between the objective load factors at work and the reactions of the workers. Loads do not automatically result in the same reactions among all workers. Characteristics such as age, sex, social support and different processing styles lead to different strains.

- Load encompasses all external influences, such as working environment, task, work organisation and social relations.
- During the work processes there are personal resources which act positively or negatively on how the task is coped with, such as support from colleagues or otherwise and personal factors (resistance factors).



⁽¹¹⁾ <http://www.next.uni-wuppertal.de/EN/index.php?next-study>

- There is also stress at the individual level, such as burnout and alcohol abuse.

Psychosocial risk factors can arise among all occupational groups in the healthcare sector, including nurses, doctors, cleaning staff and those in the medical-technical service. Well-known psychosocial risks are:

- time pressure;
- rigid hierarchical structures;
- lack of gratification and reward;
- inadequate personnel leadership;
- lack of relevant information;
- lack of support from management staff;
- work-related loads (shift work, night work, irregular working hours);
- social conflicts, harassment, bullying, violence and discrimination;
- difficulties in the field of communication and interaction, including the failure to comprehend body language;
- work organisation which is not ideal (working-time arrangements).

In this chapter, psychosocial risks will be spotlighted and assessed, possible interventions will be highlighted and examples of good practice described.

It is important to mention that there is very often a coherence of stress and psychosomatic symptoms. The following presentation of psychosocial phenomena is not based on the theoretical allocation to objective load situations or subjectively experienced strain consequences but describes the situation in many clinics and residential homes at the phenomenological level. For example, burnout or drug abuse is the consequence of a load situation at personal level whereas stress or even badly organised working time tends to be a trigger for subjectively experienced load. This procedure appears to be sensible to us because 'negative' symptoms of the workers always indicate badly designed work.

Successful intervention requires the situation to be examined first, for example as part of a risk assessment.



Determining risks as part of the risk assessment

In the risk assessment, a systematic assessment of the current working conditions is made on the basis of existing risk-related criteria of the work situation (see above). Five steps must be observed in the risk assessment.

Step 1 — Identifying hazards and those at risk

To assess the risk from psychosocial risks at work, key questions, for example, can be used to analyse the work situation. This type of procedure was selected in this guideline.

The key questions are only one possible procedure for becoming familiar with the subject matter. They merely represent an initial orientation in the field of psychosocial risks. They were collected on the basis of literature. They are theory-guided but do not represent one single theory; rather they are based on the load-strain concept (see above) and stress-theoretical relationships. The key questions were collected in this form because they have proven to be informative indicators in various studies.

The use and evaluation of the key questions is simple. The applicable features are answered with 'yes'. The 'yes' answers are added together per risk. The evaluation is performed using the traffic light principle (see Table 5.1).

Table 5.1: Evaluation scheme for the key questions for psychosocial risks

No risk	Elevated risk	High risk
1 to 5 features ticked	6 to 10 features ticked	11 to 15 features ticked
Need for action with individual features	Design and screening analyses recommended	Design and screening analyses urgently necessary

NB: For a matrix for further application, see the annex to Chapter 5 (p. 217).

The working hours are an exception. Here, so-called knock-out criteria must be observed.

However, there are criteria for the other fields which should act like a knock-out criterion. For example, very high time pressure can be an indication of excessive work intensification. Therefore, you allow for the fact that the key questions do not replace an interview with the employees about possible special workloads. It is possible that occupational health and safety measures also become necessary in the green range.

Key areas in the establishments and groups of people at risk can be identified, in that they lie in the red and/or yellow areas with several psychosocial risks.

In the following examples tables, the evaluation is made for the psychosocial risk 'stress' according to occupational groups, wards or residential areas. The occupational groups, wards or residential areas can be adapted to suit the designations in your facility. Moreover, differentiation is possible; the doctors, for example, can be classified according to their specialisation.

The tables provide an overview of whether there are indications in your establishment of:

- psychosocial problems;
- the areas in which you may possibly have them;
- what the focal areas could be;
- where the greatest need for action could be.

If there are indications of possible design problems as a result of the key questions, you should plan further steps to improve the situation in dialogue with the employees. You may possibly have to resort to experts' knowledge at this juncture.

Step 2 — Evaluating and prioritising risks

Existing risks are characterised using the tables for each psychosocial risk and workplace or occupational group (see above). Moreover, in a comparison of the tables, key issues can be determined using the number of red and yellow boxes. Action should first be derived and implemented for the occupational group or psychosocial risk with the most red boxes.

The key questions are not intended as an employee survey. For that purpose other prerequisites, such as the guarantee of anonymity or the creation of confidence-building measures, would be necessary in the establishments, on the wards or in the residential areas. It is customary in science to always formulate the features positively. This could not always be observed in this guideline, owing to the evaluation according to the traffic light principle.

Important to note

In the field of work analyses a difference is made between orienting, screening and expert procedures. As a rule, only the expert procedures provide statements on the measurement accuracy of the procedure. One procedure which has methodological evidence and, at the same time, can also be used practically at the workplace is the Copenhagen Psychosocial Questionnaire (abbreviated to COPSOQ). It is available in many European countries in the national language.

Step 3 — Deciding on preventive action

Measures of workplace design (circumstantial prevention) and/or a change in behaviour among the workers (behavioural prevention) have to be derived as a function of the risk. Acceptance by the employees is higher if they are involved as experts in their work. They themselves often know the exact work-related problems and how these can best be solved.

Step 4 — Taking action

The areas of responsibility must be clarified for action to be taken. The preparation of a timetable and cost plan assists all those involved with implementation (see Chapter 2, page 31).

Step 5 — Documentation, monitoring and review

The risk assessment must be repeated at regular intervals (approximately every two years). The assessment focuses on a review of the efficacy of the measures and the assessment of technical, organisational and staff changes.

Many positive effects can be expected in the establishments from the professional handling of the risk assessment. On the one hand, friction losses, inappropriate actions, conflicts and so on can be avoided. On the other hand, the motivation and job satisfaction of the employees increases, which is also a positive experience for the patients and residents and their relatives.

5.2. Stress and burnout

5.2.1. Nature of risk dealt with

Stress

Stress is something burdensome, unpleasant and threatening. It is possible to describe the causes (the situation is 'stressful'), the consequences (I feel 'stressed') and the process itself (this is what happens to me when I'm under 'stress'). Stress can be taken to mean an intensive, unpleasant state of tension in a heavily aversive, threatening, subjectively long-lasting situation whose avoidance is subjectively crucial. The (stress) conditions mentioned to date not only relate to 'major', rare events, but primarily also to smaller, everyday inconveniences. At the workplace it is nearly always the day-to-day stressors that are more important for the genesis of stress than large and rare negative events.

Burnout

Burnout is a disturbance of well-being which expresses a negative change of feelings, attitudes and expectations and has adverse consequences when it comes to caring for others. Burnout has features in common with the experience of stress, features which have to do mainly with emotional exhaustion or excessive fatigue. There are differences in the areas of depersonalisation, personal concern and personal fulfilment. In addition, burnout describes a long-term impairment of well-being and performance which is typical for the occupational group.

5.2.2. Basic criteria for a specific risk assessment

Stress

Features which trigger stress are known as stressors.

Stressors arising from working tasks include:

- excessively rigorous qualitative and quantitative requirements (patients, residents, clinical pictures);
- pressure of time and deadlines;
- information overload;
- contradictory work instructions from doctors, senior nurses, nursing service management or residential area management;
- constant interruptions and disturbances by colleagues, patients, residents or relatives.

01 Time pressure in a hospital.



Stressors arising from the work role include:

- insufficient aptitude, lack of professional experience;
- too much responsibility;
- unclear task assignment;
- lack of support and assistance;
- lack of recognition.

Stressors arising from the material environment include:

- unfavourable environmental influences, such as noise, electrical discharges, cold, heat and draughts;
- toxic substances, biological agents and needle pricks;
- complex technical systems: overtaxing of human capacity to think and make judgements or exceeding of capacity to taken in and process information;
- lack of aids.

Stressors arising from the social environment include:

- poor working atmosphere;
- little or poor communication;
- conflicts with superiors and colleagues;
- constant change of environment, colleagues and field of work;
- structural changes in the company;
- lack of information (e.g. in the case of change of shift);
- inadequate consideration given to compatibility of family and job;
- lack of staff.

Stressors arising from integration in workplace ('behaviour setting') include:

- being alone in the workplace (e.g. at night or at the weekend);
- long distances or rambling corridors and similarity of wards, residential areas or storeys.

Stressors arising from the person system include:

- fear of tasks, blame and sanctions;
- fear of own mistakes;
- lack of social and communicative skills;
- inefficient styles of action;
- family conflicts.

Key questions on ‘stress’

Mark the work features which apply to your facility, ward, residential area or department. Calculate the total of ‘yes’ answers and enter this in the last line!

Work features	Applies	Does not apply
1. Is there too much responsibility?	<input type="checkbox"/>	<input type="checkbox"/>
2. Do time pressures or deadlines arise frequently?	<input type="checkbox"/>	<input type="checkbox"/>
3. Are there frequent disturbances or interruptions?	<input type="checkbox"/>	<input type="checkbox"/>
4. Do tight specifications apply for performance of the work?	<input type="checkbox"/>	<input type="checkbox"/>
5. Do decisions have to be taken without adequate information and with insufficient decision-making aids?	<input type="checkbox"/>	<input type="checkbox"/>
6. Are there contradictory requirements (e.g. conflicts between meeting deadlines and quality)?	<input type="checkbox"/>	<input type="checkbox"/>
7. Is there lack of support from colleagues and superiors?	<input type="checkbox"/>	<input type="checkbox"/>
8. Is there lack of recognition for the work of the employees?	<input type="checkbox"/>	<input type="checkbox"/>
9. Are employees excluded from the planning and decision-making processes?	<input type="checkbox"/>	<input type="checkbox"/>
10. Are mistakes at work not discussed?	<input type="checkbox"/>	<input type="checkbox"/>
11. Is the working atmosphere bad?	<input type="checkbox"/>	<input type="checkbox"/>
12. Do people often go absent?	<input type="checkbox"/>	<input type="checkbox"/>
13. Are there unfavourable environmental influences?	<input type="checkbox"/>	<input type="checkbox"/>
14. Are distances very long or complex?	<input type="checkbox"/>	<input type="checkbox"/>
15. Is there lack of social and communicative skills among nursing staff?	<input type="checkbox"/>	<input type="checkbox"/>
Total		

No risk	Elevated risk	High risk
1 to 5 features ticked	6 to 10 features ticked	11 to 15 features ticked
Need for action with individual features	Design and screening analyses recommended	Design and screening analyses urgently necessary

Burnout

Burnout arises from interactions between external, internal and individual-related factors. External factors include, alongside the work requirements, work organisation and the occupational situation.

Work requirements

A particular work requirement which comprises the constant need to deal with or give attention to the persons being cared for often leads to overstrain, because a high degree of concentration is required with a ceaselessly friendly manner.

The work may also be monotonous, may provide little room for manoeuvre in terms of the activity, and may be difficult to foresee or to influence. Any pressure of time will reduce the possibilities for giving attention to the persons in care. A lack of recognition and reward will strengthen these tendencies. Unfavourable working time arrangements will have an adverse effect on the reconciliation of family and job.

The work requirements mentioned, which are only a selection, are frequently the result of deficient work organisation.

Work organisation

Bureaucratic obstacles make it difficult to put an idealistic attitude towards clients into practice.

The organisation also lays down the areas of competence and responsibility, determines the transparency of information and communication rules, exerts an influence over the conduct of management staff and promotes or reduces the opportunities to introduce innovations in the company.

If classic stressors also arise in work design, this again promotes the occurrence of burnout.



02 Time pressure: here in outpatient care.

Occupational situation

Jobs in the service domain are often unattractive. Alongside poor pay in many sectors, incursions into the workers' leisure time and a lack of opportunities for development trigger burnout. Extra-occupational obligations, such as caring for children or relatives who have to be nursed, are not taken into account when configuring the work organisation.

In addition, there is the fact that, despite a rising need, the financial resources are often limited.

Personal/individual-related factors

In addition to the condition-related factors, people contribute different conditions which inhibit or promote the occurrence of burnout through their private situation and their individual desires. These features include:

- personal attitudes to work (helper's dilemma, professional ethos);
- lack of or incorrect possibilities of coping;
- work being the most important thing in life;
- one's own needs taking a back seat;
- one's own mental balance not being achieved.

In addition to the factors of work requirement and conditions which trigger burnout there are different stressors which promote the appearance of burnout. Therefore stressors are closely related to the emergence of burnout. Conditions which on the whole promote burnout are:

- pressure of time;
- constant interruptions;
- contradictory instructions;
- few possibilities for taking one's own decisions;
- too few possibilities for obtaining social support;
- too little time to give emotional attention to others;
- a daily confrontation with the suffering or dying of patients;
- conflicts with the patients or their relatives;
- a thin coverage in terms of human resources;
- lack of training;
- lack of balance between paying attention and receiving feedback;
- a lack of esteem.

Key questions on 'burnout'

Mark the work features which apply to your facility, ward, residential area or department. Calculate the total of 'yes' answers and enter this in the last line!

At work, is there	Applies	Does not apply
1. Permanent pressure of time?	<input type="checkbox"/>	<input type="checkbox"/>
2. Constant interruptions?	<input type="checkbox"/>	<input type="checkbox"/>
3. Contradictory instructions?	<input type="checkbox"/>	<input type="checkbox"/>
4. Few possibilities for own decisions?	<input type="checkbox"/>	<input type="checkbox"/>
5. Too few possibilities for social support?	<input type="checkbox"/>	<input type="checkbox"/>
6. Too little time for getting emotional attention from your colleagues?	<input type="checkbox"/>	<input type="checkbox"/>
7. Daily confrontation with the suffering or dying of patients?	<input type="checkbox"/>	<input type="checkbox"/>
8. Conflicts with the patients or relatives?	<input type="checkbox"/>	<input type="checkbox"/>
9. Compulsion to be friendly?	<input type="checkbox"/>	<input type="checkbox"/>
10. Bureaucratic obstacles?	<input type="checkbox"/>	<input type="checkbox"/>
11. People are over-committed?	<input type="checkbox"/>	<input type="checkbox"/>
12. Overtime is often necessary?	<input type="checkbox"/>	<input type="checkbox"/>
13. Thin coverage in terms of human resources?	<input type="checkbox"/>	<input type="checkbox"/>
14. Qualification deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>
15. Services are not recognised?	<input type="checkbox"/>	<input type="checkbox"/>
Total		

No risk	Elevated risk	High risk
1 to 5 features ticked	6 to 10 features ticked	11 to 15 features ticked
Need for action with individual features	Design and screening analyses recommended	Design and screening analyses urgently necessary

5.2.3. Work situations with the greatest exposure

When you have completed the lists of key questions for a number of areas (according to the formula in the annex), you can use the evaluation scheme to determine in what work situations or in which organisation units (e.g. wards or residential areas), activity areas (e.g. nursing or cleaning), occupational groups (e.g. doctors or other staff categories) you find the greatest exposure with respect to stress or burnout.

5.2.4. Effects on health and safety

The consequences of stress encompass health impairments and reductions in performance as well as disturbances in social behaviour and personal development. In addition, an impact on leisure behaviour has also been observed.

All across Europe, stress is responsible for a great number of non-specific diseases. The relation to heart disease is currently a special matter of concern. Cardiovascular disorders and damage have become the most common natural cause of illness and death. Long-duration stress causes enormous follow-up costs in the health domain.

Stress at the workplace is given as a major cause of critical situations, errors of treatment, incidents or accidents.

In addition to the stress-related negative consequences of strain, there are characteristic health impairments which can be observed in connection with burnout. Typical warning signals are:

- the rapid development of fatigue or exhaustion; even the simplest activities become strenuous; alongside a sign of slight irritation and impatience, there is a tendency to reproach colleagues, superiors and patients/residents;
- experience of low efficiency in one's own work; workers find it increasingly difficult to empathise with clients;
- tendency to be indifferent to persons in care.

03 What to do about despair?



5.2.5. General preventive and protective measures

In order to prevent the development of stressors at the workplace as far as possible and to better protect workers from the emergence of burnout, continuous monitoring of the work situation should be undertaken. Different analysis tools and procedures are available, depending on the general conditions in the company:

- analysis of work incapacity data;
- risk assessment;
- work situation analysis;
- a health circle;
- worker surveys;
- worker interviews.

Organisational measures available for circumstantial prevention include:

- design of work organisation;
- creation of degrees of freedom;
- possibilities of social support;
- provision of feedback for the workflow and the results.

Good social and communication relationships with other occupational groups are also important.

Helpful individual-related measures include:

- continuous and further training;
- training in social and communicative skills;
- time management;
- coping with stress.

A combination of organisational and individual measures produces the most effects.



5.2.6. Description of specific preventive techniques and procedures

Preventive techniques and procedures are advisable in various areas to reduce stressors at the workplace and to prevent burnout. These include the improvement of the work organisation and the strengthening of individual resources.



Potential stressors that can be reduced by organisational measures

- Creation of degrees of freedom for individual objectives in the performance of task results in a lowering of the pulse and the blood pressure and to a reduction of depression and psychosomatic complaints.
- Provision of possibilities for social support with a high presence of potential stressors will reduce the number of psychosomatic complaints
- Design of work activities to create activities with the most complete possible task structures will result in a prevention and reduction of stress
- Increase in the time-related autonomy of workers will improve the job/private life interface



Strengthening of individual resources includes:

- initial and continuous training in specialist fields;
- learning of appropriate strategies for coping with stress by planning in time reserves, and by looking for cooperation and communication partners;
- change in the assessment of requirements by the individual by acquiring methods of agitation and fear control (self-relaxation training);
- making people aware of and correcting individual value hierarchies which give priority to one-sided and exclusively competition-oriented benefits or are equivalent to self-exploitation or self-overtaxing.

04 Well-organised social contacts foster the well-being of patients and employees.



With burnout a series of organisation-related features apply.

At company level:

- adequate, partly or slightly buffered staffing;
- socially acceptable working time and shift arrangements;
- creation of specialisation and promotion opportunities;
- training of management personnel;
- fulfilment of welfare duties (e.g. in the case of a high number of overtime hours).

At task level:

- ensuring a diversity of tasks (e.g. by means of holistic care);
- facilitating room for manoeuvre in activities with respect to time and content, with opportunities for setting own objectives and decisions;
- introduction of group work (e.g. including the quality or health circles).

At personal/individual level:

- regular group discussions of problems at work;
- provision of qualification facilities to increase specialist competency and social and emotional skills and coping strategies by means of continuous and further training, training in time management, behaviour training and fear management training;
- provision of facilities for relaxation techniques, such as autogenic training, yoga and gymnastic exercises.



05 Regular meetings are important for well-being.

5.3. Prevention and monitoring of violence and mobbing (bullying and harassment) at the workplace

Handling aggression and violence on the part of patients, clients and those in care confronts workers in medical, nursing and social professions with special challenges. Some impressive results of studies are available on this.

- In the NEXT study, it was shown for Germany that one in four nurses in old people's and nursing homes claim they are always confronted with aggressive and unfriendly patients ⁽¹¹²⁾.
- In a study by Elston et al. ⁽¹¹³⁾ of 697 doctors questioned in the UK, 70 % had been the victim of verbal violence and 10 % the victim of physical violence.

Institutions and their workers are not always adequately prepared or trained for coping with such situations. In addition to physical injuries, there is often also the risk of mental injuries to those affected. How can facilities and workers actively counter the emergence of assaults?

5.3.1. Nature of the risk dealt with

The subject of violence at the workplace is not one-dimensional, however. Possible verbal or physical assaults on workers by patients are one face of violence; workers who harass one another, or superiors who harass workers (so-called bossing) and vice versa employees who harass superiors (commonly called staffing) can turn the workplace into a 'battlefield'. The possible effects are:

- high sickness rates among workers;
- high turnover;
- poor working atmosphere;
- poor performance.

⁽¹¹²⁾ Simon, M., P. Tackenberg, H.-M. Hassselhorn, A. Kümmerling, A. Büscher and B.H. Müller, 'Auswertung der ersten Befragung der NEXT-Studie in Deutschland', Universität Wuppertal, 2005 (<http://www.next.uni-wuppertal.de>).

⁽¹¹³⁾ Elston, M. A., J. Gabe, D. Denney, R. Lee, and M. O'Beirne, 'Violence against doctors: a medical(ised) problem? The case of National Health Service general practitioners', in: *Sociology of Health and Illness*, Vol. 24, No 5, 2002, pp. 575–598 (<http://onlinelibrary.wiley.com/doi/10.1111/1467-9566.00309/pdf>).

In European linguistic usage, different terms are used for the phenomenon of psychological violence. The differences in meaning are in some cases only marginal. The phenomena **mobbing, bullying and harassment** are presented in brief in the following on the basis of a formal definition.

What is violence at work?

The concept of 'external' workplace violence generally covers insults, threats and physical or psychological aggression exerted by people from outside the organisation, including customers and clients, against a person at work that endangers their health, safety or well-being. There may be a racial or sexual dimension to the violence.

Aggressive or violent acts take the form of:

- uncivil behaviour: lack of respect for others;
- physical or verbal aggression: intention to injure;
- assault: intention to harm the other person.

One special form of violence at the workplace is mobbing. The pioneer of workplace bullying research, Heinz Leymann, defined psychosocial terror or mobbing in working life as 'hostile and unethical communication, which is directed in a systematic way by one or a few individuals mainly towards one individual who, due to mobbing, is pushed into a helpless and defenceless position, being held there by means of continuing activities. These actions occur on a very frequent basis (statistic definition: at least one week) and over a long period of time (statistic definition: at least six month)' ⁽¹¹⁴⁾⁽¹¹⁵⁾.

Mobbing

Workplace bullying is repeated, unreasonable behaviour directed towards an employee, or group of employees, that creates a risk to health and safety.

Within this definition:

- 'unreasonable behaviour' means behaviour that a reasonable person, having regard to all the circumstances, would expect to victimise, humiliate, undermine or threaten;
- 'behaviour' includes actions of individuals or a group; a system of work may be used as a means of victimising, humiliating, undermining or threatening;
- 'risk to health and safety' includes risk to the mental or physical health of the employee.

Bullying often involves a misuse or abuse of power, where the targets can experience difficulties in defending themselves.

Bullying

The term harassment covers undesirable hostility or offensive behaviour. It may also include sexual harassment. Any harassment at the workplace is a form of discrimination which is explicitly prohibited by law (see Food & Drug Administration, US Department of Health & Human Services, 2008).

**Harassment
(including sexual
harassment)**

⁽¹¹⁴⁾ Leymann, H., 'Mobbing and psychological terror at workplaces,' in: *Violence and Victims*, No 5, 1990, pp. 119–126 (<http://www.mobbingportal.com/LeymannV&V1990%282%29.pdf>).

⁽¹¹⁵⁾ Leymann, H., 'The content and development of mobbing at work,' *European Journal of Work and Organisational Psychology*, Vol. 5, No 2, 1996, pp.165–184 (<http://www.tandfonline.com/doi/abs/10.1080/13594329608414853>).

5.3.2. Basic criteria for a specific risk assessment

In this chapter a distinction is drawn between aggression towards workers and mobbing among personnel in hospitals and nursing facilities.

Violence committed by patients against the personnel

Normally, there is no such thing as one reason for assaults on nursing personnel, but in most cases every assault has a prehistory and therefore starts a cycle of violence. It is not uncommon that a lack of or deficient communication or inadequate comprehension of body language leads to misinterpretation.

Focussing on patient-related reasons, different pathological records, neurological and mental disorders or drug dependence are associated with violence against staff. Sometimes patients feel that certain measures taken by personnel are violent and they react aggressively. Worker-related behaviour, which can trigger patient violence, includes arrogance and rigidity.

There are also structural reasons for the emergence of violence, such as rigid house rules, little possibility for movement, bureaucracy or lack of personnel.

A lack of preventive protection in a facility can be demonstrated by: no contingency plans, no escape routes and dark corners which are difficult to monitor.

Important for prevention is to anticipate situations where violence can happen and be prepared (e.g. in emergency hospitalisation). A contingency plan is necessary in these situations.



06 Good work organisation as a resource.

Key questions on 'violence'

Mark the work features which apply to your facility, ward, residential area or department. Calculate the total of 'yes' answers and enter this in the last line!

Work features	Applies	Does not apply
1. In your working area is there often a so-called difficult clientele?	<input type="checkbox"/>	<input type="checkbox"/>
2. Have there to date been any insults, verbal abuse and threats from patients in connection with your work?	<input type="checkbox"/>	<input type="checkbox"/>
3. Have there to date been physical threats/assaults by patients in connection with your work?	<input type="checkbox"/>	<input type="checkbox"/>
4. If an assault takes place, there is no concept in your facility of conducting a follow-up consultation (including a team meeting)?	<input type="checkbox"/>	<input type="checkbox"/>
5. In case of assaults by patients, prompt help from superiors and colleagues cannot be expected?	<input type="checkbox"/>	<input type="checkbox"/>
6. A person-related emergency call system is not available (e.g. emergency call button on the telephone or mobile phone)?	<input type="checkbox"/>	<input type="checkbox"/>
7. There are no adequate escape routes in the event of physical assaults from a patient.	<input type="checkbox"/>	<input type="checkbox"/>
8. Critically aggressive situations were not systematically documented.	<input type="checkbox"/>	<input type="checkbox"/>
9. No arrangements are made for handling patients where it can be expected that there will be communication or comprehension difficulties (scheduling, interpreters, other accompanying persons etc)?	<input type="checkbox"/>	<input type="checkbox"/>
10. Do patients have access to dangerous objects (e.g. sharp, pointed, heavy or movable objects) within your work area?	<input type="checkbox"/>	<input type="checkbox"/>
11. If conversations take place with aggressive or potentially violent patients it is hard to get an additional colleague because of staff shortage.	<input type="checkbox"/>	<input type="checkbox"/>
12. No guidelines exist in your department governing how to handle aggressive patients.	<input type="checkbox"/>	<input type="checkbox"/>
13. Locations in buildings where a risk of violence could arise are not well lit or cannot be readily monitored.	<input type="checkbox"/>	<input type="checkbox"/>
14. De-escalation training does not exist.	<input type="checkbox"/>	<input type="checkbox"/>
15. Do you restrict your freedom of action at work in order to avoid possible confrontations with patients?	<input type="checkbox"/>	<input type="checkbox"/>
Total		

No risk	Elevated risk	High risk
1 to 5 features ticked	6 to 10 features ticked	11 to 15 features ticked
Need for action with individual features	Design and screening analyses recommended	Design and screening analyses urgently necessary

Mobbing

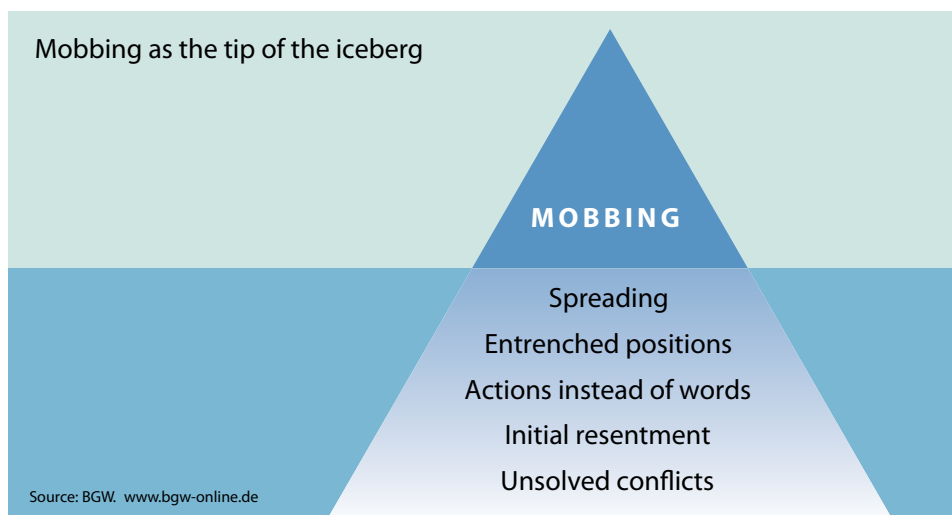
Mobbing among workers or in their relationship with superiors is expressed in various ways which makes it difficult to detect. Usually mobbing is associated with a high amount of perceived stress derived from stressors based on organisational issues, for instance bad leadership. Mobbing with regard to organisational measures can take the following forms:

- degrading jobs;
- social isolation;
- attacks on the individual and his or her private sphere;
- verbal and physical aggression;
- spreading of rumours.

Looking for the protagonists of mobbing, there are quite different constellations. You can differentiate between:

- bossing: mobbing by a supervisor (also: downward bullying);
- staffing: psychoterror by subordinates towards supervisors (also: upward bullying);
- tyrannising of employees on the same hierarchical level.

Diagram showing how mobbing can arise.



Key questions on 'mobbing'

Mark the work features which apply to your facility, ward, residential area or department. Calculate the total of 'applies' answers and enter this in the last line!

Work features	Applies	Does not apply
1. Do you feel you have a high workload?	<input type="checkbox"/>	<input type="checkbox"/>
2. Are you frequently exposed to conflicts?	<input type="checkbox"/>	<input type="checkbox"/>
3. Is cooperation at work not readily possible?	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you suffer from health disorders (headaches, internal agitation, stomach problems, trouble sleeping)?	<input type="checkbox"/>	<input type="checkbox"/>
5. Do you feel on the whole uncomfortable at your workplace?	<input type="checkbox"/>	<input type="checkbox"/>
6. Do you feel that you are treated unjustly at your workplace?	<input type="checkbox"/>	<input type="checkbox"/>
7. Do your colleagues say bad things about you?	<input type="checkbox"/>	<input type="checkbox"/>
8. Do you often have the impression that you have to do degrading jobs?	<input type="checkbox"/>	<input type="checkbox"/>
9. Have you changed your workplace several times in the past two years?	<input type="checkbox"/>	<input type="checkbox"/>
10. Is there a high staff turnover in your department?	<input type="checkbox"/>	<input type="checkbox"/>
11. Can you express your views freely in writing and verbally without being reined in by your superior?	<input type="checkbox"/>	<input type="checkbox"/>
12. Does it happen that your colleagues do not take account of you?	<input type="checkbox"/>	<input type="checkbox"/>
13. Can you not recuperate effectively after work? Are you unable to switch off your thoughts about the working day after work?	<input type="checkbox"/>	<input type="checkbox"/>
14. Have you ever been threatened with physical violence at work?	<input type="checkbox"/>	<input type="checkbox"/>
15. Do you often think about changing your workplace because of the behaviour of your colleagues or supervisors?	<input type="checkbox"/>	<input type="checkbox"/>
Total		

No risk	Elevated risk	High risk
1 to 5 features ticked	6 to 10 features ticked	11 to 15 features ticked
Need for action with individual features	Design and screening analyses recommended	Design and screening analyses urgently necessary

5.3.3. Work situations with the greatest exposure

Existing studies show that mobbing is fostered in particular by specific working conditions and forms of work organisation. Apart from a rigid hierarchical structure, these conditions include the diffusion of responsibility, a lack of clear feedback systems and deficient leadership behaviour. The list shows that some of these aspects tend not to be allowed for sufficiently especially in the work organisation of many healthcare facilities.

5.3.4. Effects on health and safety

The reaction possibilities of the workers to work situations where violence or mobbing is daily routine sometimes differ but there is also a common subset.

Effects of violence on workers include:

- physical injuries;
- (and primarily) mental consequences; frequent symptoms such as disturbed sleeping patterns, irritability, anxieties and loss of appetite;
- possible patterns of disorders, such as depression, anxiety states, amnesia without brain damage, pain not attributable to physical causes and substance abuse.

Effects of mobbing on workers include:

- stress symptoms (elevated blood pressure and pulse frequency, increase in breathing frequency);
- effects of stress (tension in the skeletal muscles, disturbance of sexual functions, formation of stomach ulcers);
- psychosomatic disturbances, illness-related absenteeism and suicidal intentions as an extreme reaction to a situation felt to be dramatic.

07 Anti-mobbing campaign.



5.3.5. General preventive and protective measures

In principle, the preventive measures can be differentiated according to 'design of the workplace' and 'change in the workers' behaviour'. For the problem of 'violence', **personal/individual preventive measures** would be, for example, the strengthening of worker competencies and their self-confidence.

Company level: develop preventive strategies (e.g. are there patient screenings which are ethically acceptable?).

Task level: adequate exchange on handover in hospital concerning potentially violent patients.

Individual level: detection of early warning signs.

The distinction between design-related prevention and preventive measures which tend to be geared to the person's behaviour can also be **mobbing**.

Circumstance-related protective measures include:

- development and living by standards of conduct;
- team development;
- introduction and/or constant further development of a risk assessment;
- SOAS-R (Staff Observation Aggression Scale-Revised): In the case of frequent attacks by patients, systematic registration is advised in order to derive preventive measures in a subsequent phase.

Behaviour optimisation includes:

- learning methods of self-assertion;
- permitting critical and conflict discussion;
- saying no;
- dealing with situations in a de-escalating and self-protecting way;
- practising how to deal with critical feedback and how to give constructive criticism;
- discussion at the content level and not at the relationship level.

The design of the social context gains particular importance when supporting factors that inhibit mobbing. For this purpose it is important to positively design the social contacts, social interaction and culture.

Company level: in the guidelines and day-to-day routine, living by the maxim that mobbing cannot be tolerated under any circumstances.

Task level: creating working sequences with clear responsibilities and areas of competence.

Individual level: learning conflict and communication techniques (also as corporate further training).



5.3.6. Description of the specific preventive techniques and procedures

Instruments of occupational health and safety which are particularly favourable for positively influencing cooperation in the company are based in a first step on the analysis (see also Section 5.1.6). For this purpose, the following procedures are possible, depending on the general conditions in the company:

- analysis of work capacity data;
- risk assessment;
- work situation analysis;
- a health circle;
- worker surveys;
- worker consultations;

5.3.7. Examples of good corporate practice

- de-escalation trainer training; As an example, a 12-day in-house training course to become a de-escalation trainer involves the relations between violence, aggression, fear, self-value and de-escalation.

Verbal de-escalation training is just as much an element as defence and escape techniques, as well as method and didactics training. Stimuli which trigger aggression and their impact on old people and people with dementia are reflected on and options to reduce aggression communicated;

- reflection on structural violence factors, and on how to handle patients and relatives;
- conduct of risk assessment;
- definition of a model for dealing with violence;
- complaints management for patients and relatives;
- follow-up discussions in the case of assaults, including those within the team.

5.3.8. Appropriate modes of behaviour in critical situations

In practice, it has proven to be very helpful to set up an 'early warning system' for crisis situations. To this end, sensitivity to changed situations must be systematically recorded. A contingency plan must come into operation to classify a situation as critical. That means a special, standardised plan becomes operative in the case of crises. This plan should be developed in an ongoing fashion and be discussed in the team so that workers know what to do step by step. The process should be organised in a continuous improvement process.

5.3.9. Most important knowledge and conclusions

Violence and aggression in the healthcare sector must be openly discussed so that measures can be developed to contain this problem and gain control over it.

Mobbing must be labelled as being unacceptable by the top management level (in the mission statement etc.) and, in addition to the wealth of know-how which is communicated to the workers, the aim is to live the maxim in every work area that mobbing is not acceptable under any circumstances.



08 Mobbing should not be tolerated.

© 123rf

5.4. Working hours

The organisation of working hours has an important influence on the effect of load factors with which workers are confronted during their work. This concerns not only the duration of the working time from which the load arises, but also its arrangement and distribution.

5.4.1. Nature of risk dealt with

This effect is clearest if one examines the duration of the daily working time. Quite clearly, fatigue increases with the length of working time, while concentration decreases. This relationship also applies to weekly and monthly working time. The 'accumulation' of working hours over these periods has an influence on exhaustion, the possibility of regeneration and also the reconciliation of family and job. In addition to the duration of working time, the arrangement and distribution is also a major influencing factor. In hospitals, in particular, where the working day actually encompasses 24 hours, work is conducted at times which are not typical of the normal routine. Staff at nursing homes must also make themselves available in the evenings and at night. Sundays and public holidays also have to be covered.

5.4.2. Basic criteria for a specific risk assessment

To assess the risk arising from the duration, arrangement or distribution of working hours, it is necessary to give a description of the system of working hours taking account of the working hour constellations which represent a risk. To do this, the following criteria can be recorded in the form of key questions.

09 Shift work as a load factor.



Key questions on 'working time'

Mark the work features which apply to your facility, ward, residential area or department. Calculate the total of 'applies' answers and enter this in the last line!

Work features	Applies	Does not apply
1. Do your average working hours exceed 48 weekly?	<input type="checkbox"/> *	<input type="checkbox"/>
2. Are there regular duty periods which are longer than 10 hours in the duty roster?	<input type="checkbox"/>	<input type="checkbox"/>
3. Does the shift schedule include night work?	<input type="checkbox"/>	<input type="checkbox"/>
4. Does the shift schedule not take account of statutory breaks?	<input type="checkbox"/> *	<input type="checkbox"/>
5. The breaks which are agreed upon can usually not be taken in the daily work?	<input type="checkbox"/> *	<input type="checkbox"/>
6. Is the rest period between duty periods shorter than 11 hours?	<input type="checkbox"/> *	<input type="checkbox"/>
7. Do you regularly work on Sunday?	<input type="checkbox"/>	<input type="checkbox"/>
8. Are there periods of standby duty?	<input type="checkbox"/>	<input type="checkbox"/>
9. Are there 24-hour standby duty periods?	<input type="checkbox"/>	<input type="checkbox"/>
10. In practice is the scheduled duration of standby duty periods exceeded?	<input type="checkbox"/>	<input type="checkbox"/>
11. Is the rest period after night work period shorter than 24 hours long?	<input type="checkbox"/>	<input type="checkbox"/>
12. Are more than 4 standby duty periods worked in a month?	<input type="checkbox"/>	<input type="checkbox"/>
13. Are there frequent changes at short notice to the duty roster?	<input type="checkbox"/>	<input type="checkbox"/>
14. Is overtime regularly worked?	<input type="checkbox"/>	<input type="checkbox"/>
15. Is there often a work privacy conflict caused by working time?	<input type="checkbox"/>	<input type="checkbox"/>
Total		

(*) These are knock-out criteria. They are laid down by the EU working time directive. A 'yes' answer leads to a direct need for action.

No risk	Elevated risk	High risk
1 to 5 features ticked	6 to 10 features ticked	11 to 15 features ticked
Need for action with individual features	Design and screening analyses recommended	Design and screening analyses urgently necessary

5.4.3. Description of the work situations with the greatest exposure

The hospital and nursing domain is a working area in which work has to be performed around the clock. This means for workers that in addition to the 'normal' daily work they also have to work at times when their bodies tend to be more geared to 'rest' for physiological reasons. This workload in addition to the normal working activity is greatest at night. But work performed in the evening hours is also a burden because of the restricted opportunities it offers for social activities. This burden, which is typical for this working area, can be adversely influenced by various aspects of working time organisation and work organisation. The health risk and also the risk of making mistakes at work then increases further when, in addition to shift work, excessively long working hours have to be worked. This situation occurs frequently in the medical domain. Here long standby duty periods combined with 'normal' working hours are still the order of the day in many places. Particular protection arrangements exist for pregnant workers or workers who have recently given birth or are breastfeeding. The Member States must take the necessary measures to ensure that such workers are not obliged to work at night. So they must be moved to daytime work. Any discrimination arising from this situation must be avoided.

5.4.4. Descriptions of the effects on health and safety

Excessively long working hours: cardiovascular and nervous complaints

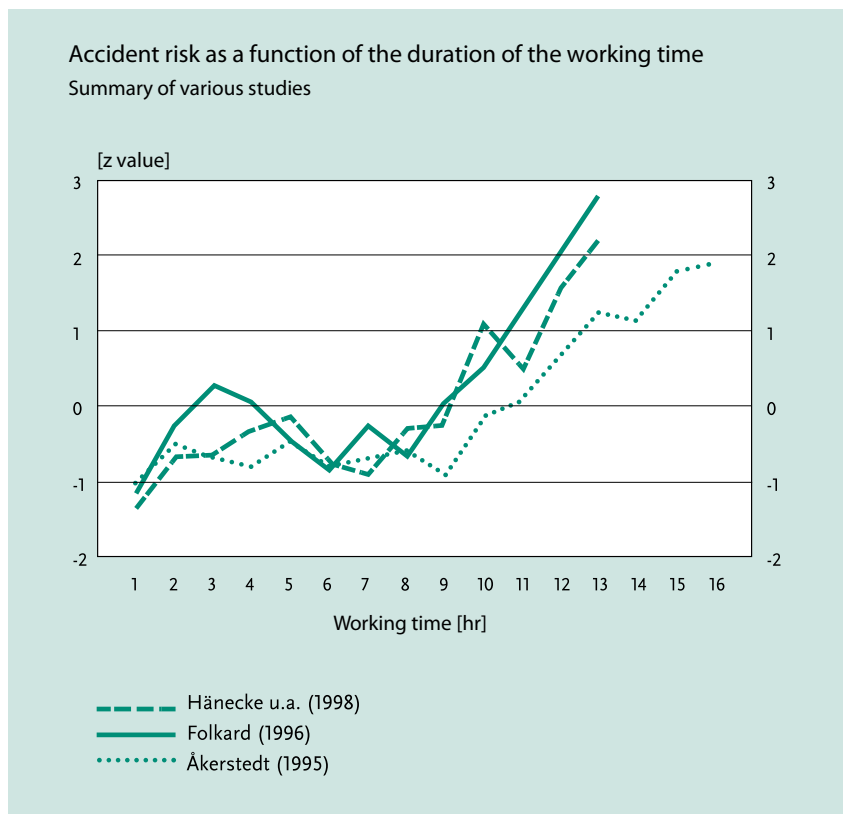
Typical health impairments which are discussed in connection with excessively long working hours are cardiovascular disorders.

Long working hours are not infrequently combined with other health-risk factors. Excessively long working hours, shift work, stress at the workplace and an unfavourable lifestyle quite frequently occur together. A survey conducted by the Japanese Ministry of Employment shows that 65 % of workers with long working hours claimed that they feel physically exhausted, 57 % reported anxiety and a feeling of stress and 48 % indicated that they were mentally exhausted. The burnout syndrome is also associated with long working hours.

In general it can be seen on the basis of the findings available that the relation between health impairments and long working hours is often systematically accompanied by their load factors. These factors often represent an additional load, such as pressure of time, career pressure and lack of human resources. The 'buffering' function of motivation only has a limited effect on the body's physiological reactions.

Enhanced accident risk

On the basis of various studies from the European domain it was confirmed that the accident risk rises considerably after the ninth working hour. This effect is enhanced even further during shift and night work.



Shift work

According to scientific knowledge, work carried out during changing and long-term 'abnormal' working times leads to an enhanced risk of health and social problems. Shift work and also long-term night work, as is normal in clinical situations, leads to an individual risk. The main impact of night and shift work are:

- tiredness, persistent sleeping problems and chronic fatigue;
- health impairments — both psychovegetative and gastrointestinal;
- accident risk;
- social desynchronisation
- inability to perform accurate and/or quality work (enduring night work).

Depending on the individual's disposition, different symptoms can occur. Apart from the fact that work around the clock is an inevitable characteristic of activity in hospitals and the nursing domain, women in particular who have children to look after at home prefer long-term night work. Work during the night makes it possible to combine a job and family. Workers are often not fully aware that health risks related to night work are high. In addition, long-term working on the night shift often results in dequalification. Women who for years have worked only at night often no longer feel up to the hectic pace of 'normal' ward duty.

This fact is a major problem for elderly workers in particular. With increasing age, the compensation opportunities for coping with the strain of shift work decline. Where there is at the same time a limited qualification level, problems frequently arise when changing to 'normal' day duty.

Some studies have shown an association between shift work and an increased risk of developing cancer ⁽¹¹⁶⁾.

⁽¹¹⁶⁾ <http://monographs.iarc.fr/ENG/Monographs/PDFs/index.php>

5.4.5. General preventive and protective measures



Possibilities exist for prevention at different levels. First and foremost the organisation of the working time system should in any case be in accordance with sound knowledge according to the state of the art. Studies over the past 40 years have shown that shift schedules definitely exhibit major differences with respect to their potential health risk (see Section 4.7).



In recent years the impact of very bright light on the adaptation to shift work has been discussed. Bright light inhibits the production of melatonin and therefore reduces tiredness.

At the level of organisation, it is possible to have a positive impact on dealing with the workload. The question of night provision is key here. The organisations should make light and healthy food available for night-time catering.



At the individual level there is the possibility of cushioning the negative effects of night and shift work by a controlled mode of behaviour. This includes:

- sporting activity;
- healthy nutrition;
- improvement in the sleeping situation.

Article 9.1 of Directive 2003/88/EC ⁽¹⁷⁾ on working time lays down, among other provisions, that night workers are entitled to a free health assessment before their assignment and thereafter at regular intervals.

**10 Health of the patients
— What about the
workers' health?**



⁽¹⁷⁾ Directive 2003/88/EC of the European Parliament and of the Council of 4 November 2003 concerning certain aspects of the organisation of working time, OJ L 299, 18.11.2003, pp. 9–19.

5.4.6. Description of the specific preventive techniques and procedures

Design recommendations:

1. As few night shifts as possible
2. No more than two to four consecutive night shifts ⁽¹¹⁸⁾
3. Forward rotation: early-late-night
4. Avoidance of the accumulation of working hours
5. As far as possible two consecutive days off at the weekend
6. Early shift not to start too early
7. Night shift not to end too late
8. Predictability of shift schedule.

5.4.7. Examples of good corporate practice

Shift and night work per se represent a high load for the workers. Therefore it is particularly important to include workers in drawing up shift rotas. Individual preferences and private interests should be allowed for as far as possible. The reliability of the shift rotas is also important. The workers must be able to rely on the fact that the rotas drawn up are also observed. That enables them to plan their private lives. That does not mean that the exchange of shifts among workers after consultation will no longer be possible. However, it does mean that no changes are to be made without the definite agreement of the workers. It is therefore also important to allow for buffers for holidays and illness of the workers when drawing up rotas.



11 Sport as a counterbalance to working life.

⁽¹¹⁸⁾ Wedderburn, A. (ed.), Continuous shift systems, Office for Official Publications of the European Communities, Luxembourg, 1998 (<http://www.eurofound.europa.eu/pubdocs/1998/02/en/1/ef9802en.pdf>).

Workers should be involved in the planning and decision-making process concerning shift rotas.

Important to note

5.4.8. Appropriate modes of behaviour in critical situations

If the analysis of the working time system conducted with reference to the key questions shows that there is an enhanced risk or that a knock-out criterion is fulfilled, the working time system must be checked with respect to possible changes. For this purpose, the person responsible for the organisation of working hours should be approached and this should be pointed out. Alternative duty rosters should be developed.

5.4.9. Most important knowledge and conclusion

Shift work is absolutely necessary and an essential prerequisite for the functioning of the health sector. Yet shift work and particularly night work has serious consequences for social life, particularly for the family and for health. To avoid or at least to attenuate the deleterious effects of shift work a great number of countermeasures have been developed. To avoid negative outcomes shift schedules should recognise, on one hand, the available technical and organisational measures, and, on the other, the medical measures, treatment for accelerated adjustment and personal behaviour.

12 Good work rota design is a relief for the whole department.

Nachtdienst	22.08.2005 - 14:30
erledigte zeigen	23.08.2005 - 08:30
überfällige zeigen	
Behandlungspflege	28.08.2005 - 08:30
Bilanzierung	03.09.2005 - 08:30
Diabeteseinstellung	
Fixierung	03.09.2005 - 10:00
Grundpflege	03.09.2005 - 21:00
Individuell	
Inkontinenzversorgung	05.09.2005 - 08:30
Lagerung	
Medikamentgabe	05.09.2005 - 08:30

5.5. Drug abuse

Workers of all social classes are confronted with a host of addictions, be it as the colleagues of an addict or possibly as the person affected. Addicts not only damage their own health but represent an increased accident risk for everyone. Addiction problems often arise from the inability to cope successfully with problems. Finding a way out of this vicious circle requires some effort (also at work).

5.5.1. Nature of the risk dealt with

Drug abuse describes the regular consumption of substances leading to physical or mental dependence. As a result of consumption, a rise in tolerance will develop in the long term.

Drug abuse

Drug abuse is the excessive consumption of substances such as alcohol, nicotine, drugs or medication, regardless of whether dependence exists or not (see 'Alcohol abuse', below). In the case of addictions not related to substances (e.g. gambling addiction, eating disorders, workaholism) it is necessary to control one's behaviour but abstinence is not possible because the behaviour cannot be completely stopped.

The term 'alcohol abuse' is used when a person consumes an ever greater amount of alcohol and going without alcohol results in withdrawal symptoms.

Alcohol abuse

The traffic light model of the WHO describes the process of the addiction development with alcohol on the basis of consumption patterns.

- Green phase: low-risk consumption = Everything is OK, responsible consumption of alcohol, low health risk.
- Yellow phase: risky, damaging consumption = Warning! be careful, high health risk, risk of addiction increases with the duration of consumption and quantity of alcohol.
- Red phase: addictive consumption risk = Stop!, addiction has occurred, look for help, stop the consumption of the addictive substance.

However, in addition to the level of consumption of the substance, there are other factors influencing the development of an addiction (including the individual mental and physical condition of the person, learning processes, experience in the family and circle of friends).

5.5.2. Basic criteria for a specific risk assessment

The basis for assessing the risk potential or abuse potential is normally the intensity of substance use. First and foremost this generally concerns substances such as tobacco, alcohol or medications. There are no concrete figures available for the proportion of persons affected or at risk in hospitals and the nursing domain. It is known, however, that there are special withdrawal clinics for medical professionals. As far as nicotine consumption is concerned, the proportion of smokers among workers in the hospital and nursing domains is considerably higher than in the average population.

Key questions on ‘drugs’

Mark the work features which apply to your facility, ward, residential area or department. Calculate the total of ‘applies’ answers and enter this in the last line!

Work features	Applies	Does not apply
1. Is there no mention in your facility of the subject of drug or medication abuse or alcoholism?	<input type="checkbox"/>	<input type="checkbox"/>
2. Are there workers in your facility who have a problem with drugs or medications?	<input type="checkbox"/>	<input type="checkbox"/>
3. Are drugs such as alcohol or medications easily or freely available (e.g. in the canteen)?	<input type="checkbox"/>	<input type="checkbox"/>
4. Employees affected in your facility cannot turn to anyone.	<input type="checkbox"/>	<input type="checkbox"/>
5. There are no offers of individual consumption control in your facility (stop-smoking courses, ‘drink less’ programmes).	<input type="checkbox"/>	<input type="checkbox"/>
6. Are there social tensions and conflicts in the working groups in your facility?	<input type="checkbox"/>	<input type="checkbox"/>
7. There is no support from supervisors in your facility.	<input type="checkbox"/>	<input type="checkbox"/>
8. Were the managers not or inadequately trained in the subject of ‘Addiction’?	<input type="checkbox"/>	<input type="checkbox"/>
9. Are subjects like welfare, educational and progressive talks unknown in your facility?	<input type="checkbox"/>	<input type="checkbox"/>
10. Were no health circles set up in your facility?	<input type="checkbox"/>	<input type="checkbox"/>
11. Are addiction prevention measures unknown in your facility?	<input type="checkbox"/>	<input type="checkbox"/>
12. Is there no stress and/or conflict management in your facility?	<input type="checkbox"/>	<input type="checkbox"/>
13. Does no one in your facility know what to do with an employee who is affected?	<input type="checkbox"/>	<input type="checkbox"/>
14. Are the signs of drug abuse unknown in your facility?	<input type="checkbox"/>	<input type="checkbox"/>
15. Is the subject of illegal drugs not mentioned in your facility?	<input type="checkbox"/>	<input type="checkbox"/>

Total

No risk	Elevated risk	High risk
1 to 5 features ticked	6 to 10 features ticked	11 to 15 features ticked
Need for action with individual features	Design and screening analyses recommended	Design and screening analyses urgently necessary

5.5.3. Work situations with the greatest exposure

It can be assumed that the greatest probability of alcohol and drug abuse can be expected in areas with a high stress potential and poor social support by supervisors and colleagues. In addition to the workplace-related influencing factors, personal living conditions must not be neglected. It is therefore particularly important to include, through good leadership behaviour, the interface between work and private life (work-life balance) in the risk assessment.

The use of alcohol and drugs must be considered in connection with stress exposure and the lack of coping strategies.

As far as smoking in clinics and homes is concerned, the smoking break is often the only opportunity to 'come to rest'. Dependable break periods would be a work organisation measure which could be taken to positively influence tobacco consumption. In Germany, more and more hospitals are committed to the prevention of tobacco consumption. The label 'smoke-free hospital' is gaining steadily in prestige.

A problem in hospitals concerning drug abuse is that pharmaceutical drugs are easy for employees to obtain, due to their work. This might lead to temptation to use sedatives or amphetamine when work-load is high.

5.5.4. Effects on health and safety

The consequences of alcohol and drug abuse must be considered in a differentiated way according to the degree of dependence. Starting from restriction of performance and impairment of the general state of health through to massive damage to health, different gradations are observed.

5.5.5. General preventive and protective measures

In general, the individual resources for dealing with load-intensive situations should be improved. This concerns both those loads which arise from the work organisations and burdensome working conditions, and those situations which arise in connection with bullying or violence at the workplace. Frequently immoderate drug consumption is also the consequence of bullying at the workplace. In general, the risk will be reduced by reinforcing self-esteem and improving coping strategies.



5.5.6. Specific preventive techniques and procedures

- Progressive talks
- Consistent approach by supervisors and colleagues in conjunction with concrete offers of help which prompts those affected to change their behaviour.



5.5.7. Appropriate modes of behaviour in critical situations

For example, 'How can I help my colleague over alcohol?'

- Say as accurately as possible what changes you have noticed and that you assume the reason is an alcohol problem. (Possibly get advice about how to broach the subject beforehand).
- Communicate quite openly that you are extremely concerned and that you would like him or her to become the colleague they used to be.
- Encourage your colleague to contact an external support centre.
- Remain a colleague and express your concern about their behaviour. Speak to the person involved — not about them. Do not assume the role of a doctor or therapist.
- Regard any possible dependence as an illness and the resultant conduct as illness-related. However, do not cover up or conceal the person's misconduct. Do not take over any work from them or protect them from the consequences of their misconduct.
- Only the addicts themselves can do anything about their problem.
- If you want, repeatedly offer to talk to the person but do not turn the problem into your own.
- If no change occurs, consult the supervisor, the staff support office, the works or staff council or an external staff advisory centre.

For supervisors: Refer to the use of a guideline on the conductance of progressive talks.

5.5.8. Most important knowledge and conclusions

When you have determined and assessed the risk, you can create an overview using the following table. Enter the totals determined and mark the corresponding red, yellow or green boxes.

Important to note

Psychosocial risks	Total determined	Risk		
		None	elevated	high
Stress		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Burnout		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mobbing		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Working hours*		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Violence		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drug abuse		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
* Note: If a knock-out criterion applies, remedial measures are essential!				

From the table it is possible to establish focal areas. Figures in the red area involve an urgent need for action. In the yellow area measures are recommended. In the green area it should be considered whether changes would be desirable for the individual features.

The ranking of the measures should be established in collaboration with the institution's management and the workers. Here, the chances of realisation can be discussed. Furthermore, deadlines and areas of responsibility for implementation should be specified.

If changes are made to the organisation (e.g. due to mergers or reorganisation), the psychosocial risks should be reviewed. New managers or technical changes/innovations can also have an impact on the psychosocial risks.

The implementation of measures should be reviewed after one or two years.

Work situations with potentially high exposure to psychosocial loads include:

An unfavourable work organisation with, for example, work peaks, pressure of time, problems in working together with colleagues, inefficient materials purchasing, overdocumentation and unclear areas of responsibility. Additional factors are:

1. deficient information and communication; poor communication frequently leads to social conflicts between workers; hierarchical forms of dealing with people in a hospital may intensify these conflicts;
2. problems in collaboration between the different occupational groups;
3. lack of involvement of the workers;
4. frequent, short-term changes in the duty roster;
5. lack of worker orientation on the part of the superior;
6. burdensome working hours (e.g. a large amount of overtime and standby duty in the medical service);
7. insufficient consideration of individual wishes in the organisation of working hours arising, for example, from specific private obligations;
8. dealing with difficult situations and patients;
9. contradictory requirements (discrepancy between working goals and working conditions, e.g. with the implementation of active nursing combined with a very great pressure of time).

High physical loads, such as repeatedly lifting and carrying patients, accelerate the experience of stress and mental fatigue, and may result in burnout in the long term. In the healthcare system, and especially in nursing, measures to reduce psychosocial and physical risks are required at the same time in the risk assessment to maintain and promote the health of the workers.

5.6. Relevant European Union directives

1. Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work ⁽¹¹⁹⁾
2. Council Directive 92/85/EEC of 19 October 1992 concerning the implementation of measures to encourage improvements in the safety and health of pregnant workers, workers who have recently given birth and women who are breastfeeding ⁽¹²⁰⁾
3. Council Directive 93/104/EC of 23 November 1993 concerning certain aspects of the organisation of working time ⁽¹²¹⁾
4. Directive 2000/34/EC of the European Parliament and of the Council of 22 June 2000 amending Council Directive 93/104/EC concerning certain aspects of the organisation of working time to cover sectors and activities excluded from that directive ⁽¹²²⁾

Other European Union instruments:

European social dialogue: Framework agreement on harassment and violence at work from April 2007

<http://osha.europa.eu/data/links/framework-agreement-on-harassment-and-violence-at-work>

European social dialogue: Framework agreement on work-related stress

http://www.etuc.org/IMG/pdf_Framework_agreement_on_work-related_stress_EN.pdf

⁽¹¹⁹⁾ OJ L 183, 29.6.1989, pp. 1–8.

⁽¹²⁰⁾ Council Directive 92/85/EEC of 19 October 1992 on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding (tenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 348, 28.11.1992, pp. 1–8.

⁽¹²¹⁾ OJ L 307, 13.12.1993, pp. 18–24.

⁽¹²²⁾ OJ L 195, 1.8.2000, pp. 41–45.

5.7. Description of good company practice

5.7.1. Interview with Havelland Clinics, Nauen, on psychosocial risks

In this interview Dr Babette Dietrich, spokeswoman of the management of the Havelland Clinics in Nauen, presents the prevention measures to avoid psychosocial risks in her establishment.



Dr Babette Dietrich, spokeswoman of the management of the Havelland Clinics, Nauen.

Interviewer: How many hours do you work per week?

Dr Dietrich: The average maximum number of working hours is 40.

Interviewer: Are there permanent night watches?

Dr Dietrich: We have one night watch otherwise a rolling rota.

Interviewer: Can break times be observed?

Dr Dietrich: In principle, yes.

Interviewer: Is on-call duty followed by a rest period?

Dr Dietrich: No duty lasts longer than 24 hours plus a 45-minute break.

Interviewer: How long is the rest period?

Dr Dietrich: At least 11 hours; in one clinic there is a stand-by service model where the rest period is shortened in line with the law on working hours.

Interviewer: Are work shifts exchanged internally?

Dr Dietrich: Yes.

Interviewer: Are there major discrepancies between the work rota as it is at the start of the month and the 'actual' rota?

Dr Dietrich: There are differences between the planned and actual rotas which we do not view as serious. The planned rota is made two months prior to the start of the rota.

Interviewer: Who is responsible in your establishment for planning the rotas?

Dr Dietrich: The managers of the nursing departments (50 to 120 employees in each case) and the physicians in charge of the clinics.

Interviewer: Are the workers included in the planning?

Dr Dietrich: Yes.

Interviewer: What assistance do you offer employees who are affected by burnout?

Dr Dietrich: Psychological support. In the case of a longer period of incapacity to work, talks with those returning to working life and reintegration according to the Hamburg model.

Best practice

Interviewer: What measures have proved successful in your establishment for the prevention of burnout?

Dr Dietrich: We offer regular further training courses on burnout prophylaxis, relaxation techniques and time management. We also offer talks between employees and supervisors.



Interviewer: If one of your staff is physically attacked, is it possible to have after-care consultation in your establishment (also for the entire team)?

Dr Dietrich: Supervision and after-care consultation are offered to both individuals and teams.

Interviewer: Are critically aggressive situations documented?

Dr Dietrich: These are documented in the patients' files.

Interviewer: Are communication seminars and de-escalation training courses offered in your establishment?

Dr Dietrich: Seminars are regularly held on the subjects of communication, dealing with conflicts and de-escalation training.

Interviewer: What do you see as the causes of stress in your establishment?

Dr Dietrich: The intensification of work, partially due to tight human resources and a fast renewal rate (e.g. documentation) but also to in-house innovation and restructuring. This sometimes results in uncertainties about one's own and others' responsibility and tasks (What is expected of me? Who is now responsible for what? Who is the person I can talk to?). Owing to competitive pressure too many projects are initiated too quickly without thorough planning of the objectives, resources and sequence.

Interviewer: What have you done so far in your establishment to counteract stress?

Dr Dietrich: Measurements of inappropriate physical and mental load situations as part of a project conducted in cooperation with a university, regular recording of the work volume in on-call service, the introduction of new working time models, reflection as part of employee/supervisor talks, team training courses, a definition of quality standards as well as the optimisation of workflows, and we have extended the project management. We are trying to prevent stress through a good work organisation with clear, written explanations in the organisation manual and a clear description of work processes and workflows. The organisational measures are implemented as a joint and binding guideline. One to two years later a date is set for a review and updating of the measures. The group sisters or the nursing department managers are responsible for the implementation of the measures. One person in quality management is appointed to ensure the dates are kept. The hospital management ensures the necessary binding nature of the measures by putting them into effect and approving the check reports on the implementation of the measures.

Interviewer: What measures have you planned for the future to prevent stress?

Dr Dietrich: Expansion in the sense of the application everywhere of existing tools. We also want to maintain an atmosphere in the establishment which prevents the issue from becoming taboo and to conduct another staff survey.

Interviewer: Is the abuse of drugs and medication openly discussed in your establishment?

Dr Dietrich: Yes, but it rarely happens. We have an addiction ward.

Interviewer: What help do you offer employees who are affected?

Dr Dietrich: Talks with the HR department, possibly with the inclusion of the supervisors and the works council. Staff in the psychiatric department are available for advice/consultation.

Interviewer: Who can employees affected turn to?

Dr Dietrich: Supervisors, the works council, the psychiatric department and the social services.

Interviewer: How do you intend to deal with drugs and medication abuse in your establishment in the future?

Dr Dietrich: There is a book of instructions on how to handle drugs in order to also prevent any possible consumption by the employees.

5.7.2. Interview with St Elisabeth Hospital, Tilburg, on psychosocial risks

In this interview, Ms Christel van Neerven, head of the occupational health and safety department, and Ms Monique Pullen, adviser on occupational health and safety, describe the measures to prevent psychosocial risks in the St Elisabeth Hospital, Tilburg, the Netherlands.



Christel van Neerven, head of the occupational health and safety department.



Monique Pullen, adviser on occupational health and safety.

Interviewer: Are there special in-house rules or regulations for dealing with different kinds of acts of aggression?

Ms Pullen: There are house rules. They have been recently updated and they still have to be agreed by the management and the works council. We observe more aggression and violence these days. Our approach is to have clear house regulations on how to communicate in a correct way with each other and the patients to prevent acts of aggression. We are working on a policy on communication and personal interaction, including a high level of customer friendliness. Our experience is that, after training employees in the polyclinic in being more customer friendly, we observed a lower rate of customer aggression. In this policy on the house rules, we address how we work together, with respect, and how we interact with patients. The policy will be implemented by the end of the year and afterwards training measures will start, including

training employees and team leaders. The basis is always how to deal with each other in a respectful way. We also advise and train people to clearly express what they can tolerate and what not and what they can do about it. We think it's important that our employees know their own limits and that they can communicate them.

Interviewer: Are there specific contact persons for cases of bullying, aggression or acts of violence in your organisation?

Ms Pullen: Employees can contact the company social worker or a confidential consultant. But the first contact person is always the team leader and head of department. We also have an external 'person of trust' (with a background in social work) employees can contact, for example if they have problems with their team leader. However, the usual way is that they contact the team leader. If they cannot talk to the team leader, they can also talk to the head of department or the next highest manager.

Interviewer: What measures for preventing burnout have you taken?

Ms Pullen: We're trying to measure it in vitality research. Issues of occupational health and safety are addressed at regular meetings between the occupational physician, the head of department and HR advisor. They talk about general measures as well as individual cases. For example, they reorganised the work on one ward.

Interviewer: In the case of physical attacks, can the employees receive prompt assistance from colleagues/superiors or from other people (e.g. security service, caretaker, porters)?

Ms Pullen: Yes, from colleagues, the team leader, the head of department and also security. Employees can call security. In some cases the security has to call the police. It is also registered afterwards that the patient caused problems and future access to the hospital can be denied.

Interviewer: If there is an attack, is there a possibility of after-care consultation in your establishment, including for the whole team?

Ms Pullen: Yes, by the team leader, head of department and/or colleagues. If more help is needed, there is the possibility of contacting the occupational physician and social worker.

Interviewer: Do you have guidelines or an agreement in your department on how to deal with aggressive patients?

Ms Pullen: It is in preparation. The contents will include aspects such as asking a colleague to assist and informing security and the head of department. Talking about the incidents afterwards in the department and discussing how the situation can be handled in the future. And talking to the occupational physician if necessary, depending on how shocking the incident was for the employee.

Interviewer: Are communication seminars and de-escalation training offered in your establishment?

Ms Pullen: Yes, but they are not obligatory. Employees generally attend the seminars when an incident has already happened. We plan to communicate more in the future what can be done. We especially want to address the team leaders more frequently, informing them about the seminars which are available. Every year, we will inform the team leaders about health and safety issues. We will advise them on what they can do and remind them that they are obliged to guarantee occupational health and safety in their department.

5.8. Links

No	Title	Country/Region	Contents/Source
1.	Report — Prevention of psychosocial risk and stress at work in practice	EU-OSHA (European Agency for Safety and Health at Work)	Stress at work can happen in any sector and in any size of organisation, it can affect anyone at any level. http://osha.europa.eu/en/publications/reports/104
2.	Framework agreement on harassment and violence at work	EU social dialogue	Mutual respect for the dignity of others at all levels within the workplace is one of the key characteristics of successful organisations. That is why harassment and violence are unacceptable. http://osha.europa.eu/data/links/framework-agreement-on-harassment-and-violence-at-work
3.	Framework agreement on work-related stress	EU social dialogue	The aim of the agreement is to increase the awareness and understanding of employers, workers and their representatives of work-related stress and to draw their attention to signs that could indicate problems of work-related stress. http://www.etuc.org/IMG/pdf_Framework_agreement_on_work-related_stress_EN.pdf
4.	Working time Its impact on health and safety	International Labour Organisation	There is now substantial evidence that working time is becoming increasingly diversified among workers. The diversity of working time arrangements that are emerging — different shift patterns, more flexible hours of work, different statuses of employment, etc. — imply that traditional methods of organising and regulating employment are increasingly being challenged. http://www.ilo.org/travail/whatwedo/publications/lang--en/doc-Name--WCMS_TRAVAIL_PUB_25/index.htm
5.	The development of a fatigue/risk index for shiftworkers	United Kingdom	The fatigue/risk index is an instrument to measure the fatigue level of employees, it was specially developed for shiftworkers. Research report. http://www.hse.gov.uk/research/rrpdf/rr446.pdf
6.	Managing shiftwork in European ATM: Literature review	Eurocontrol	The report represents the results of a feasibility study on managing shift work in European air traffic management. The document summarises available research results on employee health and social requirements, safety, performance and productivity/efficiency for shiftwork environments. http://www.eurocontrol.int/humanfactors/gallery/content/public/docs/DELIVERABLES/M27%20MSEA%20Literature%20Review%20Ed%201.0%20-%20Released-withsig.pdf
7.	Arbejdstilsynet: Workplace assessment checklists	DK	Danish Working Environment Authority report on new priorities for the working environment. http://www.at.dk/~media/AT/at/Engelsk-pdf/Andre-informationsmateriale/Future-working-environment%20pdf.ashx
8.	'Work-related health problems in the EU in 1998–99'	Eurofound/Eurostat	Eurostat is providing data concerning the different situations of European countries. The information is categorised by sector, language and country. http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-NK-01-017/EN/KS-NK-01-017-EN.PDF
9.	European Week 'Working on Stress' 2002	EU-OSHA (European Agency for Safety and Health at Work)	The European Week 2002 is an information campaign aimed at making Europe a safe and healthy place to work by promoting activities to reduce stress and work-related psychosocial risks. http://osha.europa.eu/en/campaigns/ew2002/about
10.	Factsheet 22 — Work-related stress	EU-OSHA (European Agency for Safety and Health at Work)	Work-related stress is experienced when the demands of the work environment exceed the employees' ability to cope with (or control) them. http://osha.europa.eu/en/publications/factsheets/22

No	Title	Country/Region	Contents/Source
11.	Factsheet 23 — Bullying at work	EU-OSHA (European Agency for Safety and Health at Work)	This factsheet gives information and suggestions for those wanting to take practical action to tackle bullying at work. (13.7.2009) http://osha.europa.eu/en/publications/factsheets/23
12.	Factsheet 24 — Violence at work	EU-OSHA (European Agency for Safety and Health at Work)	Violence at work is a significant cause of work-related stress. The further information section at the end of the factsheet gives details on Agency sources of assistance, including other factsheets. http://osha.europa.eu/en/publications/factsheets/24
13.	Factsheet 32 — How to tackle psychosocial issues and reduce work-related stress	EU-OSHA (European Agency for Safety and Health at Work)	More than one in four workers are affected by work-related stress in the European Union. http://osha.europa.eu/en/publications/factsheets/32
14.	Magazine 'Working on stress'	EU-OSHA (European Agency for Safety and Health at Work)	The implications are clear — work-related stress can cause people misery, both at work and at home, and significantly affect an organisation's bottom line. Therefore, there are many reasons to take action. http://osha.europa.eu/publications/magazine/5?language=de
15.	How to tackle psychosocial issues and reduce work-related stress	EU-OSHA (European Agency for Safety and Health at Work)	During recent decades, the labour market has been characterised by significant change: changed tasks, roles and jobs, flexibility in employment and production, horizontal organisations and delegation of management. This restructuring, together with changes in information technology and globalisation, gives rise to new challenges for organisations and individual workers. The changes take place all over Europe and are often followed by increasing problems such as work-related stress. http://osha.europa.eu/publications/reports/309
16.	'Risk assessment essentials'	EU-OSHA (European Agency for Safety and Health at Work)	How can I carry out a risk assessment? http://hwi.osha.europa.eu/about/material/rat2007
17.	Stress and psychosocial risks	EU-OSHA (European Agency for Safety and Health at Work)	This section of EU-OSHA's website provides up-to-date information on good health and safety practice with regard to stress at work. http://osha.europa.eu/good_practice/topics/stress
18.	Health and Safety Executive: Violence at work	United Kingdom	This document gives practical advice to help you find out if violence is a problem for your employees, and if it is, how to tackle it. http://www.hse.gov.uk/pubns/indg69.pdf
19.	COPSOQ: Copenhagen Psychosocial Questionnaire	Denmark, Germany and Spain	The COPSOQ Questionnaire is a screening tool to record mental loads and strains at work. 1. Link leads to the document: A questionnaire on psychosocial working conditions, health and well-being in three versions http://www.arbejdsmiljoforskning.dk/upload/english_copsoq_2_ed_2003-pdf.pdf 2. Link: Reference values of all the 21 psychosocial scales or dimensions (73 items) of the psychosocial risk assessment questionnaire COPSOQ ISTAS21 are computed from a representative sample of the wage-earning population in Spain http://www.scielosp.org/pdf/resp/v82n6/original3.pdf 3. Link: The German version of the questionnaire was developed on the basis of the Danish and English Copenhagen Psychosocial Questionnaire and tried out on a broad-based sample of 2 561 workers in 2003–04. http://www.copsoq.de
20.	NEXT Study	EU	The NEXT Study investigates the reasons, circumstances and consequences surrounding premature departure from the nursing profession. http://www.next.uni-wuppertal.de/EN/index.php?next-study

5.9. Literature

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Annex

In the following example tables the evaluation of the psychosocial risk, stress, is performed according to occupational groups, wards or residential areas. The occupational groups, wards or residential areas can be adapted to suit the designations in your establishment. Moreover, differentiation is possible, for example the doctors can be classified according to their specialisation.

The tables provide an overview of whether you have in your establishment;

- psychosocial problems;
- areas in which you may possibly have them
- what the focal areas are;
- where the most or greatest need for action could be.

The need for action can be derived from occupational health and safety measures. It may also involve you deciding in favour of the use of validated screening or expert procedures before you re-design the workplaces.

Occupational groups	Risk		
	None	elevated	high
1. Nursing staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Household management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Kitchen staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Doctors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Rescue staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Example Table 1: Greatest exposure according to occupational groups for stress.

Organisation unit/Activity areas	Risk		
	None	elevated	high
Intensive care unit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gynaecology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Example Table 2: Greatest exposure to stress by wards.

6

Chemical risks

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6.7.3. Specific prevention techniques and procedures

6.7.3.1. Activities with anaesthetic gases in operating theatres (and other surgical rooms)

6.7.3.2. Anaesthetic recovery rooms

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6.8. Activities involving substances which endanger reproduction

6.9. Relevant European Union directives

6.10. Description of good company practice

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6.10.2. Working safely with cytostatic drugs

6.11. Links

6.12. Literature

6.1. Introduction

01 Many employees in the health service have to work with hazardous substances.



Within the framework of the risk assessment, employers are obliged to assess the risks emanating from chemical substances ⁽¹²³⁾⁽¹²⁴⁾. An analysis of health service activities has revealed that activities involving work with the following substances, in particular, must be considered in the risk assessment:

1. cleaning and disinfectant agents;
2. anaesthetic drugs;
3. cytostatic/cytotoxic drugs;
4. substances which can endanger reproduction, especially certain pharmaceutical substances.

In addition to these substances and substance group, a host of other chemicals may play a role in the health service (e.g. solvents and other laboratory chemicals, surgical spirit, preservatives) which, however, are not discussed in further detail here. As part of a risk assessment, it should also not be forgotten that access to narcotics and drugs is considerably easier in the health service than in other professions (see also Chapter 5).

Some of the chemical substances mentioned above have toxic properties in relation to reproduction (see Section 6.8).

A number of specific problems arise in assessing the risks of chemical substances in the healthcare sector.

- **While classic dangerous substances are classified and marked as such, dangerous pharmaceuticals do not fall under the mandatory labelling provision of the European directives for dangerous substances. They are only classified and labelled according to the specifications of pharmaceuticals law. Therefore, the specific risks from such products are frequently not identifiable for workers. This is the case, for example, for anaesthetics, cytostatic drugs, other pharmaceuticals and as disinfectants.**
- **Hygiene measures often demand the use of chemical disinfectants and cleaning agents. Consideration has to be frequently given to the various risks: the increased use of chemicals may mean a reduction in the risk of infection but also an increased chemical risk.**
- **Working sequences aimed primarily at assisting patients may give rise to a risk for workers if worker protection is neglected in favour of the speed of the working sequences (e.g. in an operating theatre or casualty ward).**

⁽¹²³⁾ Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, OJ L 183, 29.6.1989, pp.1–8.

⁽¹²⁴⁾ Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC, OJ L 131, 5.5.1998, pp. 11–23.

The aim of this chapter is to describe the typical risks which arise when handling dangerous substances in the health service, to discuss the methods of risk assessment and to present the major protective measures for selected activities involving dangerous substances.

6.2. Nature of the risk dealt with: Special risks attributed to dangerous substances and preparations

Under European law on dangerous substances, such as Council Directive 67/548/EEC, dangerous substances are substances and preparations which display one or more of these properties — also known as danger features ⁽¹²⁵⁾.

Toxic risks	Physicochemical risks	Ecotoxic risks
Very toxic	Explosive	Dangerous for the environment
Toxic	Fire-enhancing	
Harmful	Extremely flammable	
Corrosive	Highly flammable	
Irritant	Flammable	
Sensitising		
Carcinogenic		
Toxic to reproduction		
Mutagenic		
Otherwise chronically harmful		

Substances with the properties mentioned which only arise in the mixture of chemicals or during the use of substances, preparations or products may also be dangerous substances, for example particulates which are produced when grinding work pieces in a dental laboratory.

Important to note

Dangerous substances also include other dangerous chemical agents according to Article 2b of Directive 98/24/EC ⁽¹²⁶⁾. Examples of agents with other chemical/physical properties are nitrogen (asphyxiating), dry ice (extremely cold), steam (hot) and compressed gases (elevated pressure).

6.3. Basic criteria for assessing chemical risks

When determining and assessing the risk from dangerous substances, the following steps must be taken:

1. collection of information on the substances, preparations and products used;
2. determination of the dangerous substances and the substances with unknown or inadequately known properties;
3. testing of the use of substitute procedures and substitute substances;
4. determination of the extent, nature and duration of exposure taking account of all exposure paths;
5. assessment of risks;

⁽¹²⁵⁾ Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances, OJ 196, 16.8.1967, pp. 1–98.

⁽¹²⁶⁾ Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC, OJ L 131, 5.5.1998, pp. 11–23.

6. implementation of protective measures taking into account the risk assessment;
7. effectiveness check (e.g. check of measures taken);
8. conclusions drawn from precautionary occupational medical examinations conducted.

Collection of information on the substances, preparations and products used

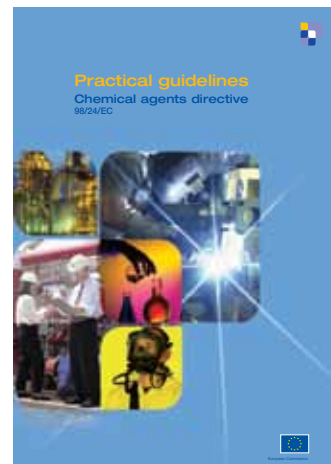
Classification of dangerous substances by the manufacturer

Manufacturers must classify dangerous substances and preparations they bring onto the market, and package and label them in accordance with the classification. Substances which are exempted from mandatory labelling are, for example, medicinal products — ready-made medications and medical products (Article 1 of Council Directive 67/548/EEC).

Danger symbols and danger warnings, the R phrases (such as 'toxic if inhaled'), draw attention to the dangerous properties. The S phrases represent safety advice (such as 'don't inhale gases/smoke/steam/aerosol') (see figure). More detailed information on the R and S phrases is provided in the publication 'Practical Guidelines of a non-binding nature on the protection of the health and safety of workers from the risks related to chemical agents at work' ⁽¹²⁷⁾.



02 Reagents in medical laboratories are often designated as hazardous substances.



03 Publication 'Practical guidelines: Chemical Agents Directive 98/24/EC'.

In certain cases, one must apply markings oneself, for instance when dangerous substances and those subject to mandatory labelling are transferred from the manufacturer's container to other vessels and are stored in this form. Labels can be purchased from the specialist trade.

As a result of the introduction of a completely new global labelling and information system, the labelling system mentioned above will be superseded in the years to come. The 'global harmonised system' (GHS) will be used in a transitional phase (up to 2015 at the latest) parallel to the old labelling system and will slowly replace it. Further sources of information on the GHS system are provided in Section 6.11.

⁽¹²⁷⁾ European Commission, 'Practical Guidelines of a non-binding nature on the protection of the health and safety of workers from the risks related to chemical agents at work, Part I', Office for Official Publications of the European Communities, Luxembourg, 2006 (ISBN 92-894-9651-7).

Safety data sheets

Safety data sheets supplement the labelling. They provide detailed information from the manufacturer on the properties of the product and the related dangers. The data sheets should be as up to date as possible and the latest versions can be requested from the manufacturer or supplier. If all safety data sheets are available for the products, this already satisfies a major portion of the information determination. Workers must have access to all safety data sheets (Article 8 of Directive 98/24/EEC ⁽¹²⁸⁾).

If additional information is required to assess the risk, it may be demanded of the manufacturer. And for agents which have no safety data sheet, such as ready-made medications and medical products, appropriate information must be provided on request. Some manufacturers supply safety data sheets for these substances on a voluntary basis. For ready-to-use medications, pharmaceutical information is also available, describing their properties and effects, albeit with respect to therapeutic use.

Check of substitute substances ⁽¹²⁹⁾⁽¹³⁰⁾

The employer must ensure that the risk to worker health and safety caused by a dangerous substance at work is eliminated by the measures laid down in the risk assessment or is reduced to a minimum. In order to fulfil this obligation, the employer must preferably replace activities involving dangerous substances or the dangerous substances themselves with procedures and substances, preparations or products, respectively, which are not dangerous or less so to the health and safety of workers under the relevant conditions of use. If a possible replacement is waived, the reasons for this must be given in the risk assessment documentation.

Even if the check of substitute substances and alternative procedures can only be conducted to a limited extent in medical care facilities owing to therapeutic freedom and hygiene regulations, it must be pointed out that workers may not be exposed to dangerous substances. High-emission procedures must be checked prior to their application with respect to the process engineering and form of application. A check must be made as to whether the objective cannot be achieved by less dangerous forms of application.

The result of the deliberations on a check of substitute substances and alternative procedures must be documented in accordance with national regulations and, where relevant, submitted to the competent authorities on request. It makes sense to fulfil this documentary obligation in medical care facilities on a procedure or substance-related basis, for example for:

- the selection of disinfectant, therapeutic and anaesthetic procedures;
- the introduction of new medications and disinfectants which may present a risk to workers.

A check must be made at regular intervals as to whether the result of the substitute substance check and the check of alternative procedures are state of the art.

Determination of the extent, nature and duration of exposure taking account of all exposure paths

Handling of products

In addition to the properties of the chemical substances or products, the precise handling of these products must be known to guarantee a diligent risk assessment according to Article 6 of Council Directive 89/391/EEC.

⁽¹²⁸⁾ Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC, OJ L 131, 5.5.1998, pp. 11–23.

⁽¹²⁹⁾ Articles 5 and 6 of Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC, OJ L 131, 5.5.1998, pp. 11–23.

⁽¹³⁰⁾ Article 4 of Council Directive 2004/37/EC of the European Parliament and of the Council of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work (Sixth individual Directive within the meaning of Article 16(1) of Council Directive 89/391/EEC (codified version) (Text with EEA relevance), OJ L 158, 30.4.2004, pp. 50–76.

- Are the products used as supplied in the packaging or are they modified and, for example, diluted (e.g. as with disinfectant concentrates)?
- Are there special preparatory steps (e.g. handling with higher concentrations) which have to be taken into account when assessing exposure?
- Are there follow-up steps, such as the cleaning of tools?

The nature of the product used and of the special procedure influences the nature of the exposure path and hence of the exposure.

Inhalation exposure path

With the open handling of volatile substances such as solvents or anaesthetic gases, the **inhalation exposure path** may be of major significance. Inhalation exposure is determined in occupational health and safety in the form of the concentration of a substance in the air at the workplace, mostly in the form of air measurements, but also with reference to comparisons with other workplaces (conclusions by analogy) or on the basis of qualified exposure estimates. The value determined can only be properly assessed if there is a related **air limit value** as an assessment criterion. At present, there are mainly national limit values.

⁽¹³¹⁾ Commission Directive 91/155/EEC of 5 March 1991 defining and laying down the detailed arrangements for the system of specific information relating to dangerous preparations in implementation of Article 10 of Directive 88/379/EEC, OJ L 76, 22.3.1991, pp. 35–41.

Dermal exposure path

With the open handling of low or non-volatile substances, such as special disinfectant agents, the **dermal exposure** often plays the greatest role.

The dermal exposure may arise due to various activities, such as the immersion of hands in chemical application solutions (e.g. cleaning solution), by contact with freshly painted/disinfected, still wet surfaces or by the wetting of the skin through spray (e.g. when spraying is used as a procedure). In contrast to airborne exposures, for which there are air limit values, there are no limit values for dermal exposure. However, taking the product classifications (R phrases), it is often possible to decide whether a dermal exposure can be at all admissible (e.g. with combustible fluids) or whether it must be avoided completely (e.g. with sensitising or corrosive substances).

⁽¹³²⁾ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, OJ L 396, 30.12.2006, pp.1–849.

When highly active substances are being handled, the **oral exposure path** can in rare cases play a role when the inhalation and dermal exposure paths are closely monitored.

Irrespective of the exposure path, biological monitoring offers the possibility of recording the absorption of substances into the body in the form of an integral value.

Important to note

The risk assessment of dangerous substances can, in many cases, be performed with the help of the data in the safety data sheets according to Directive 91/155/EEC ⁽¹³¹⁾ or more recently the Regulation (EC) No 1907/2006 ⁽¹³²⁾. Since pharmaceuticals, in particular, are supplied without a safety data sheet, it has proven useful to comply with the product manufacturer's warning indications, specialist information and instructions for use and to use other information sources. In cases of doubt, it is possible to inquire at the manufacturer.

6.3.1. Risk assessment



04 Work at histopathologic workplaces can lead to both dermal and inhalation exposure.

On the basis of the information determined for the substance-related risks from the products used and the nature of the planned activities, the inhalation, dermal and physicochemical dangers (fire and explosion dangers) involved must be assessed separately and subsequently combined in the risk assessment ⁽¹³³⁾⁽¹³⁴⁾.

The use of alcoholic cleaning agents may, for example owing to the rapid evaporation of the solvents, result in an intensive inhalation exposure which may be offset with the air limit values of the common alcohols (ethanol, 2-propanol etc.). At the same time, the high alcohol content of the cleaning agent may lead to a reduction in the skin fat and skin absorption unless action to protect the skin is taken. Furthermore, highly concentrated alcoholic products may represent a fire risk with consequences for specific protective measures in the handling and storage of the products. All these aspects are to be taken into account in the risk assessment of the specific alcoholic cleaning agent.

More detailed information on how to proceed with the risk assessment is provided in the publication 'Practical Guidelines of a non-binding nature on the protection of the health and safety of workers from the risks related to chemical agents at work'.

Inhalation, dermal and physicochemical hazards

Exposures of the skin (dermal exposures)

If skin comes into frequent contact with moisture, this can cause irritation and damage to the skin and will encourage the development of sensitisation (allergies). If the hands are subjected to a daily moisture exposure of several hours, it can be expected that damage will accumulate.

If liquid-proof protective gloves are worn without interruption or are used improperly, this can also lead to irritation and damage to the skin.

Exposure of the skin to moisture involves the greatest potential danger because it weakens the skin with respect to irritant or sensitising substances. Special attention must therefore be paid to trainees and ancillary personnel to ensure that unduly excessive moisture exposure does not arise.

Cleaning agents and disinfectants may cause irritation of the skin and sensitisation (allergies) if they frequently come into contact with the skin or are used in an improper fashion.

⁽¹³³⁾ Articles 4 and 5 of Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC, OJ L 131, 5.5.1998, pp. 11–23.

⁽¹³⁴⁾ European Commission, 'Practical Guidelines of a non-binding nature on the protection of the health and safety of workers from the risks related to chemical agents at work, Part I', Office for Official Publications of the European Communities, Luxembourg, 2006 (ISBN 92-894-9651-7).

Exposures of the respiratory tract (inhalation)

The production of volatile products and the use of sprays can lead to exposure of the respiratory tracts due to vapours and/or aerosols.

Moreover, nanoparticles, i.e. particles with a diameter of less than 0.1µm, may occur in some activities/procedures (Table 6.1).

Studies have shown, however, that where alcoholic disinfectants are used, as is usual in the particular sector, there is no need to fear that air limits for alcoholic constituents (e.g. ethanol, 2-propanol) will be exceeded.

Table 6.1: Activities in the healthcare sector where nanoparticles may occur

Activity/Procedure	Process
Laser surgery	Pyrolysis of muscles, fat etc.
Use of electrocauters	Pyrolysis of tissue
Moxibustion as part of traditional Chinese medicine (TCM)	Pyrolysis of spices (mugwort)
Use of sprays	Production of non-volatile spray residues

Exposures to substances (fire and explosion dangers)

The use of alcoholic disinfectants and solvents (e.g. surgical spirit as well as laboratory chemicals), keeping them in display stands in sales rooms (e.g. at dispensing chemists) and their stocking or storage can considerably increase the fire risk in the working domain or in the rooms concerned. This also applies to all aerosol packaging (spray cans) where an easily or highly inflammable propellant is used (e.g. propane or butane).

Risk evaluation

Following the determination of the type and level of chemical exposure present, the employer must assess the risk for the health and safety of the workers and take adequate protective, preventive and monitoring measures in accordance with Articles 6, 7 and 10 of Council Directive 98/24/EC. Detailed notes on the risk assessment are contained in the practical guidelines to Directive 98/24/EC (Section 1.2) for fire and/or explosion risks and risks from hazardous chemical reactions as well as for risks through inhalation, dermal absorption and ingestion.

The exposure of the employees to airborne substances in the respiratory air may be measured in many cases, but not with all substances, by a comparison with an air limit value (see Directive 98/24/EC (Article 3 and Annex I); Directive 2004/37/EC (Annex III); Directive 2000/39/EC and Directive 2006/15/EC).

In addition to the occupational exposure limits (OELs) initiated at European level, the respective national limit values are of importance for an assessment. Table 6.2 contains some OELs for substances which are relevant to the healthcare sector.

However, it should also be remembered that in many work situations prolonged exposures to substances at a very low level exist for which no limit value can be established owing to their effect (e.g., carcinogenic, mutagenic, reprotoxic (CMR) effect). In these cases it is especially difficult to assess the consequences of the 'long-term and low-dose exposure'.

EG-No	CAS-No	Agent	OEL (mg/m ³)	
			8 hours	Short term
200-659-6	67-56-1	Methanol	260	–
203-625-9	108-88-3	Toluene	192	384
204-696-9	124-38-9	Carbon dioxide	9 000	–
231-959-5	7782-50-5	Chlorine	–	1.5
200-467-2	60-29-7	Diethyl ether	308	616
200-662-2	67-64-1	Acetone	1 210	–
215-535-7	1330-20-7	Xylene, all isomers pure	221	442
231-595-7	7647-01-0	Hydrogen chloride	8	15
231-633-2	7664-38-2	Phosphoric acid	1	2
247-852-1	26628-22-8	Sodium azide	0.1	0.3

6.4. General preventive and protective measures ⁽¹³⁵⁾⁽¹³⁶⁾: Implementation of protective measures taking into account the risk assessment

6.4.1. Protective measures ⁽¹³⁷⁾⁽¹³⁸⁾

When it comes to preventing worker exposure to dangerous substances (especially with CMR and sensitising properties) and to wet work, technical protective measures have priority over organisational protective measures, and these in turn over personal action. All technical and organisational facilities must be used to prevent contact with the skin or the respiratory tract.

Technical protective measures basically help to prevent worker contact with dangerous substances or to restrict it to a low level. They include the use of closed automatic cleaning, disinfection or sterilisation machines, technical ventilation systems and local extractors and emission-free transfer systems in the manufacture of cytostatic drugs ⁽¹³⁹⁾.

The **organisational measures** include separation of activities involving exposure to dangerous substances from any form of food intake as well as the separation of working clothing and protective clothing or the establishment of certain cleaning or skin protection plans.

The **personal protective measures** include, for example, the selection and use of protective gloves, protective overalls, goggles or respiratory masks. The use of personal protective equipment is necessary when a particular danger for workers remains, after taking the necessary technical or organisational measures, for example due to values in excess of air limits or to possible skin contact with substances which are a danger to skin. Personal protective equipment must be suitable for protecting against the actual risks ⁽¹⁴⁰⁾. For example, protective gloves must have an appropriate form and material

Table 6.2: Occupational exposure limits (OEL) from European Union directives

⁽¹³⁵⁾ Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, OJ L 183, 29.6.1989, pp. 1–8.

⁽¹³⁶⁾ Articles 4 to 8 of Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (14th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC, OJ L 131, 5.5.1998, pp. 11–23.

⁽¹³⁷⁾ Articles 5 to 8 of Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC, OJ L 131, 5.5.1998, pp. 11–23.

⁽¹³⁸⁾ Article 5 of Council Directive 2004/37/EC of the European Parliament and of the Council of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work (Sixth individual Directive within the meaning of Article 16(1) of Council Directive 89/391/EEC) (codified version) (Text with EEA relevance), OJ L 158, 30.4.2004, pp. 50–76.

⁽¹³⁹⁾ European Commission, 'Practical Guidelines of a non-binding nature on the protection of the health and safety of workers from the risks related to chemical agents at work, Part I; Office for Official Publications of the European Communities, Luxembourg, 2006 (ISBN 92-894-9651-7).

⁽¹⁴⁰⁾ Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, OJ L 183, 29.6.1989, pp. 1–8.

thickness and the material must be adequately resistant to chemicals. Disposable medical gloves are normally not suitable as protective gloves when it comes to handling chemicals. Personal protective equipment must satisfy the requirements of Council Directive 89/686/EEC ⁽¹⁴¹⁾.

Occupational medical measures, such as precautionary examinations, may also be necessary if existing air limit values or biological limits are exceeded when activities are in progress ⁽¹⁴²⁾.

05 Cleaning/disinfecting machines reduce the exposure of staff (left).



06 The correct lead-over systems can virtually eliminate exposure (right).



07 Changing in a sluice prevents contamination being carried in (left).



08 Expansive personal safety equipment for preparing chemotherapeutic agents. This serves to protect both people and products (right).



⁽¹⁴¹⁾ Council Directive 89/686/EEC of 21 December 1989 on the approximation of the laws of the Member States relating to personal protective equipment, OJ L 399, 30.12.1989, pp. 18–38.

⁽¹⁴²⁾ Article 10 of Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 131, 5.5.1998, pp. 11–23.



09 It is easier for staff to comprehend complex operational procedures if they can see them in front of them in writing.



10 Regular instruction sessions help to keep staff focused on the work procedures and action relevant to safety.

6.4.2. Provision of information/instruction to workers

Workers who perform work with dangerous substances must be given instruction on the dangers which arise and on the protective measures (including those relating to sensitising agents and wet work) ⁽¹⁴³⁾. The courses of instruction must be adapted to suit the risk assessment, and they must be conducted prior to employment and subsequently as required, e.g. at least once a year orally and in relation to the specific workplace. Where appropriate to the risk established, the subject matter and the date/time of the courses must be recorded in writing and confirmed by the signature of those receiving instruction.

The information to be given to workers should, in many cases, be provided in written form, for example as a set of operating instructions in which the dangers which arise for people and the environment from activities with dangerous substances as well as the necessary protective measures and rules of conduct are specified (including those in relation to wet work). In such cases the operating instructions should be formulated in an easily comprehensible way and in the language of the workers, and they should be posted at a suitable location at the workplace. The operating instructions should also contain instructions on how to respond in the case of danger and on first aid ⁽¹⁴⁴⁾.

The subject matter of the course covers the topics which may be the subject of the operating instructions mentioned. Furthermore, the following topics have to be dealt with:

⁽¹⁴³⁾ Article 8 of Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC, OJ L 131, 5.5.1998, pp. 11–23.

⁽¹⁴⁴⁾ Article 7 of Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (14th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 131, 5.5.1998, pp. 11–23.

- indications regarding new or modified operating procedures, operating systems, work equipment, dangerous substances, working methods and occupational health and safety regulations;
- conclusions drawn from current skin and respiratory tract reactions, including slight ones, among workers (e.g. reddening of the skin) which may be due to occupational reasons.

In addition to the instruction given, the employer must monitor the proper application of protective, cleaning and care measures. The employer should call on workers to point out any health dangers specific to the company and to suggest protective measures.

6.4.3. Monitoring the effectiveness of measures

Where national limit values exist for agents in use, the employer must demonstrate that the protective measures taken are suitable for ensuring compliance with these limits ⁽¹⁴⁵⁾. Where he or she is unable to refer to other assessment methods, such as drawing conclusions by analogy from risk assessments published or qualified calculation and estimation procedures, measurements have to be conducted.

11 Cleaning/disinfecting work can pose a danger to staff, patients and visitors.



6.5. Cleaning and disinfection work

Cleaning and disinfection work is among the most widely encountered standard activity in the health system and it has to be performed by many workers. It is often not possible to differentiate between cleaning and disinfection operations because, for example, disinfectant cleaning agents can also be used when treating surfaces. In this chapter we will therefore talk about disinfectants and disinfection procedures, but the statements made can also be applied in their entirety to cleaning agents and procedures and to mixed forms of cleaning and disinfection.

The following disinfection procedures may subject workers to exposures.

Cleaning and disinfection work in the healthcare sector is performed more or less intensively by different occupational groups. On the one hand, minor cleaning and disinfecting work is frequently part of the work of medical doctors and nurses, for example in the case of therapeutic or nursing activities (e.g. the disinfection of hands and skin, surface disinfection and instrument disinfection).

⁽¹⁴⁵⁾ Article 6 of Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC, OJ L 131, 5.5.1998, pp. 11–23.

On the other hand, cleaning workers have to perform cleaning tasks over the whole day, such as surface disinfection, cleaning of sanitary facilities and bed disinfection, where additional loads (e.g. through biological effects, heavy lifting and carrying, wet work) may arise in addition to the chemical effects.

Kind of disinfection	Exposure
Surface disinfection (scrubbing/wiping disinfection)	Surface disinfection may give rise both to inhalation exposures to volatile agents (e.g. aldehydes, alcohols, phenol derivatives) and to intensive skin contact on the hands and arms.
Instrument disinfection	This may lead to inadmissible indoor air concentrations if manual disinfection is applied, and also with ultrasonic baths cleaning or the use of open vats.
Hand and skin disinfection	In the case of hand or skin disinfection, mostly highly concentrated alcoholic disinfectants are used which lead to an inhalation exposure to ethanol and propanols.
Spray disinfection	In spray disinfection, greater indoor air concentrations of disinfectant components arise compared with disinfection by scrubbing/wiping. Since large quantities of aerosols arise in this case, even non-volatile agents can pass into the respiratory system.
Room disinfection	During room disinfection with formaldehyde (gassing, atomisation) very high concentrations of formaldehyde arise due to the procedure. Since it is not possible to completely seal off the room being disinfected, indoor air concentrations can arise outside the room which are partly above the work hygiene limit.

6.5.1. Descriptions of the work situations with the greatest exposure

Many influencing variables determine the dermal or inhalation exposure of workers during disinfection work. They include: the disinfectant selected with the disinfectant agents it contains; the disinfection procedure selected; the spatial parameters (room size, ventilation); and the situation in terms of work organisation (duration of activity, time spent in the room etc.).

Particularly high exposures may arise in the following work situations.

Work situation	Description
Surface disinfection with particularly high agent concentration	Surface disinfectants are often supplied as concentrates and are diluted by workers with water to the necessary use concentration. If there is an acute risk of infections, higher agent concentrations are used than in preventive disinfection measures. With the relevant concentration of agents in the use solution, the danger of both inhalation and dermal exposure will grow. High exposures therefore arise, for example, when disinfectant concentrates are handled openly and with the final disinfection in operation areas.



Work situation	Description
Surface disinfection with poor ventilation	If volatile substances, such as alcohols, aldehydes or cresols, are able to pass into the atmosphere during disinfection, they will become enriched over time if there is poor ventilation (e.g. in interior, windowless rooms or in rooms below ground level without technical ventilation) and this will expose workers for some time after the actual disinfection work.
Very intensive, open disinfection operations	Long-lasting disinfection activities (e.g. in central bed stations where wipe-type disinfection is performed) will subject the workers to load in particular due to the constant exposure to agents.
Elevated temperatures	If the disinfection is performed manually at elevated temperatures (e.g. with warm water), the evaporation of volatile agents will increase and this can lead to substantially greater exposures than disinfection with cold water.
Spraying and atomisation procedures	Surface disinfection work should basically be performed by scrubbing/wiping. If, however, disinfectants are sprayed, this may result in extremely high exposures (see above).
Mixing of disinfectants	The mixing of different disinfectants may lead to chemical reactions and the development of dangerous gases (e.g. chlorine). Since the disinfection potential can be changed by the mixing, this must basically be prevented.
Deviations from routine	If routine procedures cannot be used in disinfection, the use of unsuitable substitute procedures may give rise to high exposures. If, for example, automatic disinfection machines fail because they are defective, spraying should not be used.

6.5.2. Description of the effect on health and safety

Disinfectants contain a large number of different active ingredients and ancillary substances, which are intended to kill microorganisms and in many cases also exhibit deleterious effects on human health and safety. A German analysis of 673 disinfectants revealed more than 150 different constituents. The major portion of the disinfectants was identified with one or more danger symbols, but none of these was toxic or highly toxic.

Disinfectants may, when stored, increase the fire load of a room or building (e.g. in the case of alcoholic disinfectants) and also act in an environmentally dangerous way if they get into the sewage system in large quantities. Some disinfectants must therefore be marked as environmentally dangerous.

Kind of disinfectants	Effect on health
Surface disinfectants (concentrates)	Surface disinfectants (concentrates) are often corrosive or irritant when in contact with skin or mucous membrane, and a number of constituents act systemically (to impair health) or can sensitise skin and respiratory tracts. Where alcoholic surface disinfectants are used, these may also be flammable.
Skin and hand disinfectants	Skin and hand disinfectants are flammable or highly inflammable, depending on the proportion of alcoholic agents present. Many users may show an allergic reaction to individual hand and skin disinfectants.

Instrument disinfectants	Instrument disinfectants are comparable with surface disinfectants in their effect on people.
Laundry disinfectants	Laundry disinfectants often have corrosive or irritant properties, and in addition they may act to sensitise skin or respiratory tracts.

6.5.3. Specific preventive techniques and procedures

On the basis of the corporate risk assessment (see Section 6.3), it must be established whether and which protective measures have to be taken.

Substitution

The use of thermal procedures instead of chemical disinfection procedures and the substitution of disinfectants with particularly problematical constituents by less problematical components is to be recommended.

Technical measures	<p>Care must be taken to ensure that regular disinfection work is performed in sufficiently large and well-ventilated premises.</p> <ul style="list-style-type: none"> – Automated procedures, for example in the case of instrument disinfection, subject workers to a much lower exposure than manual disinfection procedures. – Technical devices such as metering or application aids have proven useful here. – The extraction of evaporating dangerous substances at source is the most effective method of reducing worker exposure. – Room ventilation is also especially important during disinfection work. Technical room ventilation should constantly be in operation when working with volatile disinfectant agents and should be set to the highest level.
Organisational measures	<p>The organisational measures for disinfection work encompass:</p> <ul style="list-style-type: none"> – selection of suitable procedures which are both effective and, as far as possible, impose a low exposure; – clear application regulations which provide assistance for special procedures; account should also be taken here of foreseeable disturbances to the procedure sequence; – compliance with specified written procedures (disinfection procedures, concentration of application solutions); – training, re-training and instruction of workers affected with respect to the application regulations as well as the principle of hospital and work hygiene; – avoidance of excessive wet work by means of work rosters which also provide for 'dry' activities; – not all workers being able to perform work with disinfectants; for example, pregnant women, minors or workers with allergies may be unsuitable for such activities in individual cases





Personal protective measures

The personal protective measures to be taken in connection with disinfection work encompass the following.

- The use of skin protection and skin care agents may reduce skin diseases.
 - Suitable protective gloves should be worn which are both impermeable to the disinfectants used and are suitable for the work on account of their form and material properties.
 - It may also be necessary to wear special protective clothing for specific activities (transfer of disinfectants between containers, production of large quantities, with aerosol formation).
 - Goggles should be worn if it is possible for the eyes to be exposed to splashes, e.g. when handling concentrates in open form, when rectifying malfunctions, during manual endoscopes and instrument cleaning.
 - Respiratory masks should only be necessary in special cases, for example when atomising disinfectants during room disinfection, or in the case of disinfection by scrubbing/wiping with formaldehyde/glutaraldehyde where disinfection is ordered because of the presence of an infection. The need for this must be established in individual cases as part of the risk assessment
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6.6. Cytostatic/cytotoxic drugs

Cytostatic drugs have long been an indispensable medication group for the treatment of various kinds of cancer. Cytostatic drugs (or cytotoxic drugs) are handled in many (hospital) dispensaries, hospitals, medical practices or outpatient facilities. The number of preparations and applications in Europe is continuously rising because of the demographic development and expanded therapeutic possibilities.

6.6.1. Description of the work situations with the greatest exposure

Workers in the health service can come into contact with cytostatic drugs at various points, for example:

- When **cytostatic drugs** are **delivered**, or when medication vials are being unpacked and stored

Time and again there are reports of the delivery of medication in damaged packaging, to dispensaries for example. Since cytostatic drugs are highly effective active substances, it only requires the substantial release of substances from these operations for sometimes very high exposures to arise.

- During the **preparation of infusions**

The preparation of cytostatic infusions for individual patients is performed at a central point in many hospitals. Since the workers employed there are intensively engaged for long periods in handling active substances, dermal and inhalation exposures may arise here in particular for these workers.



12 Production of chemotherapeutic infusions. Here, two employees are at a safety workbench.

- During the **in-house transport** of ready-to-use infusions and cytostatic waste products (e.g. between the dispensary and the ward)

Direct contact with active substances may occur during the transport of inadequately packaged infusions and infusion syringes which have not been completely emptied and of cytostatic waste products.

- During the **application** of cytostatic drugs on the wards

When the infusion syringes are being connected and removed, infusion solution regularly escapes, which can contaminate the surrounding area with active substances.

- When **handling patients** who are undergoing cytostatic therapy (sweat, vomit, secretions)

Patients take the cytostatic drugs in therapeutic doses, but they also expel them partly in unchanged form, as vomit, sweat or urine. Since the active substances, unlike water, are not volatile, they collect on, for example, the patients' skin or other moistened surfaces which may also lead to worker exposure, e.g. as they wash the patients.

- **Cleaning activities** may result in contact with cytostatic drugs.

This relates to cleaning work in or on the safety workbenches or at the workplaces in the dispensaries. It also affects the staff on the wards, e.g. for the cleaning of beds, other furnishings and areas. It has proved very effective in individual cases to use special cleaning agents appropriate for cytostatic drugs (e.g. acidic or alkaline substances). Finally, the laundry staff may also be affected if contaminated bed linen is delivered.



13 Only well-informed staff can protect themselves: Sign on the door of a ward room showing that a patient is being treated with chemotherapy.

6.6.2. Description of the effect on health and safety

Cytostatic drugs are used to prevent the proliferation of tumour cells by means of various mechanisms. The various active substances on the market act in a toxic fashion on cells and exhibit various effects on humans, effects which become evident in particular when the concentrated substances are being handled or with the intake of therapeutic doses.

- Under the local action of cytostatic drugs as an active substance or in the form of highly concentrated pharmaceutical preparations, various local reactions may arise, such as sensitisation or irritant effects (e.g. reddening, burning, itching) and effects which destroy tissue (necrotising).
- Many of the cytostatic drugs in use today, and especially so-called alkylising substances (the oldest substance group which acts directly on the DNA), have a mutagenic, carcinogenic and/or teratogenic effect. The risk of causing secondary tumours in patients who have received treatment is in the order of percentages.

To date, only very few reports are available of acute local or systemic effects such as toxic-allergic reactions or impairment of general well-being (for example, headaches and dizziness) among doctors and nurses who handle pharmaceuticals containing cytostatic drugs. The cause was mostly major accident-related contamination or poor workplace conditions prior to the introduction of the protective measures which are common today. At present, there are no scientifically documented dose-response relationships with respect to the carcinogenic, mutagenic and reproduction-toxic potential of cytostatic drugs for quantities taken far below a therapeutic dose (low-dosage range). Even so, the previously known properties of this group of pharmaceuticals justify the implementation of protective measures for workers who come into contact with cytostatic drugs.

6.6.3. Specific prevention techniques and procedures

The risks and hence the protective measures cannot be assessed in general terms because, on the one hand, highly specialised oncology centres have to be considered and, on the other, individual hospital departments or the outpatient treatment at the patient's place of residence as well. However, some indications are given below as to what measures should be considered. The measures to be finally taken must be laid down on the basis of an individual risk assessment (see Section 6.3). The wealth of protective measures means that it is not possible to give a detailed description here. It is therefore only possible to provide an itemised list; a more detailed description can be found in the materials given under references.

The necessary information and the instruction of the employees affected about the safe work procedures should be provided regularly and, if possible, with documentation in view of the extensive action package.



14 15 Separated working areas, safety workbenches and reliable lead-over systems represent the most important technical protective measures when preparing chemotherapeutic agents.

6.6.3.1. Preparation of cytostatic drugs

Work areas	With the installation of a centralised facility for the preparation of cytostatic drugs physically separated from other work areas, specially marked and out of bounds to unauthorised persons, it is possible to ensure the efficient use of complex protective measures with a high throughput of preparations.
Workbenches	Preparations are manufactured in particularly safe conditions on so-called cytostatic workbenches (special laminar-flow workbenches).
Transfer systems	Pressure relief systems, transfer systems etc. help to prevent the release of cytostatic drugs in the individual work steps of the preparation process.
Personal protective equipment	The wearing of suitable personal protective equipment also prevents any exposure of the workers. This includes in particular: <ul style="list-style-type: none"> – suitable protective gloves, where necessary with cuffs; there are special cytostatic protective gloves and sometimes it is recommended that two pairs be worn (double gloving); – a laboratory coat closed right up to the neck with long sleeves and close-fitting cuffs.
Cleaning	It may be necessary to take further protective measures (e.g. wearing respiratory mask P2) when cleaning the workplace/the workbench as well as during maintenance work.



16 Separated working areas, safety workbenches and reliable lead-over systems represent the most important technical protective measures when preparing chemotherapeutic agents.



6.6.3.2. Preparatory work and application

General All jobs should be performed in a quiet environment and good preparation of the individual work steps helps to work cleanly and avoid emissions. Infusion devices ready for application should be filled with a suspending agent; avoid venting with solutions containing cytostatic drugs.

Work area Preparatory work steps should, as far as possible, be performed in a central cytostatic preparation facility.

Technical measures The use of equipment with easy-to-wash surfaces helps when conducting the necessary cleaning. With the application, if possible, use closed infusion and instillation systems with safe connection and transfer units. Administer infusions and injections over an absorbent surface which is impermeable downwards.

Personal protective equipment (PPE) Once again it may be necessary to wear adequate protective equipment, such as:

- protective gloves (cytostatic gloves)
- protective coat
- where relevant goggles (in the case of emergency measures).

If there is any contamination of the protective gloves, these should be changed immediately.

Waste/disposal Any waste products which arise should be disposed of in an orderly fashion immediately. Do not disconnect infusion bags and bottles after administering but dispose of them completely.



17 A heat-seal device for safely disposing of waste soiled by chemotherapeutic agents (top left).

18 A system for disposing of materials soiled by chemotherapeutic waste on stations (top right).

19 A transport box for used chemotherapeutic infusions (bottom).

6.6.3.3. Packaging and transport

- The use of plastic bottles prevents the danger of breakage and hence the possibility of contamination.
- Syringes should be sealed prior to transport.
- In the case of in-plant transport, transport cassettes or bags must be protected to prevent any unforeseen release of the cytostatic drugs into the environment. The containers should be clearly identified as transport containers for cytostatic drugs.

6.6.3.4. Cleaning work

Special protective measures should be taken to remove spilt medicinal agents containing cytostatic drugs as well as for cleaning contaminated surfaces. Table 6.3 shows an example of an appropriate emergency package.

Table 6.3: Contents of a special kit for cleaning contaminated surfaces

Personal protective equipment	Protective overall, liquid-resistant, with long sleeves and tight-fitting cuffs Protective gloves Protective goggles Overshoes Respirator masks
Disposal	Cut cellulose Hand shovel Receptacles and waste containers

Spreading of the spilt cytostatic drugs must be prevented (e.g. by cordoning off the accident scene, signs).

- **Clothing** contaminated by excreta as well as **bed linen** and other **textiles** should be changed immediately, packed in a container and delivered to the cleaning department.
- If the laundry contaminated with cytostatic drugs is treated in **laundries** with the same protective measures as ‘infectious’ laundry, the workers are well protected. To this end the relevant laundry must, however, be clearly identified.

6.6.3.5. Additional measures

It is recommended (and necessary under certain conditions) that workers’ handling of cytostatic drugs be individually documented (see Article 10 of Council Directive 98/24/EC). This can be done, for example, as part of the regular care by the occupational physician, and it will then be possible to include the information collected in the workers’ occupational medical documents.

In view of the CMR properties of many cytostatic drugs, it is essential to exercise special care when assigning personnel before and during pregnancy.

Pregnant women and nursing mothers should not be assigned to the preparation of cytostatic drugs. Similarly it is not possible to use them for any activities where they are exposed to (CMR) cytostatic drugs.

6.7. Activities involving anaesthetic gases

The use of anaesthetics given intravenously or as gas fed into the patient's respiration air is absolutely indispensable in surgical operations. Specially close attention has to be paid to anaesthetic gases in the risk assessment for workers in the operational domain because their gaseous state means that they can also quickly escape into the indoor air.

Anaesthetic gases are used anywhere where people have to be supplied in emergency situations, such as in emergency admission departments, in operating theatres and operating rooms in surgical practices, in anaesthetic recovery rooms and for some time also in individual dental practices. In hospitals, dinitrogen monoxide and other medical gases can also be supplied using centralised gas supply facilities.

In the case of anaesthesia by gas, the patients are usually given a dinitrogen monoxide/oxygen mixture with an O_2 content of 30–50 %. Volatile (evaporable) inhalation anaesthetics are added to the respiration gas in varying proportions depending on their anaesthetic potential. The best known anaesthetic gases are dinitrogen monoxide and the volatile anaesthetics halothane, enflurane, isoflurane, sevoflurane and desflurane, although halothane is only used to a limited extent because of its specific negative properties.

For some time anaesthesia has been applied increasingly without dinitrogen monoxide but with an increased concentration of a volatile anaesthetic.

Anaesthetic gases are given to patients in a controlled fashion using anaesthetic devices, the connection being made using various adapters. For example, use is made of face masks, tubes introduced into the windpipe (endotrachea/anaesthesia, ETA) and larynx masks, where a small mask is inserted directly into the larynx. These adapters differ in the tightness of their fit and hence in the respective leakage flow.



20 A reliable system to fill vapours for volatile anaesthetics (in this case: Sevoflurane).

6.7.1. Description of work with maximum exposure

The quantitative assessment of exposure to anaesthetic gases demands a knowledge of the typical anaesthetic activities in the work areas affected and hence at least occasional documentation of the surgical interventions, the anaesthetic gases selected and the anaesthetic techniques, the duration of the anaesthetic, etc. In addition, the spatial parameters such as room sizes, types of ventilation and ventilation capacities as well as the workers affected and their integration in the work organisation must be known. For anaesthetic recovery rooms, not only the technical data but also the patients' dwell times and the occupation density are of interest. This data forms the basis for assessing the exposure of individual workers.

In the following situations especially high anaesthesia exposures must be anticipated.

- The **performance of gas anaesthesia in rooms** where there is no ventilation/air-conditioning system and/or there is no anaesthetic gas extraction. In such cases the anaesthetic gases will pass into the indoor air and become enriched, imposing high air-related exposures on workers.
- If **mask anaesthesia is used** and this not only for short periods, this will lead to high leakage rates and correspondingly high exposures. This also applies to the use of face masks in anaesthetic lines conveying dinitrogen monoxide.
- **Disconnection of the gas circuits without any reduction in gas flow** will cause high exposures. This includes disconnecting the patient at the anaesthesia end when clear air is not breathed in with the anaesthetic gas for an adequate time.
- **Special operating techniques** where the tightness of the machine/man connection is not guaranteed, e.g. where surgery is being performed in the mouth/throat area, also lead to high exposures.
- **The transfer of vapours** into containers where the transfer system is not tight will cause exposure to volatile anaesthetics.
- If patients are being supplied in anaesthetic recovery rooms which only have natural ventilation, it must be expected that there will be high concentrations of exhaled anaesthetic gases, especially during the winter period.

6.7.2. Description of the effect on health and safety

Exposure to anaesthetic gases may involve a health risk for the workers exposed, both in clinical and outpatient operating areas and in anaesthetic recovery rooms. Workers are subject to much lower gas concentration exposures than the patients but this exposure may last a whole working life. If the work hygiene parameters are not adequate, the workers concerned often complain about symptoms such as fatigue and headaches. But there are also complaints about more serious physical impairments, such as reduced fertility and problems during pregnancy.

The most important influencing factors with respect to the nature and level of health effects are the type of anaesthetic gas used, the level of gas concentration present in the workers' respiration air and the duration of exposure.

Studies available describe mainly influences on the central nervous system, such as mood swings and negative effects on neuropsychological efficiency. But only a few occupational illnesses are described, for instance hepatitis due to the action of halothane, bronchial asthma due to enflurane, or allergic contact eczema due to halothane or isoflurane.

A number of studies also give indications of genotoxic effects from exposure to anaesthetic gases with airborne concentrations which may correspond to occupational exposure but other studies did not verify these.

A carcinogenic risk is not probable given the data available.

An increased risk of spontaneous abortions has been found to be probable, however, in the case of high airborne concentrations which are no longer state of the art, especially when the volatile anaesthetic halothane is being used. Similarly it is probable that dinitrogen monoxide may lead to a reduction in fertility in the case of very high air concentrations.

At present, there are different national air limit values in Europe for assessing the inhalation exposure which arises (Table 6.4).

	Denmark		Germany		Sweden		Spain		United Kingdom	
	8 hours	Short term	8 hours	Short term	8 hours	Short term	8 hours	Short term	8 hours	Short term
Dinitrogen monoxide EC-No 233-032-0 CAS-No 10024-97-2	90	180	180	360	92				183	
Halothane EC-No 205-796-5 CAS-No 151-67-7	40	80	41	328	40	80	410		82	
Enflurane EC-No 237-553-4 CAS-No 22194-22-5	15	30	150	1 200	575		80	150	383	
Isoflurane EC-No 247-897-7 CAS-No 26675-46-7					80	150	383		383	
Sevoflurane EC-No — CAS-No 28523-86-6					80	170				
Desflurane EC-No — CAS-No 57041-67-5					70	140				

In Germany occupational exposure limits have been published for the gases di-nitrogen monoxide (100 ppm/180 mg/m³), halothane (5 ppm/41 mg/m³) and enflurane (20 ppm/150 mg/m³), in each case as a mean value over eight hours. Other countries have an air limit value for isoflurane: e.g. France (2 ppm/15 mg/m³) or Switzerland (10 ppm/77 mg/m³).

Table 6.4: Occupational exposure limits for anaesthetic gases in the European Union (The selected countries are only examples)

6.7.3. Specific prevention techniques and procedures

The low-emission application of anaesthesia with gas demands of the anaesthetists not only specific specialist knowledge, but also knowledge of the influencing variables acting on the gas exposure and the performance of risk assessments since, due to their specific behaviour, they can substantially affect the level of gas exposures. It should therefore be ensured that such knowledge is transferred during training or that it can be acquired in a specific course of instruction.

6.7.3.1. Activities with anaesthetic gases in operating theatres (and other surgical rooms)

The following protective measures will guarantee low worker exposure.



Basic technical prerequisites	<p>The extraction of anaesthetic gas using a buffer system (external/internal) for surplus anaesthetic gas helps to dispose safely of the gases from the patients' respiratory air.</p> <p>A ventilation system (in Germany for example according to DIN 1946 Part 4) conveys anaesthetic gases released as well as other air contaminants such as CO₂, active substances in disinfectants or solvents quickly out of the indoor air. Contaminated air is replaced with fresh air.</p>
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Anaesthetic system	<p>The leakage in the circulation system close to the patient should be very low, e.g. < 150 ml/min.</p> <p>Measuring and flushing gases should be conveyed in the exhaust system.</p>
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Anaesthetic procedures	<p>The vast majority of anaesthesias by gas should be applied in the following way:</p> <ul style="list-style-type: none"> - initiation of the anaesthesia without anaesthetic gases; - intubation anaesthesia (with mechanical respiration but without blocked cuff); - anaesthesia with larynx masks. <p>Masks (firmly fitted) should be used only briefly, and scheduled for not more than about 30 minutes/day.</p>
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Organisational measures	<p>It should be ensured that at least one person in the anaesthetic team has sound knowledge relating to the area-specific questions of occupational health and safety (see above).</p> <p>A regular inspection/service should be conducted on the technical equipment and the protective measures taken. This includes a check of</p> <ul style="list-style-type: none"> - the extraction capacity of the extraction system; - the room ventilation system; - the anaesthetic gas systems (e.g. leak test); - the exhaust gas hoses.
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6.7.3.2. Anaesthetic recovery rooms

In anaesthetic recovery rooms the patients exhale almost completely the anaesthetic gas stored in the body. The personnel looking after them are therefore also exposed to anaesthetic gases in the anaesthetic recovery room, even if no anaesthetic procedure as such is applied there. Nevertheless, mobile anaesthetic devices are often kept there for emergency in order to permit a fast response.

Local extraction of the gases exhaled has been used in isolated cases but it has not become common practice because of handling and acceptance problems.



21 View of a modern recovery room in a large hospital.

The following measures can minimise the exposure to anaesthetics.

- Patient documents should be evaluated regularly. In this way information is obtained on anaesthetic sequences and also data on the dwell time in the anaesthetic recovery room and occupation rates for the room.
- In the anaesthetic recovery rooms where patients are regularly supplied with gas anaesthesia, only a ventilation system can ensure adequate ventilation. Natural ventilation generally cannot ensure that the aforementioned air limit values are observed. The ventilation installations must be designed in accordance with national specifications.
- The technical installations (anaesthesia devices, ventilation systems etc.) must be checked regularly to establish that they are in working order.
- In the anaesthetic recovery rooms avoidable emissions should be prevented, e.g. transfer of vapours to containers.

6.7.3.3. Other activities with anaesthetic gases

Anaesthetic gases may arise at other points in health facilities as well. Here are some examples.

- Volatile anaesthetic substances are delivered and have to be stored. Breakage of containers may cause very high exposure levels for a short period.
- In many hospitals anaesthetic gases are delivered with other medical gases in a centralised gas supply system and are connected to the distribution system. Once again, leaks may occur both at the central gas point and in the distribution pipe system. In particular, the anaesthetic gas sockets for dinitrogen monoxide may have a leak and should therefore regularly undergo a leak-tightness inspection.



6.7.3.4. Additional measures

Workers exposed to anaesthetic gases should be subject to occupational medical monitoring in compliance with the relevant national regulations. The aim is the early detection of possible symptoms of elevated exposure to anaesthetic gas by means of company medical examinations, a regular check of working conditions at these workplaces and the motivation of workers to remain attentive with regard to the necessary protective measures.

As part of the examinations, female workers who wish to have children or are in the early stage of pregnancy should be given special advice, for example regarding other employment opportunities in the company.

It would be opportune to combine this occupational healthcare with other examinations, such as those relating to the risks of blood-transmitted infectious diseases, tuberculosis, ionising radiation, disinfectants, or ergonomic or psychosocial factors.

6.8. Activities involving substances which endanger reproduction

The handling of various chemical products (disinfectants, cytostatic drugs, anaesthetics, other pharmaceuticals, laboratory chemicals) in the health system also encompasses, in isolated cases, contact with substances which have properties that endanger reproduction.

They cover many of the cytostatic drugs discussed in Section 6.6 as well as anaesthetic gases (e.g. halothane or dinitrogen monoxide), the handling of which has already been discussed in Section 6.7. If the mild sterilisation of thermolabile products is necessary, this is often performed with ethylene oxide, a gas which is also reproduction-toxic and carcinogenic.



22 Hazards for staff can arise even when handling small yet highly powerful amounts of substances.

It is well known that radioactive substances also have the property of being embryotoxic. However, activities with radioactive substances are not regulated in most countries by regulations on dangerous substances but by atomic energy law (cf. Council Directive 96/29/Euratom ⁽¹⁴⁶⁾), and so this issue will not be discussed further here.

Activities with substances hazardous to reproduction are subject to the same regulations of the 'risk assessment' and the occupational health and safety measures as other dangerous substances. The principles formulated in Chapters 1 and 2 of the guidelines also apply here and the steps of the risk assessment mentioned in Section 6.3 must be observed here, too:

1. collection of information on the substances, preparations and products used
2. determination of the dangerous substances and the substances with unknown or inadequately known properties
3. testing of the use of substitute procedures and substitute substances
4. determination of the extent, nature and duration of exposure taking all exposure paths into account
5. assessment of risks
6. implementation of protective measures taking the risk assessment into account,
7. effectiveness check (e.g. check of measures taken)
8. conclusions drawn from precautionary occupational medical examinations conducted.

Referring to 1–3

Only in the case of pure substances for which the manufacturer indicates in safety data sheets that they have properties that endanger reproduction can such substances also be identified. This includes, for example, pharmaceutical substances such as estradiolbenzoate or -valerate, hydrocortizone(-acetate), progesterone or testosterone propionate.

If there is contact with ready-to-use pharmaceuticals which are subject to their own marking and packaging system, it is more difficult to establish any deleterious properties — the only possibility is to go by the manufacturer's information, for example in the form of specialist data. However, the specialist data refers for the most part to the effects on the patient and hence to therapeutic methods of intake (parenteral, oral, subcutaneous, etc.) and to therapeutic dosages. The information can therefore only be applied to a limited extent to the workers, who are normally exposed via other paths (inhalative, dermal) and to substantially lower dosages. For example, some monoclonal antibodies are given as a counter-indication in the case of pregnancy but this relates to parenteral intake and the significance of other intake paths has not yet been definitively assessed.

The way in which substances which endanger reproduction are handled depends on the specific activity. This may cover a range of different activities, of which work with anaesthetics and activities involving contact with cytostatic drugs have already been discussed above (Sections 6.6 and 6.7). A further activity is the preparation and application of pharmaceuticals which endanger reproduction in dispensaries and at hospitals or on nursing wards. Here, the workers in the dispensary, the ward staff and the nursing staff may be affected as well as the cleaning workers and the staff in the waste disposal or laundry departments where the dirty bed linen or patients' clothing is delivered, washed and processed.

⁽¹⁴⁶⁾ Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation, OJ L 159, 29.6.1996, pp. 1–114.

Referring to 4–5

Pharmaceutical substances: In view of the molecular size of many active substances, inhalative intake through evaporation and dermal intake only play a secondary role with these substances. But active substances which are used in extremely fine powder form may pass as particles in respiration air and onto the nearest surfaces (hands, worktops) when they are being weighed, crushed in a mortar and stirred into ointment bases or during the manufacture of capsules. There is therefore the risk of inhalation and oral intake due to smear contamination. The exposure times are, according to German studies, a few minutes to one hour or more. To date, it has only been possible to estimate the pollution of respiration air and it is in the order of $\mu\text{g}/\text{m}^3$ (shift average).

Cytostatic/cytotoxic drugs: see Section 6.6.

Anaesthetic gases: see Section 6.7.

Ethylene oxide: When gaseous ethylene oxide is used, there is mainly an inhalation exposure risk, for example from leaks in the supply lines to the automatic sterilisation unit or due to sterilisers which have not been vented sufficiently or not at all being opened.

Referring to 6–7

The protective measures taken during activities with **pharmaceutical substances** that endanger reproduction should be based on those for cytostatic drugs, which are often also CMR pharmaceuticals. However, practice still falls far short of this standard (e.g. manufacture of ointments containing hydrocortisone).

The protective measures taken during activities with **cytostatic/cytotoxic drugs** or **anaesthetic gases** are discussed in Sections 6.6 and 6.7.

When ethylene oxide is used as a sterilisation gas, a host of technical, organisational and personal protection measures are taken which range from the use of fully automatic sterilisation equipment, through sufficient technical room ventilation down to exact specifications on the airing of articles which have been sterilised.

The correct measures to protect against substances that endanger reproduction can only be taken when all players, i.e. employers and workers, are sufficiently informed about the existing risks and the possible protective measures. As already mentioned above, this applies both to the employees working directly with the substances and those indirectly affected in cleaning work, handling of laundry, waste disposal or in maintenance and repair work. As reproduction-toxic properties of chemical exposures often take effect in the first weeks of a pregnancy, sufficient protective measures are at least necessary when workers have a strong desire to have children. However, this presupposes that the workers openly communicate this desire to their employer. Furthermore, the employer can only implement the necessary protective measures adequately (e.g. avoidance of exposure) pursuant to Council Directive 92/85/EEC⁽¹⁴⁷⁾ on improving the health and safety of pregnant workers, workers who have recently given birth and women who are breastfeeding if the pregnancies are known in the company at an early stage.

⁽¹⁴⁷⁾ Council Directive 92/85/EEC of 19 October 1992 on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding (tenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), OJ L 348, 28.11.1992, pp. 1–8.

6.9. Relevant European Union directives

1. Council Directive 89/391/EEC on the introduction of measures to encourage measures to encourage improvements in safety and health of workers at work (occupational health and safety framework directive) ⁽¹⁴⁸⁾
2. Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) ⁽¹⁴⁹⁾
3. Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances ⁽¹⁵⁰⁾
4. Directive 1999/45/EC of the European Parliament and of the Council of 31 May 1999 concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations ⁽¹⁵¹⁾
5. Council Directive 76/769/EEC of 27 July 1976 on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations ⁽¹⁵²⁾
6. Directive 2004/37/EC of the European Parliament and of the Council of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work (Sixth individual Directive within the meaning of Article 16(1) of Council Directive 89/391/EEC (codified version) (Text with EEA relevance) ⁽¹⁵³⁾
7. Council Directive 89/686/EEC of 21 December 1989 on the approximation of the laws of the Member States relating to personal protective equipment ⁽¹⁵⁴⁾
8. Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the registration, evaluation, authorisation and restriction of chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC ⁽¹⁵⁵⁾
9. Council Directive 92/85/EEC of 19 October 1992 on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding (tenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) ⁽¹⁵⁶⁾
10. Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation ⁽¹⁵⁷⁾

⁽¹⁴⁸⁾ OJ L 183, 29.6.1989, pp. 1–8.

⁽¹⁴⁹⁾ OJ L 131, 5.5.1998, pp. 11–23.

⁽¹⁵⁰⁾ OJ 196, 16.8.1967, pp. 1–98.

⁽¹⁵¹⁾ OJ L 200, 30.7.1999, pp. 1–68.

⁽¹⁵²⁾ OJ L 262, 27.9.1976, pp. 201–203.

⁽¹⁵³⁾ OJ L 158, 30.4.2004, pp. 50–76.

⁽¹⁵⁴⁾ OJ L 399, 30.12.1989, pp. 18–38.

⁽¹⁵⁵⁾ OJ L 396, 30.12.2006, pp. 1–849.

⁽¹⁵⁶⁾ OJ L 348, 28.11.1992, pp. 1–8.

⁽¹⁵⁷⁾ OJ L 159, 29.6.1996, pp. 1–114.

6.10. Description of good company practice

6.10.1. Interview with General Hospital Vienna (AKH Vienna) on safe working in disinfection activities

The general hospital in Vienna (AKH Vienna) is a long-established and very large hospital offering maximum healthcare with over 2 000 beds and more than 9 000 employees. In an interview, the associate university professor, Prof. Dr Ojan Assadian, interim manager of the clinical department for hospital hygiene, explained the fundamentals of safe disinfection in practice.



Prof. Dr Ojan Assadian, interim manager of the clinical department for hospital hygiene of the AKH Vienna.

Interviewer: How and by whom are the necessary disinfection activities determined in the establishment? Is a choice of disinfection processes made from the aspect of minimising exposures to chemicals of workers affected (e.g. thermal instead of chemical processes)?

Prof. Dr Ojan Assadian: The hygiene experts in the clinical department for hospital hygiene at the AKH Vienna have the task of analysing the need for treatment processes in the broadest sense of the term, i.e. cleaning, disinfection and sterilisation, in cooperation with the specialised departments, and establish the correct procedures. A selection of the disinfection processes only takes place after determining the hygiene efficiency aspects. If it is possible to use various disinfectants and/or various disinfection processes, the disinfectant and the process which have the least impact on the workers are selected.

Interviewer: When are formaldehyde and other aldehydes (glutaraldehyde, glyoxal etc.) used? For which disinfection activities?

Prof. Dr Ojan Assadian: Formaldehyde and the other aldehyde disinfectant active substances excel through their very good effectiveness, a low protein error and good degradability. However, these substances are volatile, have highly adverse effects on people and can only be combined with cleaning substances with great difficulty. Therefore, these substances are no longer used for preventive surface disinfection, such as in areas away from the patients. By contrast, these surfaces are regularly cleaned and only disinfected for a specific reason, e.g. with quaternary ammonium compounds. However, surfaces near the patients are disinfected with aldehydes, such as in manual bed disinfection. Equally, surfaces near patients which are verifiably contaminated with blood or other body secretions are disinfected with aldehyde disinfectants.

Interviewer: Are there clear, written instructions for use for the various disinfection processes? Are foreseeable disruptions to the routine workflow also regulated there, such as the necessary procedure in the event of a defect in an automatic disinfection machine?

Best practice



AKH Vienna
(source: AKH information centre)

Prof. Dr Ojan Assadian: The current disinfection plan of the AKH Vienna can be viewed by all employees on the Internet (<http://www.meduniwien.ac.at/krankenhaushygiene>). This plan describes in great detail the procedure for individual hygiene treatment steps as well as the necessary occupational health and safety measures. Moreover, alternative measures are described, e.g. manual disinfection, for foreseeable deviations in the processes (e.g. automatic disinfection machine is not available, possibly due to a defect).

Interviewer: Is regular disinfection work involving volatile active substances (e.g. alcohols, aldehydes, cresols etc.) performed in adequately large and well ventilated rooms? Is there a risk assessment available for this work?

Prof. Dr Ojan Assadian: The description of the disinfection processes also deals with the exposure of workers. However, it is not possible to allow for all work situations which are conceivable in a hospital in a central work instruction.

Interviewer: Is disinfection, e.g. of individual surfaces or the skin, performed with spray processes? Does this perhaps take place in the context of special situations, e.g. if an automatic bed disinfection machine fails?

Prof. Dr Ojan Assadian: Spray processes are not to be recommended from a hygienic and occupational hygiene point of view. They do not comply with the hygiene standard of our disinfection plans and are therefore not permitted in our establishment, not even in the event of special situations.

Interviewer: What methods are used for preparing application solutions for surface disinfection (e.g. dosing aids, central disinfectant dispensers)?

Prof. Dr Ojan Assadian: Both dosing aids and central disinfectant dispensers are used in our establishment. The latter are installed at easily accessible locations in individual departments and dispense various disinfectants, both non-aldehydes for routine disinfection and aldehydes for disinfection in specific situations.

Interviewer: What personal protective equipment is worn for regular, large-area surface disinfection work? What about the equipment for final disinfection activities?

Prof. Dr Ojan Assadian: The choice of protective measures for the workers must be commensurate with the risk of the contamination and thus the disinfection situation. In principle, protective gloves are to be worn when handling surface disinfectants. If there are particular risks owing to major contamination or special microbial exposures, also as part of final disinfection work, more protective measures are specified in the disinfection regulations, e.g. disposable aprons, liquid-tight footwear (boots) as well as respirator masks to protect against biological and chemical effects.

Interviewer: What protective gloves are selected for disinfection activities?

Prof. Dr Ojan Assadian: In the selection of suitable protective gloves we adhere to the recommendations of the glove manufacturers for chemical suitability. Naturally, we otherwise use only powder-free, low-allergen latex gloves according to EN455.

Interviewer: Is there a skin protection plan establishing the company regulations on skin protection? Is the issue 'wet work' and protection against it tackled as part of the skin protection measures and are appropriate measures offered?



Cleaning and disinfecting hands — this issue also affects the safety of the workers

Prof. Dr Ojan Assadian: Skin protection, also against the damaging effects of wet work, is dealt with in the cleaning and disinfection plan where not only the alcoholic hand disinfectants or soaps are regulated but naturally also the appropriate skin care and skin protection products. Of course, these are also made available to the employees. The AKH Vienna places great emphasis on ensuring that the correct and high-quality products are used as, ultimately, the hands of the employees are medical work tools which have to be well maintained and looked after.

Interviewer: How frequently are the workers affected instructed on the necessary technical, organisational and personal protective measures? Who does that and in what setting? Is the instruction documented?

Prof. Dr Ojan Assadian: We have hand hygiene training courses and, for the cleaning staff, where we have no disinfectant mixing units, highly targeted courses on how the correct concentrations are prepared. The workers must also be shown that, do it themselves and the whole process is naturally documented. This also includes the correct occupational health and safety measures. Instruction courses are also regularly held by the supervisors in the individual departments and always documented.

6.10.2. Working safely with cytostatic drugs

In a further interview Prof. Dr Robert Mader, University Clinic for Internal Medicine I, Clinical Department for Oncology, and Andrea Wolfsberger and Shahla Farokhnia, Cytostatic Drugs Department of the Hospital Pharmacy, all from the General Hospital (AKH) of Vienna, describe the organisation of the preparation and application of cytostatic drugs.



Prof. Dr Robert Mader, University Clinic for Internal Medicine I, Clinical Department for Oncology, and Andrea Wolfsberger and Shahla Farokhnia, Cytostatic Drugs Department of the Hospital Pharmacy, all from the General Hospital (AKH) of Vienna, describe the organisation of the preparation and application of cytostatic drugs.

How many preparations are produced in your facility every year?

The AKH Vienna has 2 000 beds and approximately 9 000 employees and is therefore definitely one of the largest hospitals in central Europe. The pharmacy is consequently also large. In the AKH about 10 000 oncological patients are treated therapeutically and cared for annually. In the pharmacy, which also serves the St Anna Children's Hospital, approximately 45 000 cytostatic preparations are made per year. On average days about 180 preparations are produced and on peak days this figure can be as high as 350. In the Cytostatic Drugs Department there are four pharmacists in full service and 10 pharmaceutical assistants. The work is performed on five workbenches divided up between two rooms.

How are the delivery and storage of cytostatic drugs organised in the hospital? Are steps taken to safeguard broken vials which could result in high exposure levels for workers?

The medications are delivered by the companies along a fixed route and are then taken over directly in the pharmacy by the relevant department. Under our safety regulations cytostatic drugs must be specially marked and heat-welded in addition in foil. Furthermore numerous cytostatic drugs are delivered in a special extra outer protection (e.g. Onkosafe). This means that, if the container is broken, any contamination by the cytostatic drugs in the transport box or pharmacy is prevented. To date there have, however, been no breakages on the transport route. Should this happen, however, the instruction is to dispose of the transport box together with its contents in accordance with the waste disposal regulations.

In case there is a breakage or spillage of cytostatic drugs in the pharmacy or hospital there is an emergency kit, consisting of five half face masks with particle filter P 3, two packs of cytostatic gloves, two packs of protective coats, one plastic bucket, cellulose, two waste bags and normal household gloves. The use of the materials is regulated by a set of work instructions.

What qualifications do personnel preparing cytostatic drugs have? How are the workers informed about the risks and necessary measures and how often?

We give the personnel theoretical and practical training. A course of induction takes about six months. Every six months there is a follow-up course. When new medications are used the personnel are again given training. As an extra safety measure we use a special computer program to enter the therapy and for production purposes. This specifies the individual working steps in the production process.



The emergency set of the AKH Vienna to remove cytostatic contamination in the event of breakage or spillage.

Other training measures cover compliance with hygiene regulations, such as correct hand disinfection, correct entry through airlocks into the pharmacy's production area and the compliant donning of protective clothing (such as overalls, mouth protection, gloves and hood).

In addition a team meeting is conducted once a month to clarify any questions arising and discuss safety aspects.

Are the workers on the wards where cytostatic drugs are applied also given instruction on the possible risks?

The pharmacists in the Cytostatic Drugs Department offer the personnel on the wards where cytostatic therapies are administered a talk on the 'safe handling of cytostatic drugs', and this offer is often taken up. The main subjects relate to how to deal with cases of contamination. This concerns both spilt infusion solutions and the disposal of bodily secretions (urine, vomit). The handling of the emergency kit is also discussed.

Of course there are also the regular courses of instruction given by the senior ward personnel themselves.

Thanks to this education programme there is now a high level of awareness regarding the risks and essential measures, and this is also conveyed by the workers on the spot to new personnel. The workers are made aware how important it is to comply with the hygienic safety measures in order to lower the health risk. This also applies to other groups of personnel involved, such those as the cleaning services and the hospital laundry.

How is the preparation organised (is it centralised/decentralised)? What technical equipment do the preparation locations have (e.g. separate rooms, airlocks, safety workbenches, technical ventilation facilities, use of aids (spikes etc.))?

In the AKH Vienna there is a centralised organisation of the preparation of cytostatic drugs. The pharmacy has two separate clean rooms with three and two workbenches respectively.

The rooms and workbenches are constantly monitored with respect to ventilation output and parameters. If the pressure in the clean rooms is not correct or something is not right with the workbenches, the systems shut down, an acoustic signal sounds and the workers must leave the room. The clean rooms can only be entered through an airlock system, in which the personnel change their clothing. Furthermore there are material airlocks.

Two pharmaceutical assistants work on each of the workbenches. The drug preparation in the workbenches is conducted gravimetrically using a computer program which specifies the production steps precisely. When all these steps have been correctly implemented, the label is printed. Provided the vials are suitable, we use a closed system to reduce or prevent the formation of aerosols in the workbench. Cytostatic waste products are collected in the workbench (plastic bag), heat-sealed in the so-called PactoSafe and disposed of in a black bin (see Fig. 17, Section 6.6.3.2, page 239).

Are measures taken to monitor the workers' exposure to cytostatic drugs (e.g. air measurements, wipe-test monitoring and biological monitoring)?

Alongside the hygienic measurements, which have to be conducted regularly for reasons of quality, there are at present no regular monitoring operations in terms of air measurements, biological monitoring or wipe-test monitoring. In view of the limited amount of information it yields, such monitoring is most useful when conducting studies, but it is not suitable for routine monitoring of the individual exposure in terms of occupational medicine. Such monitoring is, however, in preparation on the basis of statutory specifications demanding work to GMP regulations (validation phase).

In addition to microbiological monitoring, it is important for the personnel to undergo intensive training and regular follow-up instruction, and for the technical equipment to be maintained in an appropriate state.

Are individuals who prepare and apply with cytostatic drugs provided with occupational healthcare? What form does this take? Are special occupational health measures taken which are geared to the cytostatic drugs? This may include, for example, documentation of the nature and scope of work with cytostatic drugs.

As a matter of routine a stool sample is taken once a year and every two years a lung X-ray examination is conducted. In addition the workers are given regularly occupational medical support by the company doctor in the form of an annual questionnaire. This occupational medical care serves primarily to establish exposure levels. The production personnel, for example, suffer from the back complaints and tension due to the fact that they sit at the workbenches and to the working procedures during production. Per workbench there is a daily output of approximately 60 preparations, and consequently work at the workbenches is a full-time activity. The break times have therefore been extended for this area. The documentation is compiled automatically and in relation to the individual workers in the computer system. Every working step can be retraced.

How do you arrange for the disposal of cytostatic waste organisationally and technically?

The cytostatic waste products are already collected in plastic bags in the workbench and heat-sealed in the PactoSafe without any further handling. The sealed waste is then placed in a special black bin. The bin is sealed irreversibly and tightly, marked appropriately, transported away and destroyed unopened in the special waste incineration unit. Less difficult waste (hoods, mouth protection etc.) is collected in grey bags as hospital waste, compressed in the grinding press and destroyed at a waste incineration plant.

How do you arrange for the in-house transport of cytostatic waste (and preparations of cytostatic drugs) organisationally and technically?

For the in-house transport there is a specially trained 'cytostatic drugs carrier', who is responsible for distributing the finished preparations within the hospital. This person occupies a very important position in their work since they must ensure that the correct preparations arrive at the correct ward at the correct time. In such a large hospital as the AKH Vienna this is a highly responsible function. Arrangements must therefore also be made for someone who can deputise and this person must also be appropriately trained.

The finished preparations are heat-welded in foil bags, placed in liquid-tight boxes in the material airlock and taken over independently by the 'cyto-carrier' (see Fig 19, Section 6.6.3.2, page 239). In a special transport vehicle with liquid-tight plastic container or in transport boxes which are used exclusively to transport cytostatic drugs, the finished preparations are taken to the individual wards.

How are groups of people who need special protection (e.g. pregnant women) taken into account in the risk assessment?

Pregnant women and persons under 18 years of age may not work in the production of cytostatic drugs. All those employed in the production of cytostatic drugs are therefore instructed to notify the employer immediately if a pregnancy arises. The women concerned will then be assigned to different workplaces.

6.11. Links

No	Title	Country/Region	Contents/Source
1.	MPZ Factsheet Introductic Gevaarlijke Stoffen: Voor OK's	Netherlands	Brief introduction to the problems of hazardous substances in operating theatres. http://www.milieuplatform.nl/attachments/307/Factsheet_OK.pdf
2.	MPZ Factsheet Introductic Gevaarlijke Stoffen: Voor Apotheek	Netherlands	Brief introduction to the problems of hazardous substances in dispensaries. http://www.milieuplatform.nl/attachments/277/Factsheet_APO-THEEK.pdf
3.	MPZ Factsheet Introductic Gevaarlijke Stoffen: Voor Verpleging	Netherlands	Brief introduction to the problems of hazardous substances in nursing. http://www.milieuplatform.nl/attachments/280/Factsheet_VERPLEGING.pdf
4.	M 135 Sicherer Umgang mit Narkosegasen	Austria	Overview of technical requirements, frequent shortcomings, possible causes and safety measures to protect the workers. http://www.auva.at/mediaDB/MMDB125858_M135.pdf
5.	Latex and you	United Kingdom	Factsheet on the risk from Latex and on the necessary protective measures. http://www.hse.gov.uk/pubns/indg320.pdf
6.	Safe handling of cytotoxic drugs	United Kingdom	This guidance of the British HSE aims to raise awareness among employers and employees of the hazards associated with cytotoxic drugs and the precautions to take when handling them. http://www.hse.gov.uk/pubns/misc615.pdf
7.	Anti-cancéreux en médecine vétérinaire	France	Overview of the use of cytotoxic drugs in veterinary medicine and the necessary protective measures. http://www.inrs.fr/inrs-pub/inrs01.nsf/inrs01_catalog_view_view/AB79F46DFEEE17F7C12574D60049FD91/\$FILE/ft173.pdf
8.	Postes de sécurité microbiologique. Postes de sécurité cytotoxique. Choix et utilisation	France	This work offers assistance to identify and use effective safety workbenches for working with microbiological and cytotoxic materials. http://www.inrs.fr/inrs-pub/inrs01.nsf/intranetobject-accesparreference/ND%202201/\$file/nd2201.pdf
9.	Fiches toxicologique de l'INRS	France	Toxicological information on individual substances which may be relevant at workplaces. The respective 'fiche toxicologique' breaks down into the sections description of the substance, existing risks, existing (French) standards, recommendations for safe handling, bibliography. http://www.inrs.fr/secure/controle_toxicologie.html Halothane: http://www.inrs.fr/INRS-PUB/inrs01.nsf/inrs01_catalog_view_view/EAA16C3366800FAAC1256CE8005B2345/\$FILE/ft174.pdf Glyoxal: http://www.inrs.fr/INRS-PUB/inrs01.nsf/inrs01_catalog_view_view/F084298B49045108C1256CE8005A86FB/\$FILE/ft229.pdf Cresols: http://www.inrs.fr/INRS-PUB/inrs01.nsf/inrs01_catalog_view_view/5A5BB1F901F06795C1256CE8005AFDBF/\$FILE/ft97.pdf Formaldehyde: http://www.inrs.fr/INRS-PUB/inrs01.nsf/inrs01_catalog_view_view/9EB1ED6D45C5CCFFC1256CE8005A70A9/\$FILE/ft7.pdf

No	Title	Country/Region	Contents/Source
10.	Safety and health good practice online for the health sector (Factsheet 29)	EU-OSHA (European Agency for Safety and Health at Work)	This factsheet provides a basic introduction to occupational health and safety in the healthcare sector and how to find information for the sector on the European Agency's (OSHA) website. http://osha.europa.eu/en/publications/factsheets/29
11.	An introduction to dangerous substances in the workplace (Factsheet 33)	EU-OSHA (European Agency for Safety and Health at Work)	The European Agency (OSHA) has produced a series of factsheets focusing on the communication of occupational health and safety-related information on dangerous substances including biological agents. This factsheet introduces the key issues in this topic. http://osha.europa.eu/en/publications/factsheets/33
12.	Elimination and substitution of dangerous substances (Factsheet 34)	EU-OSHA (European Agency for Safety and Health at Work)	Brief introduction to the problems of hazardous substances in dispensaries. http://osha.europa.eu/en/publications/factsheets/34
13.	Respiratory sensitizers (Factsheet 39)	EU-OSHA (European Agency for Safety and Health at Work)	This factsheet discusses important characteristics of the exposure to these agents and appropriate prevention measures. http://osha.europa.eu/en/publications/factsheets/39
14.	Skin sensitizers (Factsheet 40)	EU-OSHA (European Agency for Safety and Health at Work)	This factsheet contains information on skin sensitizers as well as preventive measures for skin exposure. http://osha.europa.eu/en/publications/factsheets/40
15.	Gender issues in health and safety at work (Factsheet 42)	EU-OSHA (European Agency for Safety and Health at Work)	This factsheet presents a summary of a detailed report on 'Gender issues in health and safety at work'. http://osha.europa.eu/en/publications/factsheets/42
16.	Cleaners and dangerous substances (Factsheet 41)	EU-OSHA (European Agency for Safety and Health at Work)	This factsheet is intended to inform employers, supervisors, workers and their representatives, particularly those in small and medium enterprises (SMEs), about the dangers of cleaning work and how they can be prevented. http://osha.europa.eu/en/publications/factsheets/41
17.	Communicating information about dangerous substances (Factsheet 35)	EU-OSHA (European Agency for Safety and Health at Work)	This factsheet presents points to consider for successful communication. http://osha.europa.eu/en/publications/factsheets/35
18.	Including gender issues in risk assessment (Factsheet 43)	EU-OSHA (European Agency for Safety and Health at Work)	Continuous efforts are needed to improve the working conditions of both women and men. So it is important to include gender issues in workplace risk assessments, and 'mainstreaming' gender issues into risk prevention is now an objective of the European Union and of this factsheet. http://osha.europa.eu/en/publications/factsheets/43
19.	Risk assessment — roles and responsibilities (Factsheet 80)	EU-OSHA (European Agency for Safety and Health at Work)	Workers' health and safety is protected in Europe by an approach based on assessing and managing risk. In order to carry out effective workplace risk assessment, all those involved require a clear understanding of the legal context, concepts, the process of assessing the risks and the role to be played by the main actors involved in the process. http://osha.europa.eu/en/publications/factsheets/80

No	Title	Country/Region	Contents/Source
20.	Safety in the use of disinfectants in the health services	Germany/ France/ Switzerland	This paper (Consensus paper) summarises the thinking of a working group of the ISSA Health Services Section on occupational risks and applicable preventive measures in the use of disinfectants. http://193.134.194.37/ara/layout/set/print/content/download/74443/1385961/file/2-%20-%20Consensus%20Paper%20Disinfectants.pdf
21.	Safety in the use of anaesthetic gases	Germany/ France/ Switzerland	This paper (consensus paper) summarises the thinking of a working group of the ISSA Health Services Section on occupational risks and applicable preventive measures in the use of aesthetic gases. http://www.issa.int/content/download/74442/1385958/file/2-%20Consensus%20Paper%20Anaesthetic%20Gases.pdf
22.	Safety in the use of cytotoxic drugs	Germany/ France/ Switzerland	This paper (consensus paper) summarises the thinking of a working group of the ISSA Health Services Section on occupational risks and applicable preventive measures in the use of cytotoxic drugs. http://www.issa.int/Resources/Resources/Securite-dans-la-manipulation-des-cytostatiques
23.	Occupational risk prevention in aerosol therapy (pentamidine, ribavirin)	Germany/ France/ Switzerland	This paper (consensus paper) summarises the thinking of a working group of the ISSA Health Services Section on occupational risks and applicable preventive measures in aerosol therapy with pentamidine or ribavirin. http://www.issa.int/Resources/Resources/Prevention-des-risques-professionnels-dans-l-aerosoltherapie/
24.	Berufliche Hautkrankheiten 2869/11.D 2869/11.F	Switzerland	This paper describes the problem of skin diseases at work in Switzerland and provides information on the necessary protective measures. http://www.sapros.ch/images/supplier/220/pdf/02869_11_d.pdf
25.	Verhütung von Berufskrankheiten in pathologisch-anatomischen Instituten und histologischen Laboratorien 2869/25.D	Switzerland	This work contains a risk assessment of the chemical and biological risks in pathological/anatomical institutes and histological laboratories, describes protective measures to prevent occupational diseases and offers occupational medical information for examinations by works physicians. http://www.sapros.ch/images/supplier/220/pdf/02869_25_d.pdf
26.	Verhütung gesundheitlicher Gefahren bei der Desinfektion von Flächen und Instrumenten in Spital und Praxis 2869/23.D 2869/23.F	Switzerland	This factsheet describes the major risks in disinfection activities in hospitals and doctors' surgeries as well as the protective measures to be taken. http://www.sapros.ch/images/supplier/220/pdf/02869_23_d.pdf
27.	Umgang mit Anästhesiegasen 2869/29.D 2869/29.F	Switzerland	This work describes the risk assessment in handling anaesthetic gases in healthcare facilities as well as the necessary protective measures. http://www.sapros.ch/images/supplier/220/pdf/02869_29_d.pdf
28.	Hautschutz bei der Arbeit 44074.D	Switzerland	This publication focuses on the work-induced risks to the skin and describes the existing measures to protect the skin from a Swiss point of view. http://www.sapros.ch/images/supplier/220/pdf/44074_d.pdf

No	Title	Country/Region	Contents/Source
29.	Niedertemperatursterilisation im Gesundheitswesen: Sicherer Umgang mit Ethylenoxid und Formaldehyd SBA 501.D	Switzerland	This publication describes the risks from ethylene oxide and formaldehyde in gas sterilisers and explains the necessary measures in Switzerland. http://www.sapros.ch/images/supplier/220/pdf/sba501_d.pdf
30.	Protection of pregnant, post-natal and breastfeeding employees	Ireland	This guide is aimed at health and safety practitioners, employers, managers, employees, safety representatives and others to give guidance on the Irish Chapter 2 of Part 6 and the related Schedule 8 to the Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No 299 of 2007) relating to pregnant, post natal and breastfeeding employees. The objective of the guide is to give general guidance aimed at the prevention of occupational accidents or ill health. http://www.hsa.ie/eng/Publications_and_Forms/Publications/Retail/Gen_Apps_Pregnant_Post_Natal.pdf
31.	Risk assessment of chemical hazards	Ireland	This leaflet from Ireland is intended to help employers in assessing the risks that relate to chemical agents in the workplace. http://www2.ul.ie/pdf/661738913.pdf
32.	Il Rischio da Manipolazione di Chemioterapici	Ireland	This factsheet describes the chemical risks in handling cytostatic drugs, the necessary protective measures and work organisation precautions. http://www.ispesl.it/chemioterapici/chemioterapici.pdf
33.	Vorbereitung und Applikation von Arzneimitteln mit krebserzeugenden, erbgut-verändernden, fruchtschädigenden und fruchtbarkeits-schädigenden (KMR) Eigenschaften durch pflegendes oder ärztliches Personal	Germany	A brief, practical guide to handling hazardous medications, intended in particular for those actually working with them. http://www.bgw-online.de/internet/generator/Inhalt/OnlineInhalt/Statische_20Seiten/Navigation_20links/Kundenzentrum/Grundlagen_Forschung/Gefahrstoffe/Bausteine_Gefahrungsbeurteilung/Baustein_509_Arzneimittel_mit_KMR,property=pdfDownload.pdf
34.	Zytostatika im Gesundheitsdienst Informationen zur sicheren Handhabung von Zytostatika	Germany	A comprehensive compilation of the risks and necessary protective measures in handling cytostatic drugs in healthcare. Includes draft operating manuals to inform and instruct the workers. http://www.bgw-online.de/internet/generator/Inhalt/OnlineInhalt/Medientypen/bgw_20themen/M620_Zytostatika_im_Gesundheitsdienst,property=pdfDownload.pdf
35.	Virtuelle Praxis	Germany	The 'Virtuelle Praxis' is an Internet site especially for small and medium enterprises, e.g. doctors' surgeries, which provides an overview of the duties relating to occupational health and safety in handling chemical substances. Lots of detailed information and working aids. http://www.bgw-online.de/internet/generator/Navi-bgw-online/NavigationLinks/Virtuelle_20Praxis/navi.html
36.	BGR 206 Desinfektionsarbeiten im Gesundheitsdienst	Germany	This publication describes from a German point of view the risks and the necessary protective measures in disinfection work in healthcare, e.g. hand and skin disinfection, surface disinfection, instrument disinfection etc. http://www.bgw-online.de/internet/generator/Inhalt/OnlineInhalt/Medientypen/bgw_vorschriften-regeln/BGR206_Desinfektionsarbeiten_im_Gesundheitsdienst,property=pdfDownload.pdf

No	Title	Country/Region	Contents/Source
37.	Guideline for disinfection and sterilisation in healthcare facilities	USA	This guideline discusses the use of products by healthcare personnel in healthcare settings, such as hospitals, outpatient care and home care. www.cdc.gov/ncidod/dhqp/pdf/guidelines/Disinfection_Nov_2008.pdf
38.	Fiche toxicologique de l'INRS — oxyde d'éthylène (FT 70)	France	Toxicological information on ethylene oxide. http://www.inrs.fr/INRS-PUB/inrs01.nsf/inrs01_catalog_view_view/93992664336C676BC1256CE8005B608B/\$FILE/ft70.pdf
39.	Begasungen mit Ethylenoxid und Formaldehyd in Sterilisations- und Desinfektionsanlagen (TRGS 513)	Germany	This TRGS discusses the use of ethylene oxide and formaldehyde in devices for sterilisation or disinfection. http://www.baua.de/de/Themen-von-A-Z/Gefahrstoffe/TRGS/pdf/TRGS-513.pdf?__blob=publicationFile&v=3
40.	Occupational skin diseases and dermal exposure in the European Union (EU-25): policy and practice overview	EU-OSHA (European Agency for Safety and Health at Work)	This report presents an overview of dermal exposure, skin diseases and principal policies in relation to the recognition and recording of skin diseases. http://osha.europa.eu/en/publications/reports/TE7007049ENC_skin_diseases
41.	Global harmonised system of classification and labelling of chemicals (GHS)	UNECE	The link gives an introduction to the globally harmonised system of classification and labelling of chemicals (GHS). www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html
42.	Preparation of cytostatic solutions (Citosztatikus keverékinfúziók előállítása)	Hungary	Guideline for safe preparation of cytostatic solutions either at the hospital pharmacy or beside the ward. The guideline presents scientifically proven requirements of safe procedures for workers and patients. Fulfilment of these recommendations and guarantee professional and quality care of patients compliance with occupational health and safety provisions. The requirements set in the guideline should also be met in hospitals where aseptic laboratories are established besides medical wards are preparing cytostatic solutions. http://www.okbi.hu/kiadv/citosztatdolg_mved.pdf
43.	Health protection of workers in cytostatics exposure (Citosztatikumokkal dolgozók egészségvédelme)	Hungary	The second edition raises the issues, drafts therapeutic mechanism of cytostatics, workers at risk, risk sources. General principles are formulated for the protection of personnel and work environment, and surveillance thereof. Current practice is presented besides introduction of optimal work environment for workers dealing with cytostatics. Methods of decontamination and neutralization of cytostatics are compiled. http://www.ogyi.hu/dynamic/citkevinfmod07.pdf

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Annexes

Annex 1: List of acronyms

Annex 2: Experts involved in the preparation of this guide

Annex 1: List of acronyms

AKH: Wien: Vienna General Hospital

AMR: antimicrobial resistance

AR: antibiotic resistance

ARS: antibiotic resistance surveillance

ASSTSAS: Association paritaire pour la santé et la sécurité du travail du secteur des affaires sociales (Association for Joint Health and Safety of the Social Affairs Sector)

ATM: air traffic management

AUVA: Allgemeine Unfallversicherungsanstalt (General Accident Insurance Company) (Austria)

BAuA: Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (Federal Institute for Occupational Safety and Health) (Germany)

BCG: bacillus Calmette-Guérin

BGW: Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege (Professional Association for Health Services and Welfare) (Germany)

BUKH: Berufsgenossenschaftliches Unfallkrankenhaus Hamburg (BG Trauma Hospital Hamburg)

CJD: Creutzfeldt-Jakob disease

CMR: carcinogenic, mutagenic and reprotoxic

COPSOQ: Copenhagen Psychosocial Questionnaire

DNA: deoxyribonucleic acid

DNGfK: Deutsches Netz Gesundheitsfördernder Krankenhäuser (German Network of Health-Promoting Hospitals)

ECDC: European Centre for Disease Prevention and Control

EHEC: Enterohaemorrhagic *Escherichia coli*

ESCMID: *European Society of Clinical Microbiology and Infectious Diseases*

EU-OSHA: European Agency for Safety and Health at Work

Eurofound: European Foundation for the Improvement of Living and Working Conditions

EZ: St Élisabeth Hospital, Tilburg

FFP: filtering face piece

EPSU: European Federation of Public Service Unions

GHS: globally harmonised system of classification and labelling of chemicals

GMP: good manufacturing practice

HIV: human immunodeficiency virus

HME: Handling Movement and Ergonomics Ltd

Hospeem: European Hospital and Healthcare Employers' Association

HSE: Health and Safety Executive

HVBG: Hauptverband der gewerblichen Berufsgenossenschaften (Federation of Institutions for Statutory Accident Insurance and Prevention) (Germany)

IGRAs: interferon-gamma release assays

ILO: International Labour Organisation

INRS: *Institut national de recherche et de sécurité* pour la prévention des accidents du travail et des maladies professionnelles (National Research and Safety for the prevention of occupational accidents and diseases) (France)

IPSE: Improving Patient Safety in Europe

ISSA: International Social Security Association

kN: kilonewton

mAb or moAb: monoclonal antibodies

MHSG: Mental Health Strategy Group

MIS: minimally invasive surgery

MRSA: Methicillin-resistant *Staphylococcus aureus*

MSD: muskuloskeletal disorder

MYAZ: system quality management in place for hospitals in the Netherlands

NI: nosocomial infection

NIOSH: National Institute for Occupational Safety and Health

OEL: occupational exposure limit

OiRA: interactive online risk assessment tool

PE: polyethylene

PEP: post-exposure prophylaxis

PPE: personal protective equipment

PVC: polyvinyl chloride

RCN: Royal College of Nursing

SARS: severe acute respiratory syndrome

SLIC: European Senior Labour Inspectors Committee

SOAS-R: Staff observation aggression scale, revised

SRSV: *small round structure viruses*

SST: health and safety at work (French)

STIKO: Ständige Impfkommission (Standing Committee on Vaccination)

SUVA: Caisse nationale suisse d'assurance en cas d'accidents (Swiss National Accident Insurance)

T-O-P: technical, organisational and personal/individual

TRGS: technical rules for hazardous substances

UV: ultraviolet

vCJD: variant Creutzfeldt-Jakob disease

WHO: World Health Organisation

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The main focus of this guide is to present up-to-date technical and scientific knowledge regarding the prevention of the most significant risks in healthcare, especially biological, musculoskeletal, psychosocial and chemical risks, and to support the implementation of the relevant European Union directives in force. Practical instruments to support employers in identifying the risks for the health and safety of their employees and to guide the implementation of preventive measures in their healthcare facilities are outlined and clarified.

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