



# Work-related health risks



## Research and company practice

# **Work-Related Health Risks: Research and Company Practice**

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Dieser Bericht liegt auch als deutsche und französische Fassung vor.  
This report is also available in German and French.  
Le présent rapport est aussi disponible en allemande et en français.

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## Abstract

In the period 2000/2001, the Research Section of the International Social Security Association (ISSA) conducted a survey of fifteen national OSH-research institutes on the subject of prevention of work-related health risks. The survey focused on problems and deficits in the field of in-company prevention as well as methods and approaches with which to solve those problems. Using a questionnaire, structured according to the various prevention elements and types of risk, plus interviews, the researchers were able to compile a comprehensive picture of prevention in research and practice.

The findings show that the situation in the various countries differs significantly due to economic and legislative reasons. There is a close correlation between the prevention deficits observed in connection with the different types of risk and countries' economic performance (expressed in terms of GDP).

In most respondents' opinion, there are no longer any major problems in the areas of risk identification and evaluation. On the other hand, they *do* still consider there to be a number of deficits with regard to practical prevention, selection of suitable measures in practice and evaluation of the effectiveness of prevention measures.

There are still significant deficits with regard to the newer topics of work organisation, communication, ergonomics and psychology at the workplace. In particular, there is still a lack of suitable, standardised evaluation tools in these areas. In most sectors, there are not enough examples of best practice. More effort should be invested in cost-benefit analyses so that OSH measures can be employed in a more expedient manner.



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## 1 Introduction

Prevention in the workplace today aims not only to prevent occupational accidents and diseases, but also to eliminate or reduce all risks to workers' lives and health at work ("work-related health risks").

To do this, companies need to identify and assess all the potential work-related risks in advance. In many countries, this process is laid down in occupational safety and health (OSH) legislation. Some small and medium-sized companies still experience difficulties in identifying such hazards and in applying suitable measures to prevent work-related health risks.

In 2000/2001, the ISSA Research Section carried out a scientifically based survey to gather information from national OSH institutes and authorities on their experience and opinions in the area of prevention of work-related health risks.

The chief aim of this survey of fifteen OSH-research institutes in thirteen countries was to determine what problems and deficits are seen in company practice and which new methods and approaches can be used to solve those problems.

## 2 Methods

The survey of the research institutes was conducted using a questionnaire, with an annex for additional written comments, and, in some cases, personal interviews. Table 1 shows the procedure used for the survey.

**Table 1:** Survey procedure

<b>Phase</b>	<b>Activity</b>
1	Development of the questionnaire, following on from former surveys, e.g. by the European Foundation for the Improvement of Living and Working Conditions
2	Distribution of the questionnaire to national OSH institutes world-wide
3	Completion of the questionnaire by the institutes
4	Interviews with selected OSH institutes
5	Qualitative and quantitative analysis of the answers (questionnaire and interview)

For the purposes of the survey, fifteen types of risk (e.g. mechanical, physical, chemical, poor ergonomics and psychological loads) were defined as well as the following five "elements", or steps, of practical prevention:



- identification of risks,
- evaluation of risks,
- development of suitable prevention measures,
- selection and application/implementation in the company and
- evaluation of effectiveness.

Table 2 shows the types of risk defined in the questionnaire.

**Table 2:** Types of risk defined for the survey

<b>Risk types<sup>1)</sup></b>	<b>Examples</b>
1. Mechanical risks	A) Sharp edges, moving parts of machines, malfunctions in machinery B) Accidents caused by stumbling, slipping or falling (Tribology) C) Transport and road accidents
2. Electricity	Touching, approaching
3. Fire and explosion	Inflammable, explosive substances
4. Physical risks	Noise, radiation, vibration
5. Chemical risks	Handling hazardous chemical substances
6. Biological risks	Handling bacteria, fungi
7. High and low temperature	Burns and hypothermia
8. Physical loads	Lifting and carrying loads, working posture
9. Poor ergonomics	Poor workflow, insufficient equipment, posture, screens, etc.
10. Workplace environment	Climate, air exchange rate, temperature, humidity
11. Psychological loads	Stress, time pressure, complexity/monotony of task, mobbing
12. Violence	Aggression, physical assaults, etc.
13. Poor organisation of work	Poor time planning, time pressure, insufficient information given to employees, etc.

1) Personal factors (e.g. age or gender) were not listed as a separate risk but *should* be taken into account when identifying risks to safety and health at the workplace.

For each of these risk types, the institutes were asked to say whether they thought that companies had the necessary expertise to deal with the risks. The survey also asked whether the various elements of prevention posed a key problem in connection with specific types of risk or whether the institutes had any opinion at all on this subject. The questionnaire is shown in Table 3.

**Table 3:** Questionnaire of the IVSS survey

				<b>Elements of prevention</b>				
<b>Type of risk</b>	We are able to give an assessment			1. Identification of the risk	2. Evaluation of the risk	3. Development of suitable preventive measures <sup>1)</sup>	4. Selection and application/ implementation in the company	5. Evaluation of effectiveness
	<b>Yes</b>	<b>In part</b>	<b>No</b>					
1. Mechanical risks								
2. Electricity								
3. Fire and explosion								
4. Physical risks								
5. Chemical risks								
6. Biological risks								
7. High and low temperatures								
8. Physical loads								
9. Poor ergonomics								
10. Workplace environment								
11. Psychological loads								
12. Violence								
13. Poor organisation of work								
Further risks (if applicable):								
14. Electromagnetic fields								
15. Radioactive radiation/ x-rays								

1) This refers both to preventive measures developed by specialised manufacturers and to those developed by firms which then use them themselves.

The survey was conducted using questionnaires, on which the respondents indicated and rated the relevant risk-specific prevention elements (see Section 3.1). The written comments in the annex to the questionnaire were used to expand on the results and additional information was gathered by means of interviews in some cases.

The annex asked for the following information:

- explanations of the respondents' answers for each of the risk types, particularly details of which new methods and approaches they thought could help solve the problems faced in practice;
- any other important, unsolved problems faced in practice and which new methods and approaches could offer possible solutions; and
- legislation related to the prevention of work-related health risks.

This evaluation provides a summary of the answers to the questionnaire and the comments from twelve of the participating institutes, supplemented by the results of the interviews with five institutes. All the answers are presented in Section 3.2. It lists the most important answers in a table structured according to risk type. Further details are given in Annex 1, entitled "Details Concerning Specific Countries and Sectors".

Six countries commented on legislation related to the prevention of work-related health risks (see Table 6, entitled "Legislation Related to the Prevention of Work-Related Health Risks"). General conclusions are only possible to a limited extent because of the differences between the countries and the lack of information in some cases.

Three OSH institutes (INRS, France; AUVA, Austria; BIA, Germany) conducted surveys among fifteen national OSH institutes, which are listed in Table 4.

**Table 4:** Participating institutes

<b>Abbreviation</b>	<b>Institute</b>	<b>Country</b>	<b>Annex<sup>1)</sup></b>	<b>Interview<sup>2)</sup></b>
AUVA	Allgemeine Unfallversicherungsanstalt	Austria	+	
INRS	Institut National de Recherche et de Sécurité	France	+	
BIA	Berufsgenossenschaftliches Institut für Arbeitsschutz - BIA	Germany	+	
BAuA	Bundesanstalt für Arbeitsschutz und Arbeitsmedizin	Germany	+	
EL.IN.Y.A.E.	Hellenic Institute for Occupational Safety and Health	Greece	+	
MKK	Munkavédelmi Kutatási Közalapítvány (Public Foundation for Research on Occupational Safety)	Hungary	+	
ISPESL	Istituto Superiore per la Prevenzione e la Sicurezza del Lavoro	Italy	+	+
INAIL	Istituto Nazionale per l'Assicurazione contro gli Infortuni sul Lavoro	Italy	+	
CIOP-PIB	Centralny Instytut Ochrony Pracy (Central Institute for Labour Protection – National Research Institut)	Poland	+	+
INCDDPM	Institutul National de Cercetare-Dezvoltare Pentru Protectia Muncii	Romania	+	+
SUVA	Schweizer Unfallversicherungsanstalt	Switzerland	+	+
INSHT	Instituto Nacional de Seguridad e Higiene en el Trabajo	Spain	+	+
OSRI	Occupational Safety Research Institute	Czech Rep.		
IIOSH	Institute for Occupational Safety and Hygiene	Israel		
IRSST	Institut de Recherche Robert-Sauvé en Santé et en Sécurité du Travail	Canada		

1) The respondents also had the opportunity to give free-text answers in the annex to the questionnaire. Those answers are evaluated in Tables 5-6 and Annexes 1-2.  
+ : The respondents filled in the annex.

2) + : Interviews were conducted

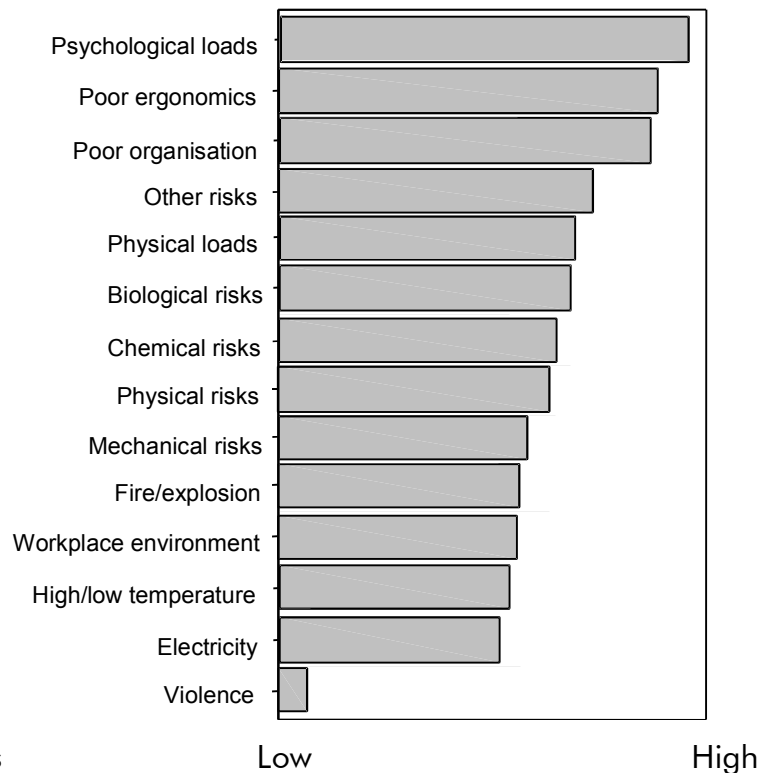
### 3 Results

#### 3.1 Quantitative analysis of the questionnaire

This Section presents the quantitative results of the analysis. The results do not include the details given in the written comments and interviews. Those details are presented in Section 3.2.

The respondents rated the major deficits and problems in the practical implementation of measures aimed at preventing work-related health risks specified in the questionnaire. Figure 1 shows the risk types in the order of their rating.

**Figure 1:** Deficits and problems in practical OSH prevention for specific types of risk

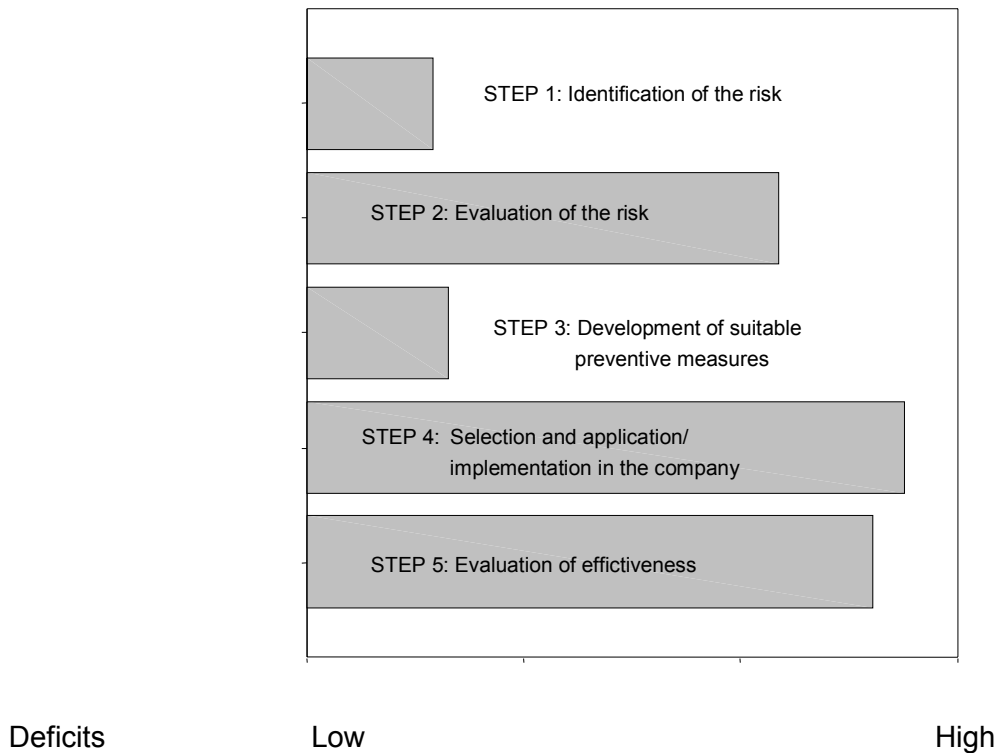


The results correspond to those of past surveys.

If one takes a closer look at the deficits in practical prevention (see Figure 2), one can see that the main issues are in the following prevention steps:

- evaluation of risk,
- selection and application/implementation in the company and
- evaluation of effectiveness.

**Figure 2:** Deficits in the individual elements of prevention



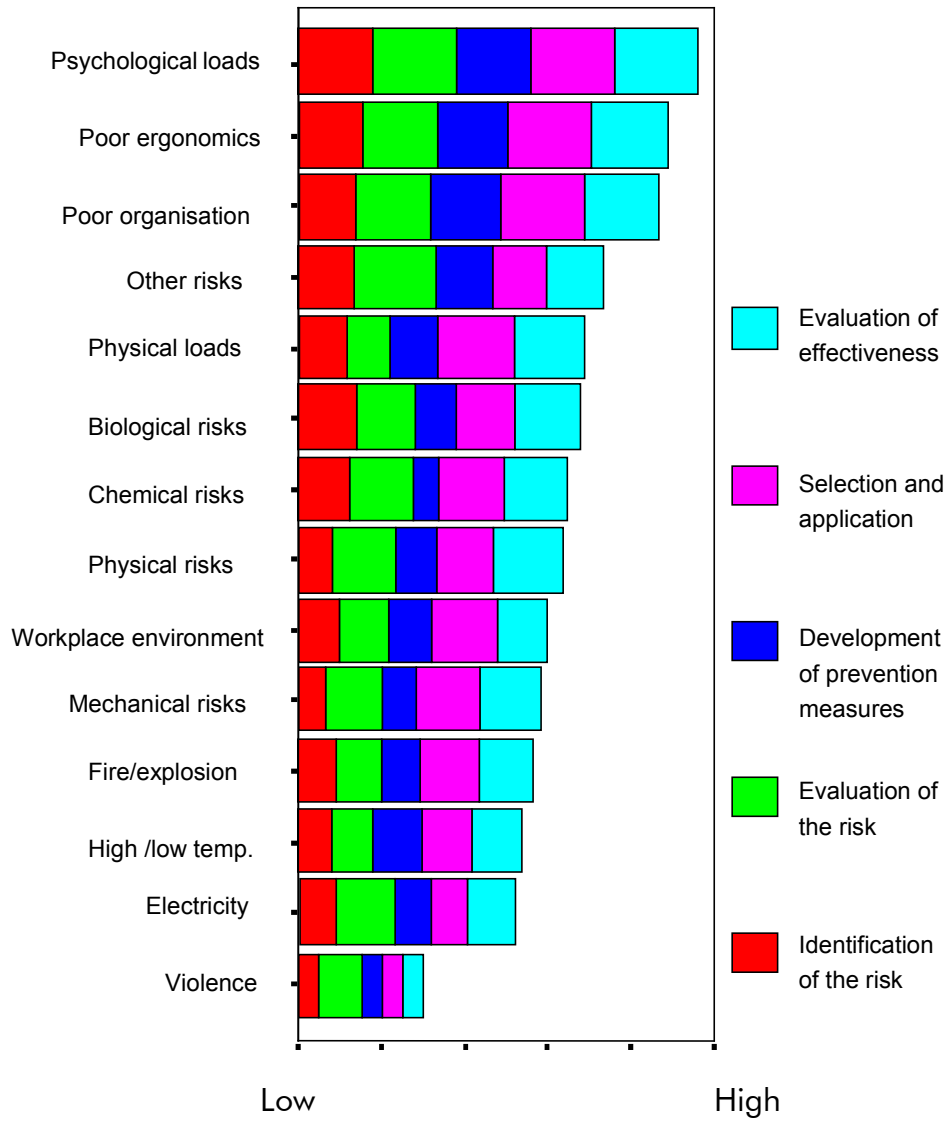
By grouping the deficits in the individual prevention steps on the basis of the ratings assigned to them by type of risk, one can see where the deficits are concentrated.

The respondents cited deficits for both the “old” types of risk (i.e. chemical or biological risks) and the “new” ones (i.e. psychological loads or poor ergonomics), especially with regard to selection of suitable prevention measures and evaluation of effectiveness. This is clearly reflected in Figure 3 on page 12.

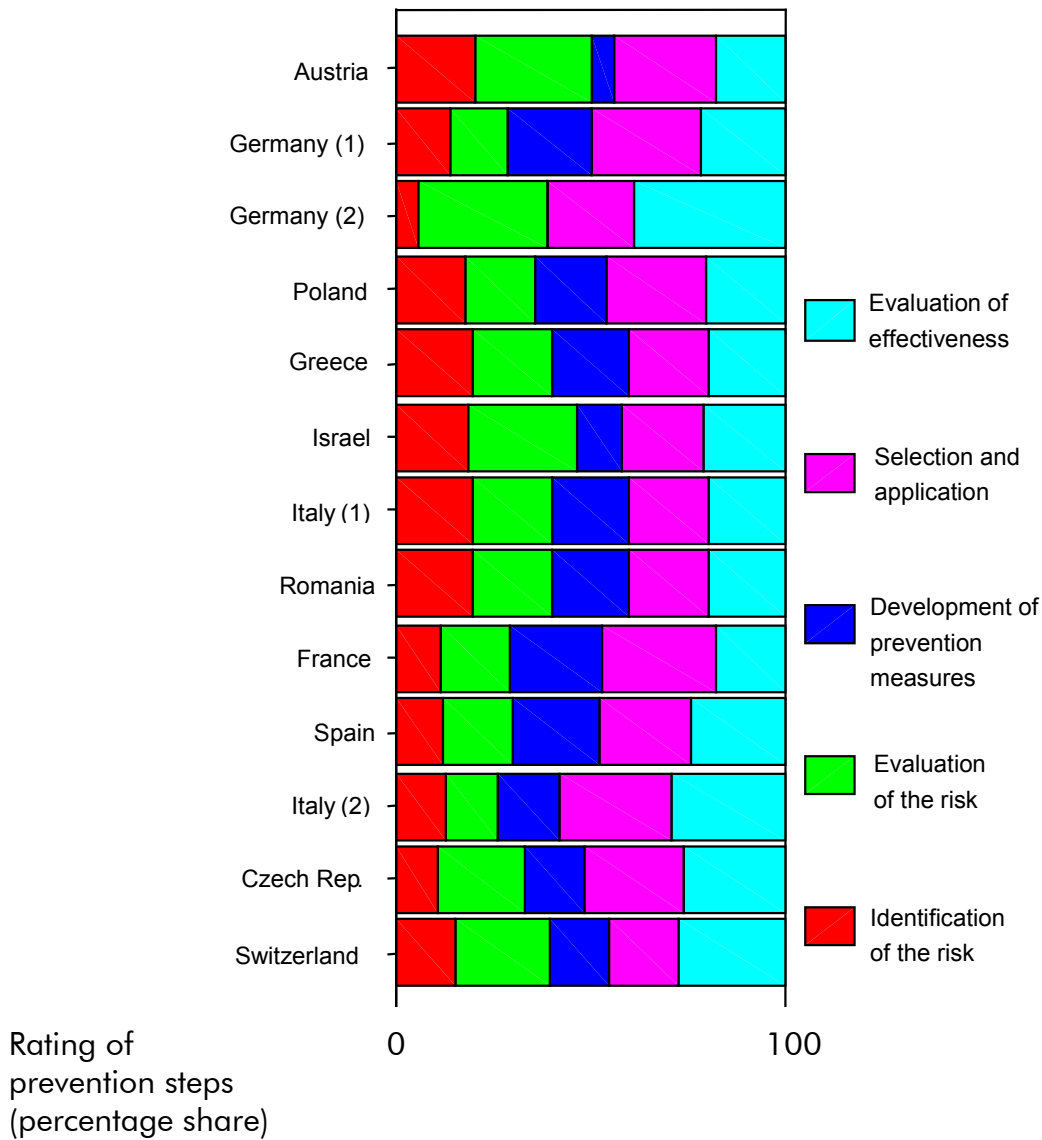
The various countries and institutes rate the individual prevention steps very similarly (see Figure 4 on page 13).

In general, deficits in the different types of risk in OSH are linked closely to the gross domestic product (GDP) of the country. Countries with a low GDP reported important problems or deficits in OSH in all types of risk and all elements of prevention, whereas countries with a higher GDP reported problems or deficits mainly in risks such as “Psychological loads”, “Poor ergonomics” and “Poor organisation of work” as well as in “Development of suitable preventive measures”, “Selection and application/ Implementation in the company” and “Evaluation of effectiveness”.

**Figure 3:** Deficits in the individual prevention steps by type of risk



**Figure 4:** Rating of prevention steps: National differences?



### 3.2 Qualitative analysis of the written comments and interviews

The respondents did not entirely adhere to the five-element structure used in the questionnaire. Consequently, the original prevention elements (identification of risks, evaluation of risks, development of suitable prevention measures, selection and application/implementation in the company and evaluation of effectiveness) were discarded and the following categories used for the evaluation instead:

- risk identification and evaluation,
- prevention measures,
- checks to determine the effectiveness of prevention methods in practice,
- obstacles to implementation in practice and
- relevant legislation.



### **3.2.1 Risk identification and evaluation**

All in all, this problem appears to be solved in most of the countries. For the traditional risk types in particular, there are sufficient prevention measures (e.g. hazard analyses, exposure analyses and safety data sheets) in place to identify the risks and usually also to evaluate and control them. When it comes to the “newer” topics in OSH research (poor work organisation, psychological factors at the workplace, ergonomics and radiation), measures still need to be developed, as does accident-risk research.

There is a specific problem in the area of chemical risks. In the EU, users of hazardous chemicals have to be supplied with a safety data sheet detailing the risks involved and appropriate protection measures. Although safety data sheets are also available for “existing commercial chemical substances” (substances placed on the market for the first time before 18 September 1981), the information contained in them is not always sufficient for risk-evaluation purposes. In many companies, there are a variety of compounds and mixtures which can only be evaluated to a certain extent. Another problem which can sometimes occur is that the recommended protection measures are difficult to understand and are thus not implemented.

There also appear to be deficits with regard to plant safety.

A significant deficit is often seen to exist in the documentation and evaluation of risks caused by psychological factors since the issue is considered very complex.

Some voices call for more systematic approaches in order to evaluate the overall risk posed by the individual factors at the workplace. The combination of occupational and non-occupational risks remains a considerable problem for risk evaluation because it is practically impossible to separate the various influences.

### **3.2.2 Prevention measures**

There is a wide range of prevention measures for specific risk types. The main instruments cited were:

- risk evaluation,
- workplace analyses,
- consulting,
- (intensive/ad hoc )training,
- best practice recommendations,
- safety checks,
- information material (stickers and leaflets),
- use of databases,
- risk profiles,
- personal protective equipment (PPE),
- limit values,
- product codes,
- improvement of communication and management,
- skills development for management,
- employee-participation models,
- reward systems and
- campaigns.

It was striking that suitable prevention measures existed or were known of for all risk types - the only deficits observed were in the areas of workplace organisation, ergonomics and psychological factors.

Despite the numerous prevention activities, some quarters call for better implementation of the prevention measures. They would like to see more consideration being given to man-machine interfaces since, although knowledge about prevention measures exists, it is rarely translated into practice in in-company prevention.

### **3.2.3 Evaluation of the effectiveness of prevention approaches in practice**

The participating institutes only cited a few verifiably successful prevention strategies. For the most part, they tended to write down what they would *like* to see rather than verifiable cases of successful prevention. The strategies below were generally considered successful, irrespective of whether they have proven their worth yet in practice.

#### *At the "human-human interface"*

- Solving problems of acceptance
- Raising motivation
- More prevention policy (e.g. employee bonuses but also financial help with investments in safety)
- Improvement of company and management culture
- Improved communication flows
- Creating employee/employer awareness of OSH issues

#### *At the political level*

- Prevention and OSH should be given a stronger legal basis (especially for small and medium enterprises - SMEs)

#### *With regard to information material*

- Checking information material for practical applicability
- More clarity of structure and better understandability
- Guidelines must be implemented by the responsible person in the enterprise
- Practical aids for selecting suitable PPE
- More sector-specific guides
- More consideration of OSH requirements in work-equipment design

#### *In the area of training*

- More (workplace-specific) training
- More problem-specific training
- Expert consulting services

*Especially relevant for small and medium enterprises - SMEs*

- Development of SME-specific protection measures
- More practical aids for implementation in enterprises
- Guidelines and specific recommendations for workplace design
- Increased acceptance for prevention measures

There is a clear call for existing prevention measures to be evaluated with regard to their practical use and to be adapted to the sectors' specific needs, particularly those of SMEs. Human-human interfaces should also be given more consideration so as to avoid communication-related errors.

Apart from the above-mentioned prevention methods for the future, the participants also cited approaches where they would like to see the effectiveness in practice evaluated by means of research projects and improved. Thus, in their view, prevention research should concentrate on the following:

- cost-benefit analyses, monetisation of preventive effects,
- development of indicators for evaluating effectiveness,
- development of economic models,
- risk analyses for accident research,
- possibilities for reducing the causes of risks and
- examination of PPE (practical applicability, acceptance, understandability of instructions, etc.)

A very clear wish expressed by the respondents was to see research findings translated into company practice more often.

### **3.2.4 Obstacles to prevention**

One major obstacle to successful use of prevention measures is that some of the parties involved in OSH lack specific knowledge of certain areas. Some external inspectors or equipment manufacturers, for instance, are not familiar with certain company-specific factors and are thus unable to facilitate practical prevention.

Although information material and training *are* available, they are not sufficiently utilised. The information material fails to provide brief, clearly structured and specific guidance or best practice examples. Unfortunately, there is also sometimes a lack of willingness in enterprises to utilise that material in their day-to-day work. A further obstacle is the time and performance pressure to which companies, especially SMEs, are subject. OSH measures are thus frequently perceived as being more of a nuisance and time-consuming. Some quarters are of the opinion that OSH is expensive and complex. But the crucial point is that there is doubt about and a lack of recognition of the fact that prevention is worthwhile in order to prevent accidents, preserve health and save money.

PPE is sometimes not used to a sufficient degree even though there is a wide range of sophisticated equipment available.

It would thus appear that the goal should be to raise awareness of the need for prevention both among employees and employers. Only by integrating prevention into enterprises' workflows and creating awareness of its importance at the management level will it be possible to increase the importance attached to prevention in the long run. At the moment, risks are also underestimated as habituation sets in.

Another problem is the lack of awareness of the influence of psychological factors on behaviour at the workplace. Research into this subject only began recently and there is a lack of standardised assessment instruments, knowledge of the subject and willingness to tackle it in a constructive manner. Communication deficits are often mentioned in this context.

There are as yet no cost-benefit analyses with which to indicate the cost for enterprises of *not* having OSH measures in place, particularly the high cost of accidents. Neither accident prevention nor the effectiveness of accident-prevention measures has been adequately researched yet.

### **3.2.5 Legislation**

The survey's findings demonstrate that one central OSH law is an advantage because it brings together a number of different rules and simplifies access to legislation. Stringent regulations tend, despite their low level of acceptance, to have a positive effect on accident rates. EU directives promote prevention, particularly in those countries with a low level of occupational safety and health since such countries translate the directives directly into national laws and thus swiftly establish OSH legislation with clear requirements.

### **3.2.6 Conclusion**

The replies are very varied. The situations in the countries differ significantly, thus making it difficult to compare them directly and to draw general conclusions. This is reflected, above all, by the fact that traditional OSH issues are more of a priority for Central and Eastern European (CEE) countries than for Western European countries. In the CEE countries, enterprises' outmoded equipment and lack of funds are the chief problems in OSH. Often, it is impossible to purchase the new machines needed in order to improve the OSH situation. A further problem in the countries with a relatively low GDP is the scant willingness to conduct prevention measures. That willingness needs to be nurtured as it is far lower than in the other European countries. The prevention approach taken by Romania is interesting since it permits prioritisation; the sum of the individual risks with their different ratings is the decisive factor. This strategy appears to be beneficial because it means that prevention measures can primarily be carried out in high-risk areas.

Respondents from several countries stated that there were a number of identification and evaluation instruments for most risk types. However, in some fields, where there are major new technical developments, they need to be reviewed, re-assessed and adapted. Accordingly, new prevention measures need to be developed and existing ones adapted too. Evidently, many risks are still underestimated today both by employees and employers. Many respondents mentioned the need for improved

knowledge on recommended work equipment and best practice examples. Although there is a great deal of information available on OSH, there is a lack of knowledge in enterprises. The information material was also criticised strongly because of its lack of understandability and clarity of structure. Both the information material and PPE need to be reviewed in order to determine their practical applicability and thus to raise acceptance for them.

A general deficit in prevention measures can be seen in the areas of ergonomics, communication, psychology at the workplace and work organisation. Despite the increase in research on these topics, there are not enough instruments, recommendations, guidelines, etc. for them. In this respect, the prevention measures need to be improved because these aspects are often not given due consideration.

There is evidently a problem with a lack of knowledge about how various types of risk interact at the workplace; this was also the reason why the classification of the prevention elements in the questionnaire sometimes caused difficulties. The problem of interaction between different types of risk and the problem of multi-causality is particularly apparent in accidents.

Generally speaking, large companies seem to deal with OSH well but there are often problems in SMEs. Production and cost efficiency are top of the agenda at SMEs and prevention is sometimes neglected. Few SMEs recognise the "profitability of prevention".

An important factor in determining the success of prevention measures is whether they are not too expensive for companies and whether they are accepted at the workplace.

The respondents would like to see a stronger legal basis for prevention and more importance being attached to prevention by society. General appreciation of prevention and OSH overall should be higher, in their opinion.

The respondents called for more development of economic models in order to evaluate the monetary value of measures too and to demonstrate that prevention pays off. For the most part, there is no information on the effectiveness of prevention measures.

The strategies considered possibly most successful tended to be expressed more in terms of what the respondents would *like* to see, which is why this evaluation provides recommendations for future priorities in prevention work rather than concrete examples of best practice.

## 4 Summary of the results

Expenditure on prevention of work-related health risks correlates with the gross domestic product of the country in question. OSH prevention at the workplace requires statutory minimum standards. In addition, appropriate equipment and adequate capital are closely related to this issue as they are crucial to achieving a certain level of occupational safety and health. There is no universal "gold standard" for prevention measures that could be applied to all countries.

There are hardly any deficits left in the prevention processes of "Identification of risks" and "Development of suitable prevention measures" but the respondents still saw some in "Evaluation of risks", "Selection and application/Implementation in the company" and particularly "Evaluation of effectiveness". Enterprises are sufficiently aware of instruments for evaluating the "Effectiveness of prevention measures" for the traditional OSH issues (physical and chemical risks) but such instruments have yet to be developed and established for the "new" issues (work organisation, communication, ergonomics and workplace psychology).

The respondents saw deficits in enterprises' selection of measures both in the case of "traditional" and "new" risks.

There is a wealth of information material available concerning prevention in the field of occupational safety and health. However, it is not particularly understandable, clearly structured, practically applicable or accepted by enterprises. Small and medium enterprises, in particular, are calling for more sector-specific and practice-oriented guidelines and recommendations for workplace design.

There is also a wide range of training available. The focus should be more on enterprise-specific and ad hoc courses, problem-specific training and expert consulting services.

There is not enough knowledge about the combined effect of various risk types. Research is especially necessary in the area of accidents as it will help reduce the high number of serious injuries and the correspondingly high resulting costs.

For most sectors there are too few examples of best practice.

Cost-benefit analyses should be carried out to illustrate the high cost of *not* having OSH measures in place. Employees and employers alike are not sufficiently aware of the fact that prevention pays off financially but also socially and that it should thus be made a key management task.

More consideration should be given to the "cost efficiency of prevention" in future.

## **5 Recommendations for future prevention measures**

### **Recommendation 1**

The information available must be reviewed to determine its practicability and effectiveness in enterprises and then be adapted accordingly; this process should give preference to sectors where prevention is particularly important. In order to satisfy the requirement for concise, enterprise-specific information on OSH, the information material in enterprises typical of the various sectors should be evaluated. In addition, lists of the most important information materials and the recommended work equipment should be produced for each sector.

### **Recommendation 2**

The question of whether appropriate, sector-specific training is available should be explored. Where it is available, its usefulness for the target group should be evaluated, improved and the content constantly updated. If such training is not available, courses should be developed.

### **Recommendation 3**

The spheres of research and industry should join forces to develop aids for assessing the "new" risks, specifically:

- psychological loads at the workplace,
- work organisation and
- ergonomics.

The current work on developing instruments with which to evaluate these issues should remain a priority.

### **Recommendation 4**

The effectiveness of the prevention measures for the "traditional" issues needs to be reviewed as well and the measures brought into line with new technical developments.

### **Recommendation 5**

Practical methods should be developed for "cost efficiency and effectiveness of occupational safety and health (cost-benefit analyses)" since, so far, the published methods are almost all of a scientific nature and are not accessible to companies (not understandable or practicable).

**Recommendation 6**

Where they exist, examples of best practice should be collected for each specific sector in such a way that the information can be easily accessed by those with an interest in the subject.

**Recommendation 7**

Instruments such as financial incentives (from the government or insurance providers) should be used in order to offer more economic motivation to implement prevention measures.



**Table 5: Breakdown of information on prevention elements by risk type**

<b>All risks</b>					
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	AUVA hazard and exposure analyses are available for various noxious hazards.	Risk evaluations, consulting services, seminars, information material (leaflets, etc.) are used.	<p>Motivation and acceptance play a crucial role. Important factors for the information material are:</p> <ul style="list-style-type: none"> <li>• clarity of structure,</li> <li>• understandability and</li> <li>• adherence to the "bare necessities".</li> </ul> <p>In addition, information obtained from the authorities is often good.</p>	<ul style="list-style-type: none"> <li>• Information deficits</li> <li>• Prejudiced opinion that OSH is expensive and labour-intensive</li> <li>• Neglect of key issues (ergonomics, psychological factors)</li> </ul> <p>There are still many gaps in OSH in SMEs.</p>	
EL.IN.Y.A.E. Greece	Risks are recognised in most cases.	<p>Fundamental deficits still exist with regard to the measures.</p> <p>The following are still necessary:</p> <ul style="list-style-type: none"> <li>• support for best practice (especially in the case of chemicals, stress and musculoskeletal disorders) and</li> <li>• rewards for companies which use innovative prevention measures</li> </ul>	<p>An active prevention policy is beneficial, e.g.:</p> <ul style="list-style-type: none"> <li>• reward system for improvement of the working environment and</li> <li>• ad hoc training</li> </ul>	There are information deficits with regard to company best practice.	More information can be found in Section 8 of the report entitled "Priorities and Strategies in Occupational Safety and Health. Policy of the European Union" by the European Agency for Safety and Health at Work, Bilbao.

	<b>All risks</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
MKK Hungary	This point is often underestimated.		Prevention measures tend to be given more attention in new and large companies.	<p>Many SMEs and older companies have the following problems:</p> <ul style="list-style-type: none"> <li>• major knowledge deficits,</li> <li>• lack of willingness on the part of management,</li> <li>• too little money and</li> <li>• measures are too expensive.</li> </ul> <p>For further sector-specific details, see Annex 1 (1).</p>	

<b>All risks</b>					
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
INAIL Italy	Most risks cannot be identified or evaluated in isolation. Some of these risks also occur in leisure activities. In addition, many accidents and diseases are caused by multiple factors and are thus often neglected in research into causes (causal research).		<p>Prevention should be made a statutory part of production; adequate communication flows, training methods and information should also be developed further.</p> <p>The methods should be applied at the workplace with the psychological context included and the executive management involved.</p> <p>Economic models should be developed (see Annex 1, (2)).</p> <p>Newer subjects (e.g. electromagnetic fields - EMFs) should be researched.</p> <p>Prevention solutions for SMEs are necessary for difficult-to-solve issues.</p> <p>Accident analyses at public institutions should be introduced for the complex sphere of causal research.</p>		Risk should be seen as part of life (see Annex 1, (3)).

	<b>All risks</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
ISPESL Italy			<p>The following would appear to be beneficial for ad hoc training:</p> <ul style="list-style-type: none"> <li>• (advanced) courses need to be designed for specific risks and sectors,</li> <li>• training must be offered and designed specifically for the employees,</li> <li>• train-the-trainer courses are needed and</li> <li>• measures need to be taken to improve use of and access to existing written information.</li> </ul>		
CIOP Poland	Prevention focuses on all risk types except violence. Risk-evaluation methods have been developed and are currently gaining ground in companies.				

	All risks				
<i>Institution/ Country</i>	<i>Risk identification and evaluation</i>	<i>Prevention measures</i>	<i>Effectiveness of prevention methods in practice</i>	<i>Obstacles to practical implementation</i>	<i>Comments</i>
INCDPM Romania	<p>Hazards are identified using the INCDPM method (see Annex 1, (4)).</p> <p>Risk at the workplace is evaluated using evaluation sheets which assign the risks to different levels (see Annex 1, (5a)). This enables priorities to be determined for protection and prevention measures. The overall risk at a workplace is calculated by weighting the identified individual risks.</p>	<p>The prevention measures are conducted on the basis of the priorities determined using the evaluation sheet. Once the overall risk reaches a certain level, measures have to be taken. The action taken is based on recommendations (see Annex 1, (5b)).</p>	<p>The advantage of the INCDPM method is that it can be used for every work step and all work processes. Furthermore, it can be computer-aided.</p>	<ul style="list-style-type: none"> <li>• Companies' financial situation</li> <li>• Inadequate employee training</li> <li>• Time pressure during production process</li> <li>• Inadequate ventilation</li> <li>• Unprotected and unmarked hazardous areas</li> <li>• Incorrect behaviour at the workplace</li> </ul>	
INSHT Spain			<p>Prevention only works properly in large enterprises. In SMEs, guidelines and the like are only sufficient if they are implemented by a person with relevant responsibility.</p> <p>OSH must become rooted in people's consciousness if the problem is to be solved. The political aim, including for social insurance bodies, should be to have a high number of SMEs which meet OSH requirements.</p>	<p>Employers at SMEs are predominantly interested in production and business so they often neglect prevention. There is often misunderstanding or a lack of knowledge about prevention equipment and regulations. But it is also the case that too little time is devoted to prevention management and development of appropriate measures.</p>	<p>There is evidence of a trend towards external OSH services which bring high quality and provide SMEs with the relevant knowledge; but this trend is considered problematic.</p> <p>The legal definition of "accident" is far too rigid (see Annex 1, (6)).</p>

	<b>Mechanical risks</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	Risks are identified and solved by means of analyses and workplace assessments. However, the risks in SMEs are a small-scale problem. Near-miss accidents are often not detected because they are not recorded.	Developing prevention measures is not a problem. There are also projects, campaigns, consulting services, courses and leaflets on this subject.	Can only be detected to a certain extent because a drop in accident figures is only registered if the accident rate was previously high.	<ul style="list-style-type: none"> <li>• Risk underestimation due to habituation effect</li> <li>• Implementation seen as hindering production</li> <li>• Measures are only stepped up if the accident figures are high</li> <li>• Data collection is problematic because SMEs do not have enough data</li> <li>• Near-miss accidents are usually not recorded at all</li> <li>• Enterprises with high mechanical risks have few accidents</li> </ul>	

	<b>Mechanical risks</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
INRS France				<ul style="list-style-type: none"> <li>• SME managers sometimes neglect their duty to evaluate risk</li> <li>• There is too little time and the costs are too high for OSH</li> <li>• CRAMs do not reach enough companies</li> </ul>	CRAM: Caisse Régionale d'Assurance Maladie (regional health assurance funds)
BAuA Germany		Although there <i>are</i> sufficient measures in place, they need to be evolved and updated.	Future prevention work will need to focus on evolving integrated safety in design and for technical protection measures. Safety requirements will thus have to be integrated into the early stages of the development process for products and processes (see Annex 1, (7a)).		A large percentage of accidents are caused by mechanical risks (moving machinery parts, transport equipment, falls, falls from a height); consequently, there is still a high risk.

	<b>Mechanical risks</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
ISPESL Italy		<ul style="list-style-type: none"> <li>• Ad hoc training</li> <li>• Use of databases for safety checks</li> <li>• Solutions</li> <li>• Risk profiles</li> <li>• Information on measures is available</li> </ul>		SMEs ignore the information on measures. The necessary safety structure is still missing, especially in Southern Italy.	There is a wealth of experience, spanning several years, with safety technologies, particularly due to national harmonisation activities. There is close contact between the approximately 600 inspectors in the field and the enterprises. However, often the inspectorate headquarters does not have close contact with the inspectors. The accident figures have increased (see Annex 1, (7b)).
INAIL Italy	Although many risks <i>are</i> identifiable, some of them are difficult to fit into the categories given in the questionnaire.	<ul style="list-style-type: none"> <li>• Identification</li> <li>• Risk analysis</li> <li>• Information</li> <li>• Training</li> </ul>		There are gaps and problems in all of the prevention elements.	
SUVA Switzerland	Risks are known but it is difficult to estimate their frequency because of a lack of information concerning overall exposure.		There are successful projects in three sectors (see Annex 1, (8b)).	Information on measures is available but the enterprises are not familiar with it or ignore it.	It is difficult to estimate the risks because it is often not known how many employees work with how many machines to what capacity.



	<b>Mechanical risks</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
INSHT Spain	Awareness of risk identification and evaluation exists. Technical improvements are reducing accident risks but there are still deficits in the following sectors: construction, mining, timber and metal industries.		The political sphere should promote SME investments in safety, e.g. decommissioning of old and unsafe machines, structures.  Serious transport accidents could be prevented by means of risk analyses.	Implementation of measures and evaluation of their efficiency are difficult. There are no cost-benefit analyses as yet. The links between accident type and other factors (e.g. speed of work, subcontracting, temporary workers, migrants, etc.) are still unclear.	

	<b>Electricity</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	The risks are identified with ease but there are still problems with small insulation defects .	The following measures are in place everywhere: <ul style="list-style-type: none"> <li>• information,</li> <li>• training,</li> <li>• leaflets,</li> <li>• stickers,</li> <li>• consulting services and</li> <li>• training via the electro-pathological museum</li> </ul>	The current prevention measures are effective.	The risk posed by high-voltage hazards is underestimated due to habituation effects setting in after years of dealing with electricity for lighting purposes.	This topic is not particularly relevant because only a small number of persons die as a result of such accidents (5 electricity-related fatalities in 1999).
INRS France			The opinion is that increased collaboration between users and electricians would be beneficial.		

<b>Electricity</b>					
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
BAuA Germany	There are no problems with risk identification in the field of electricity, voltage and hazards caused by proximity and contact. However, there are still uncertainties with regard to risk evaluation.	Prevention measures are in place.	<ul style="list-style-type: none"> <li>• New measures need to be developed for new equipment</li> <li>• Existing measures should be reviewed and modified in line with new developments</li> <li>• Acceptance of personal protective equipment (PPE) should be examined in studies involving users</li> <li>• Electrical accidents which also involve psychological factors should be documented and analysed</li> <li>• Accident questionnaires with systematic data acquisition and forwarding to competent bodies</li> </ul>	PPE is not always used. Accidents are not sufficiently documented to be able to determine the effectiveness of PPE.	
ISPESL Italy		Prevention measures are in place.	More ad hoc training is necessary.		Thanks to new OSH legislation, there are no more problems. Only certified professionals may install electrical equipment. There are far fewer accidents as a result.

	<b>Electricity</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
INAIL Italy		<ul style="list-style-type: none"> <li>• Identification of risks</li> <li>• Risk analysis</li> <li>• Information</li> <li>• Training</li> </ul>			
SUVA Switzerland	Risks are known but it is difficult to estimate their frequency because of a lack of information concerning overall exposure.				<p>SUVA is not directly responsible for this field, due to the legislative provisions, and its competence is thus restricted.</p> <p>There are projects in three sectors (see Annex 1, (8b)).</p>
INSHT Spain	The risks are known.	<ul style="list-style-type: none"> <li>• Selection and application of measures (new materials, generic protection measures and PPE)</li> <li>• Evaluation of efficiency</li> <li>• Improvement of training</li> </ul>	<p>Specific protection measures should be developed, particularly for SMEs.</p> <p>Existing workplace-specific training should be expanded.</p>		Electrical equipment must be installed by suitably trained and certified professionals. The employer is responsible for ensuring this requirement is fulfilled.

	<b>Fire and explosions</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	<p>Methods exist, different analyses are used for them. The risk is only high in enterprises which seldom handle such substances. AUVA has only investigated explosions (air/gas ratio).</p> <p>There are problems with the use of inflammable materials for decorative purposes.</p> <p>A further problem is posed by blocked escape routes, e.g. in discos and supermarkets.</p>	<p>Measures are in place for the most part but not in those enterprises which seldom handle such substances.</p>		<ul style="list-style-type: none"> <li>• Acceptance of prevention measures</li> <li>• Lack of knowledge due to lack of experience in handling inflammable materials</li> <li>• Many measures are sabotaged</li> <li>• Escape routes are sometimes blocked</li> </ul>	<p>Fire safety officers are an official requirement.</p>
INRS France	<p>Since the companies differ greatly, it is hardly possible for INRS staff to evaluate the specific risks; consequently, only general prevention recommendations are usual.</p>	<p>Prevention is the managers' task, not INRS'.</p> <p>Hazardous zones should be clearly demarcated; assistance is necessary to do this.</p>			
ISPESL Italy		<p>Prevention measures are in place.</p>	<p>Further as hoc training is necessary.</p>		

	<b>Fire and explosions</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
INAIL Italy		<ul style="list-style-type: none"> <li>• Identification</li> <li>• Risk analysis</li> <li>• Information</li> <li>• Training</li> </ul>			
SUVA Switzerland	Risk analyses and evaluations are in place.	Although measures <i>are</i> in place, the evaluations are often inadequate.			
INSHT Spain	Risks are known and under control.	<ul style="list-style-type: none"> <li>• Selection and application of measures (new materials, generic protection measures and PPE)</li> <li>• Evaluation of efficiency</li> <li>• Improvement of training</li> </ul>	Specific protection measures should be developed, particularly for SMEs.		

<b>Physical risks</b>					
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	Various risk analyses are in place, such as noise measurements, consulting services for companies, etc.	Prevention measures are in place but there are obstacles.	It is difficult to assess successful strategies because the effectiveness of the measures can only be judged over a long period.	<ul style="list-style-type: none"> <li>• Underestimation of noise, vibrations and draughts</li> <li>• Employees are often the reason why implementation fails (e.g. noise control)</li> <li>• It is difficult to separate occupational and non-occupational hazards</li> </ul>	
BAuA Germany	Risk analyses are in place but there are deficits in the areas of noise and radiation (lasers, UV, IR and visible light).	Although noise-control measures are in place, new prevention measures need to be developed.	<p><u>Noise</u></p> <ul style="list-style-type: none"> <li>• Causes of noise and radiation need to be reduced (noise sources, machinery, work methods)</li> <li>• Development and implementation of methods for enforcing specified emission levels and appropriate measures (see Annex 1, (9))</li> </ul> <p><u>Laser radiation</u></p> <ul style="list-style-type: none"> <li>• Research into and evaluation of short-pulse laser rays</li> <li>• Development of measures</li> </ul>	<p>There is still a lack of knowledge about certain types of radiation. In some fields, there is a lack of acceptance for measures.</p> <p>Noise-reduction possibilities are not used sufficiently (see Annex 1, (9)).</p>	<p>High noise levels lead to different hazards than medium levels (see Annex 1, (10)).</p> <p>There is a significant increase in visible and IR radiation in a number of areas of application (see Annex 1, (13)).</p>

<b>Physical risks</b>					
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
BAuA Germany (contd.)			<p>to provide protection against short-pulse lasers, especially protective goggles (see Annex 1 (11))</p> <p><u>UV radiation</u> (see Annex 1 (12))</p> <ul style="list-style-type: none"> <li>• Evaluation of UV radiation at work and in leisure</li> <li>• Elimination of knowledge deficits</li> <li>• Specification of limit and reference values</li> <li>• Development of suitable PPE</li> <li>• Standardisation of measuring equipment and strategy</li> <li>• Assessment of employee exposure out of doors</li> <li>• Development of indicators for assessing effectiveness</li> <li>• Target-group-oriented information material</li> <li>• Implementation aids for enterprises</li> <li>• Materials for advanced training</li> </ul>		



	<b>Physical risks</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
BAuA Germany (contd.)			<u>Visible and IR radiation</u> <ul style="list-style-type: none"> <li>• Evaluation of hazards</li> <li>• Standardisation of measuring equipment and strategy</li> <li>• Specification of limit values</li> <li>• Development of simple, mobile measuring devices</li> </ul>		
ISPESL Italy		Databases are used (safety checks, solutions, risk profiles). Measures are in place for noise control but not so much for vibration control .		Appropriate protection measures are still not used widely enough.	
INAIL Italy		<ul style="list-style-type: none"> <li>• Identification and risk analysis</li> <li>• Information</li> <li>• Training</li> <li>• Technical and health-related research on radiation, vibrations, high- and low-frequency ranges</li> <li>• Specification of limit values</li> </ul>			

	<b>Physical risks</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
SUVA Switzerland	<p>Since much remains unknown about the risks in the low-dose range, it is difficult to estimate them.</p> <p>There are no deficits when it comes to identifying noise, vibration and radiation risks; assessments are usually not a problem.</p>	It is usually not a problem to take measures against noise, vibration and radiation.		There is a lack of systematic knowledge about effectiveness and possible measures to provide protection against electromagnetic fields and radiation.	<p>Noise maps exist.</p> <p>Enterprises only see problems with the cost-benefit issue in some cases.</p>
INSHT Spain	Non-ionising radiation is becoming increasingly widespread but there is still not enough knowledge about it. Interdisciplinary research is thus required.	Prevention measures <i>are</i> in place but they are insufficient in some cases.	Research findings should be used to derive practical solutions.	Action is still required with regard to selecting suitable prevention measures and determining the effectiveness of those measures. There is still not sufficient knowledge about the use of lasers in cosmetic surgery, particularly dermatological treatment.	

	Chemical risks				
<i>Institution/ Country</i>	<i>Risk identification and evaluation</i>	<i>Prevention measures</i>	<i>Effectiveness of prevention methods in practice</i>	<i>Obstacles to practical implementation</i>	<i>Comments</i>
AUVA Austria	Risks are only identified to a certain extent because there are approximately 3,500 new substances every year. Further problems are the time lag between the appearance of the substances and the development of the measuring equipment, the difficulty in providing protection against substances which are available under a variety of names, absence of safety data sheets and hazard analyses by AUVA.	There are many consulting services available.  Prevention is the norm in the area of technical OSH and PPE.			In those enterprises which are directly affected, there are only small problems or no problems at all. But there <i>are</i> problems in those enterprises where chemicals only play a minor role.  Despite all its activities, AUVA is only able to carry out limited risk estimation.
INRS France	Labelling and safety data sheets make identification easy; however, toxicological and epidemiological aspects are making risk evaluation increasingly difficult.			Some of the regulations are contradictory. It is difficult to determine the effectiveness of prevention measures because the harmful effects of many substances are latent and combined exposure is involved in most cases.	

	Chemical risks				
<i>Institution/ Country</i>	<i>Risk identification and evaluation</i>	<i>Prevention measures</i>	<i>Effectiveness of prevention methods in practice</i>	<i>Obstacles to practical implementation</i>	<i>Comments</i>
BIA Germany	Problems still exist with assessment, particularly where products are compared.  There are also problems when it comes to determining and assessing exposure.	<ul style="list-style-type: none"> <li>• Product codes</li> <li>• Sector-specific solutions</li> <li>• "Column Model"</li> <li>• Procedure- and substance-specific criteria</li> <li>• BIA recommendations</li> </ul>		There are problems where substances have latent and chronic effects.	
BAuA Germany	<p>a) There are gaps in toxicological information; there is a lack of risk-evaluation tools.</p> <p>b) There are deficits in plant safety (see Annex 1, (14)).</p>	b) Plant safety is presently solved by technical means but the "human factors" have been neglected.	<p>a) More research and prevention are required for:</p> <ul style="list-style-type: none"> <li>• dust-related, non-specific diseases of the respiratory tract,</li> <li>• work-related diseases of the respiratory tract caused by combined exposure,</li> <li>• contact dermatitis,</li> <li>• environmental monitoring for air allergens,</li> <li>• dermal exposure and</li> <li>• work-related risks to the reproduction system.</li> </ul> <p>For details, see Annex 1, (8).</p>	<p>a)</p> <ul style="list-style-type: none"> <li>• Lack of adequate prevention strategies, especially for dermatological risks and reproductive toxicology</li> <li>• Lack of gold-standard limit values for selecting suitable measures</li> <li>• Problem of performing representative measurements in real working conditions</li> <li>• Information is based on model assumptions so effectiveness can only be determined to a limited</li> </ul>	<p>Responses a) and b) were given by different interviewees.</p> <p>Examples of instruments:</p> <ul style="list-style-type: none"> <li>• TRGS 440 "Substitute Substances",</li> <li>• HSE COSHH Essentials,</li> <li>• standardised work practice (TRGS 440) and</li> <li>• good company practice - minimum requirements for chemicals (TRGS 500)</li> </ul>

Chemical risks					
<i>Institution/ Country</i>	<i>Risk identification and evaluation</i>	<i>Prevention measures</i>	<i>Effectiveness of prevention methods in practice</i>	<i>Obstacles to practical implementation</i>	<i>Comments</i>
BAuA Germany			<p>b) Plant safety Development of operators' ability to react flexibly in extraordinary situations.</p> <p>b) Required Research into workflows, periodic exercises on how to avert hazards.</p>	<p>extent</p> <ul style="list-style-type: none"> <li>Deficits have not been identified and remedied adequately yet</li> <li>More simple instruments for risk evaluation and selection of control strategies need to be developed further</li> </ul>	
ISPESL Italy		Databases (e.g. safety checks and risk profiles) are useful.		<p>Training on how to handle pesticides is provided for <i>employers</i>, not the <i>employees</i>.</p> <p>Often, SMEs do not understand the information on hazardous substances. Feedback from the enterprises is too meagre. The consulting services for the enterprises are inadequate.</p>	ISPESL works more on a superordinate level (see Annex 1, (8c)).
INAIL Italy		<ul style="list-style-type: none"> <li>Information, training and research on potential carcinogenicity and mutagenicity</li> <li>Specification of limit values</li> </ul>			

<b>Chemical risks</b>					
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
SUVA Switzerland	<p>Identification and risk evaluation do exist in some cases but the constant flow of new chemicals makes them difficult.</p> <p>SMEs do not have sound risk assessment in place.</p>	The prevention measures tend to work well.	One successful approach is the legal obligation to call in more experts under certain conditions; as a result, more exposure measurements are carried out and the limit values are adhered to more. Obligatory approval procedures for plans to introduce new work processes in industry have proven effective.	In the area of dust and diesel-engine emissions, there is no legal basis for particulate filters.	
INSHT Spain	<ul style="list-style-type: none"> <li>• Sufficient substance-related information and regulations are in place</li> <li>• Action still needs to be taken with regard to risk evaluation</li> <li>• Need for action with regard to new chemicals and allergenic compounds</li> </ul>		<p>Useful approaches are:</p> <ul style="list-style-type: none"> <li>• practical aids which explain the required labelling and pictures,</li> <li>• development of measuring routines for specific substances,</li> <li>• more substitution of hazardous chemicals and more market information concerning them,</li> <li>• practical guides to selecting protective measures and PPE and</li> <li>• development of methods for registering persons exposed to specific chemicals</li> </ul>	Measuring methods and methods for selecting and evaluating hazardous substances still need to be developed.	INSHT's research mainly covers acute effects. Compensation is only paid if allergies begin <u>after</u> the person starts the job. Compensation is not paid for atopic diseases. WHO recommendations are usually directly transposed into Spanish law.

	<b>Biological risks</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	Hazard analyses exist but estimation is only possible to a limited extent, especially in the disposal area.	The measures are successful in enterprises which frequently handle biological substances but there are problems where such handling occurs infrequently.		Although SMEs have knowledge about the substances, there is a lack of willingness to invest in prevention.	
BIA Germany			Sector-specific guides are useful.	There are problems when it comes to assessing effectiveness, especially in the case of latent and chronic effects.	
ISPESL Italy		Databases (e.g. safety checks and risk profiles) are useful.	Consumer-protection measures also have a positive impact on OSH. Occupational health professionals decide whether hepatitis vaccinations are carried out. Detailed regulations for plant for sorting out hazardous substances have reduced the risks.		Prevention focuses on the healthcare sector. A biological-agent exposure database is being set up.
INAIL Italy		<ul style="list-style-type: none"> <li>• Information</li> <li>• Training and research on potential carcinogenicity and mutagenicity</li> <li>• Specification of limit values</li> </ul>			

	<b>Biological risks</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
SUVA Switzerland	Awareness of risk identification exists to some extent but the constant flow of new chemicals makes identification and risk evaluation difficult.	If the risks have been identified, the prevention measures do not pose a problem.	There are various successful campaigns.	Campaigns are only successful if they are repeated periodically.	SUVA supports sector solutions for SMEs, most of which are devised by the various sectors' associations. They contain risk assessments for standard situations. If such assessments do not exist, SMEs have to call in specialists.
INSHT Spain	Risk identification is not a dominant subject and is really quite a new topic.	There are still deficits in all prevention methods.	The following are useful: <ul style="list-style-type: none"> <li>• evaluation methods,</li> <li>• vaccinations,</li> <li>• technical safety checks,</li> <li>• prevention measures (general and PPE),</li> <li>• registration of exposed workers,</li> <li>• research on workplace accidents or outbreaks of illnesses and</li> <li>• increased research in the field of identification of new biological substances: endotoxins, long-term effects, etc.</li> </ul>		The focus is not on infectious diseases but on biological influences, which have a sensitising effect.



	High and low temperatures				
<i>Institution/ Country</i>	<i>Risk identification and evaluation</i>	<i>Prevention measures</i>	<i>Effectiveness of prevention methods in practice</i>	<i>Obstacles to practical implementation</i>	<i>Comments</i>
AUVA Austria	Hazard analyses exist but the risks are often underestimated. There are still unresolved questions with regard to the long-term effect of extreme temperatures.	Prevention measures are in place and mainly consist of hazard analyses and consulting services.		The risks are underestimated because extreme temperatures often only occur for a short time.  There is little willingness to implement measures.	
ISPESL Italy		More training is needed.		The primary problem is that the employees do not recognise the risk.  Problems chiefly occur in small enterprises, e.g. bakeries.	
INAIL Italy		<ul style="list-style-type: none"> <li>• Identification</li> <li>• Risk analysis</li> <li>• Information</li> <li>• Training</li> </ul>			
SUVA Switzerland	There are no problems in this field.				
INSHT Spain					This topic is dealt with under physical and mechanical risks and is thus not described separately here.

	<b>Physical strain</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	The risks have only been identified to a certain extent because small loads are considered unproblematic and the damage usually does not occur until a later date.	The following measures are in place: <ul style="list-style-type: none"> <li>• lifting aids,</li> <li>• (intensive) training,</li> <li>• consulting,</li> <li>• leaflets, etc.</li> </ul> Industry has also implemented measures, e.g. smaller packages.	It is difficult to determine which approaches are successful because the figures on long-term damage and sick leave are unreliable.	One major obstacle is workers' assumption that they are doing their work properly although it is causing too much strain. There are also acceptance problems with prevention; e.g. people consider it too much bother to fetch a lifting aid just for two sacks.	
INRS France		The know-how exists but suitable prevention measures are not implemented to a sufficient extent.			
BIA Germany				There are problems when it comes to assessing latent effects.  There are problems with in-company implementation because of employees' behaviour.	
ISPESL Italy	The NIOSH Guidelines are in widespread use in the healthcare sector.	Databases (e.g. safety checks, solutions and risk profiles) are useful.			Physical strain and ergonomics are among the main fields covered by ISPESL.

	<b>Physical strain</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
INAIL Italy		<ul style="list-style-type: none"> <li>• Identification</li> <li>• Risk analysis</li> <li>• Information</li> <li>• Training</li> </ul>			
SUVA Switzerland	<p>Awareness of risk identification exists.</p> <p>The guideline-value method has been introduced, making it possible to reliably assess strain, especially in lifting and carrying activities.</p>	Methods are being developed to calculate the financial benefit (due to stress reduction leading to lower accident rates) of adhering to prevention measures.	There are successful examples for lifting and carrying.	<p>The problems are known but solutions need to be found which companies will accept and which are not too expensive.</p> <p>The measures sometimes require far-reaching intervention in the process structure and this can lead to acceptance problems.</p>	There is a conflict between prevention and compensation for lifting and carrying due to different criteria.
INSHT Spain	There are sufficient provisions for risk identification and the identification methods offer sufficient solutions.		Problem-specific training and expert consulting services could be developed - these would be the most efficient methods.	There are still deficits in the construction and healthcare sectors. Suitable prevention measures should be selected and implemented in these areas.	

	<b>Poor ergonomics</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	The risks are only identified to a limited extent.	Prevention measures are in place but are not used to a sufficient extent.		<ul style="list-style-type: none"> <li>• The methods and tools available are not always used as intended</li> <li>• Too little awareness of good ergonomics</li> <li>• Measures too expensive</li> <li>• Too much effort required</li> <li>• Lack of space</li> </ul>	The link between poor ergonomics and health complaints is difficult to see because there are often long latency periods involved.
INRS France		Findings and methods should be translated into practice more in companies.			
BIA Germany				Problems arise during the actual assessment and implementation of ergonomically complex situations. Consequently, a number of aspects should be taken into account right from the equipping/furnishing stage. Assessing effectiveness can be a problem if effects on health do not kick in immediately.	

<b>Poor ergonomics</b>					
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
BAuA Germany	<ul style="list-style-type: none"> <li>• Priority on all prevention elements</li> <li>• Evaluations exist but the numerous methods are only of limited practical use</li> <li>• The risks posed by poor ergonomics are still underestimated when incidents and accidents occur</li> </ul>		<p>The following approaches are necessary:</p> <ul style="list-style-type: none"> <li>• development of instruments,</li> <li>• more consideration of the altered requirements in work-equipment design,</li> <li>• attention paid to product design and</li> <li>• evaluation of effectiveness</li> </ul> <p>Guides for selecting ergonomic products and descriptions of good example solutions are considered useful.</p>	<p>All of the factors in the prevention elements have deficits (see Annex 1, (16)).</p> <p>There is still a great need for evaluation tools.</p>	<p>The “ergonomics” risk type takes in a wide scope; this survey only considers work equipment (see Annex 1, (15)).</p> <p>The world of work has changed and this has led to new problems (see Annex 1, (17)).</p>
ISPESL Italy		Databases (e.g. safety checks, solutions and risk profiles) are useful.			
INAIL Italy		<ul style="list-style-type: none"> <li>• Identification</li> <li>• Risk analysis</li> <li>• Information</li> <li>• Training</li> </ul>			

	Poor ergonomics				
<i>Institution/ Country</i>	<i>Risk identification and evaluation</i>	<i>Prevention measures</i>	<i>Effectiveness of prevention methods in practice</i>	<i>Obstacles to practical implementation</i>	<i>Comments</i>
SUVA Switzerland	<p>This is the field in which systematic development of risk evaluation and evaluation of the efficiency of measures are most necessary. Systematic studies are thus needed.</p> <p>There is still a major deficit in the design, equipping and improvement of workplaces.</p>			<p>The current legislative stipulations are too general.</p> <p>There are still acceptance problems though they are on the decline.</p>	Prevention should focus on musculoskeletal disorders.
INSHT Spain	<p>The high incidence of musculoskeletal disorders is proof of the numerous unsolved problems in the field of ergonomics, which is why ergonomics is a relevant topic. It is a field with a complicated pathogenesis, confounders and long-term and cumulative effects, which explains the small amount of companies' activities.</p>		<p>The following approaches are useful:</p> <ul style="list-style-type: none"> <li>• improvements in all prevention elements, starting with raising employer and employee awareness,</li> <li>• provision of specific evaluation methods,</li> <li>• guidelines and</li> <li>• specific recommendations for workplace design should be made available to SMEs.</li> </ul>		Nevertheless, the subject of ergonomics is of secondary importance.

	<b>Workplace environment</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	Risk-identification measurements are conducted. The risks are often not identified until after consulting has taken place.	Prevention measures, such as consulting, are in place.		<ul style="list-style-type: none"> <li>• Insufficient awareness of problems</li> <li>• Implementation difficult in some cases</li> <li>• Insufficient willingness to spend more money</li> <li>• Incorrect counter-measures</li> </ul>	Effectiveness can be seen quickly, e.g. if the rate of short-term sick leave decreases.
BIA Germany				Problems arise during the assessment and implementation of ergonomically complex situations. Consequently, a number of aspects should be taken into account right from the equipping/furnishing stage.	Assessing effectiveness can be a problem if effects on health do not kick in immediately.
ISPESL Italy		More ad hoc training for employers is necessary.			In ISPESL's view, workplace environment is not an important problem.

	<b>Workplace environment</b>				
<i>Institution/ Country</i>	<i>Risk identification and evaluation</i>	<i>Prevention measures</i>	<i>Effectiveness of prevention methods in practice</i>	<i>Obstacles to practical implementation</i>	<i>Comments</i>
INAIL Italy		<ul style="list-style-type: none"> <li>• Information and training</li> <li>• Development of management awareness</li> <li>• Skills development for management</li> <li>• Employee-participation models</li> </ul>			
SUVA Switzerland				There is still not enough willingness on employers' part to invest in OSH. The advantages are not yet recognised to a sufficient extent.	
INSHT Spain				There is still not sufficient understanding of this subject in office and administrative work. Problems are also seen in connection with psychosocial factors.	Workplace design is seen as being more about architecture and lighting. Climate, temperature and humidity are classified under different headings so there are no further details here.



	<b>Psychological loads</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention measures in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	Although analyses are available, it is difficult to estimate the risks. In addition, long evaluation periods are required. Mobbing is difficult to detect and analyse.	Sufficient prevention measures are in place and there are also company psychologists.	The company culture and management style are crucial for success. This is partly reflected in the rate of sick leave, e.g. if employees are not concerned about losing their jobs.	<ul style="list-style-type: none"> <li>• Poor company culture</li> <li>• Poor management style</li> <li>• Turning a blind eye to mobbing</li> </ul>	Stress is considered a trend and a way for people to underline their own importance.
INRS France	There are still deficits in the area of risk identification.	It is difficult to determine measures because there is a lack of knowledge on this subject at the moment.	The aim should be to acquire more expertise on this subject.		
ISPESL Italy	ISPESL has expertise in this area but there are no standardised assessment instruments in industry.	More ad hoc training is required.			There are three anti-mobbing centres in Italy.
INAIL Italy	Identification of the specific risks is not possible but studies and evaluations are currently being carried out. There is not yet enough information available. Often, there is a co-risk factor.	<ul style="list-style-type: none"> <li>• Information and training</li> <li>• Development of management awareness</li> <li>• Skills development for management</li> <li>• Employee-participation models</li> </ul>			

	<b>Psychological loads</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention measures in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
SUVA Switzerland	Many mechanisms are known but it is difficult to evaluate the risks present in companies. The work and safety climates tend to be evaluated instead. Some private insurers offer systematic approaches.	<p>It is difficult to identify evidence to justify intervention measures.</p> <p>Improvement of communication and management style, more employee participation, etc. can lead to real, measurable improvement in safety in the enterprise.</p> <p>These prevention measures fall within the remit of the Swiss rail company (Schweizer Bundesbahnen) but SUVA is not involved.</p>		A chief obstacle is the low level of acceptance for this subject in enterprises.	The SALSA questionnaire is currently being tested. SUVA is working on combating alcohol and drugs.

	<b>Psychological loads</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention measures in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
INSHT Spain	Psychological loads and requirements have become one of the most important issues in OSH. The risks comprise a variety of complex factors and have various causes (customers, work organisation, corporate culture, etc). This makes it difficult to deal with them. The negative effects are not only mental illnesses but also musculoskeletal disorders, accidents at work and a decline in the quality of work output.	Reliable methods for identifying and evaluating the risks are complicated and only accessible to experts.	It is useful to translate research findings into workplace practice and to exchange solutions.	It is difficult to deal with this subject because there is hardly any information from the enterprises.	Stress has to be seen in conjunction with the cultural background. Theoretical psychological approaches are known. Cost-benefit analyses are only conducted in large enterprises and only where such programmes are sponsored by the government.

	<b>Physical violence</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention measures in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	There is no awareness of risk identification for this subject.				Potential for aggression can increase due to poor working conditions.
INRS France	The risk is only identified to a small extent.	It is difficult to determine measures because there is a lack of knowledge on this subject at the moment.	The aim should be to acquire more expertise on this subject.		
ISPESL Italy		More ad hoc training is necessary.			Violence is not seen as a work risk.
INAIL Italy	Identification of the specific risks is not possible but studies and evaluations are currently being carried out. There is not yet enough information available.	<ul style="list-style-type: none"> <li>• Information and training</li> <li>• Development of management awareness</li> <li>• Skills development for management</li> <li>• Employee-participation models</li> </ul>			
SUVA Switzerland	There is no experience with this subject.				SUVA's work does not yet cover physical violence.

	<b>Physical violence</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention measures in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
INSHT Spain	No quantitative figures are available. Physical and psychological violence can be observed and is perpetrated by external persons (customers, patients and general public) and internal persons (colleagues and managers).	Prevention measures should concentrate on human behaviour and on cultural and educational aspects. For example, anti-violence campaigns, methods for identifying violence at an early stage or improvement of victim protection (regulations) could help prevent this risk.			

	<b>Poor work organisation</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention measures in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	Risks have been identified by means of analysis and consulting; they tend not to be seen as health risks.		<ul style="list-style-type: none"> <li>• Good work organisation</li> <li>• Good information for employees</li> </ul>	<ul style="list-style-type: none"> <li>• The health risk is not recognised</li> <li>• Enterprises with an old management style often do not recognise the problem</li> <li>• The problem is often only seen as a financial problem</li> <li>• System slow to change</li> <li>• "Competition" between production and maintenance</li> </ul>	
INRS France	The risk is only recognised to a small extent.	It is difficult to determine measures because there is a lack of knowledge on this subject at the moment.	More knowledge is needed on this subject.		

	<b>Poor work organisation</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention measures in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
BIA Germany	It is very difficult to assess the risks and impacts in this area.			There are problems when it comes to assessing complex work organisation. In some cases, work organisation is the crucial productivity factor and health aspect for competition, e.g. through shift work.	
ISPESL Italy		More ad hoc training is necessary.			The problems are primarily to be found in medium-sized enterprise; some of them are caused by flexibilisation of working times. There is considered to be a major overlap between these problems and psychological problems.
INAIL Italy	There is not enough information available on this subject. As a result, in many cases, companies have not yet recognised the risks.	<ul style="list-style-type: none"> <li>• Information and training</li> <li>• Development of management awareness</li> <li>• Skills development for management</li> <li>• Employee-participation models</li> </ul>			

	<b>Poor work organisation</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention measures in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
SUVA Switzerland		It is practically impossible to produce a list of general measures because the enterprises differ too much and there are too many influencing factors (e.g. product, substances used, political and social environment).			



	<b>Poor work organisation</b>				
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention measures in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
INSHT Spain	Organisation of work and production does not usually include OSH aspects, especially in SMEs.		<p>The initiative should come from society (employee representatives, educational institutions and social partners) so that a preventive culture can be developed and made an integral part of company management.</p> <p>It would be interesting to calculate the costs of not having prevention in place. Possible methods to do this could be cost-benefit analyses and estimations of costs for workplace accidents and work-related diseases. New models of company management should be supported.</p> <p>There are plans for a state service which will include the technical aspects, organisation and training for employees.</p>	Prevention is generally neglected in SMEs.	<p>There are plans to evaluate the measures. The OSH system, which consists of many parts, should be simplified.</p> <p>INSHT does not have contact with enterprises because "mutuals" (sector-specific insurance providers) perform such tasks. As a result, we do not have information on practice in enterprises.</p>

<b>Electromagnetic fields</b>					
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
AUVA Austria	There is still a lack of basic knowledge on this subject and of awareness of the risks.	There are no problems because screening is used for strong, defined fields.			It is not yet possible to draw up strategies because there is not enough knowledge.
ISPESL Italy					There is a lack of practical measures. The subject is relatively new so its relevance has yet to be assessed.
SUVA Switzerland	The risks have not yet been defined.	The prevention measures are inadequate as yet.			There is a lack both of systematic knowledge on the effects of electromagnetic fields and relevant measures.

<b>Radioactive radiation/ x-rays</b>					
<b><i>Institution/ Country</i></b>	<b><i>Risk identification and evaluation</i></b>	<b><i>Prevention measures</i></b>	<b><i>Effectiveness of prevention methods in practice</i></b>	<b><i>Obstacles to practical implementation</i></b>	<b><i>Comments</i></b>
ISPESL Italy	Risk-identification measures are in place.		More ad hoc training is necessary.		



## **Annex 1: Details concerning specific countries and sectors**

### (1) MKK (Hungary): Sector-specific details

If enterprises have financial problems, they are not particularly willing to pay out for OSH. Many SMEs do not have enough knowledge about the risks and measures and are thus very passive. Occupational safety and health is neglected because of productivity pressure. Common problems are the lack of protection against falling, unprotected work in pits, incorrect operation of machinery and inadequate accident analyses.

The biggest prevention problems are the lack of expertise and the lack of management interest in solutions. Consequently, there is still a considerable lack of information. The aims should be to develop and disseminate information media as well as to introduce and use reward systems.

The following sectors have significant deficits:

- healthcare (too little staff, too little technical equipment),
- construction (often the minimum protection measures and PPE are not in place; errors are repeated time and again; not enough protection against falls),
- timber (in some cases, problems with protection against wood dust; no guards on saws; noise; neglect of protection measures, use of old equipment; often foresters do not wear PPE),
- mechanical engineering (sector is still developing but SMEs often still use dangerous tools; insufficient electrical safety; not enough space, not enough protection against machinery, lack of expertise on how to use and transport machinery),
- metal production (often there is no medical examination for new workers; inadequate ventilation, explosion hazards),
- commerce/catering (in old enterprises overcrowding, outmoded equipment, inadequate protection against electrical hazards),
- footwear (growth in the industry up due to foreign investors, but that does not necessarily mean improvement in equipment and working conditions; often not enough protection against chemicals),
- agriculture (outmoded equipment, insufficient OSH and machinery-related protection; uncertain market situation means that machinery is not replaced) and
- foodstuffs (situation good in large enterprises because of presence of safety officers but inadequate in small enterprises).

### (2) INAIL (Italy): Economic models

Prevention should be seen as an important part of production which is made an obligation by legislation, not as an essential part of company organisation. Economic models should be developed to estimate the economic value of OSH for the system and for enterprises and to shed light on the costs of not having OSH in place. OSH should become an integral part of management so safety legislation (similar to EN ISO 14 000, the ISO standard for environmental management systems) is necessary. Studies are needed on newer topics (e.g. EMFs) but also on risks which are not related to the workplace. Prevention solutions are needed for SMEs and skilled trades, espe-

cially where such solutions are difficult to find. Public bodies in the field of prevention should implement accident-analysis methods in order to permit more complex research into the causes.

### (3) INAIL (Italy)

The cultural aspect should be explored first of all because risks are part of our lives and thus never completely preventable at work.

### (4) INCDPM (Romania): INCDPM method

The INCDPM method is based on other international methods and is recognised by the Romanian Ministry of Labour. The workplace must be precisely defined for analysis using this method to achieve the best possible results. There is a statutory requirement for an inspections commission. The risk is identified using the “checklist for identifying risk factors”. The work process is broken down into four elements (production equipment, workplace environment, task and workers) and the following elements contain appropriate risk factors, i.e.:

- production equipment - mechanical, physical, biological and environmental risk factors;
- work factors - inappropriate work content, physical strain; and
- workers: incorrect actions, carelessness.

### (5a) INCDPM (Romania): Evaluation sheet

The workplace-evaluation sheet is used to classify the risks identified at the workplace in question. Some psychological factors are not covered. Each risk and the worst-case consequences are reflected in a risk scale which combines the severity of the consequence and the probability of occurrence. The severity of the consequences is rated based on accident and illness figures for similar workplaces.

### (5b) INCDPM (Romania): Recommendations for measures to be taken

The recommendations contain the following information: identified risk factor, risk level, recommended measure, responsibility and deadline for implementation. The measures must be implemented in the given order (specific, generic and personal prevention measures).

### (6) INSHT (Spain): Legal definition

The legal definition of the term “accident” is rigid since it takes in all damage to health which occurs at the workplace (e.g. normal stumbling and heart attacks). A list of 92 occupational diseases has been in existence, unchanged, since 1966. The legislation does not offer a clearly defined possibility to make changes.

#### (7) BAuA (Germany): Mechanical risks

The main point made in connection with mechanical risks is that safety requirements need to be incorporated at an early stage of the development process for products and processes, e.g.

- information and evaluation modules in CAD processes,
- improvement of transfer of information from the OSH sphere to developers,
- optimisation of the effectiveness of protection measures by analysing the causes of incorrect actions and misuse by the user and
- further development of anti-slip covering and footwear including methods for evaluating their anti-slip properties.

#### (7b) ISPESL (Italy): Accidents

A rise in accident rates is evident in correlation with increasing productivity. "Intervention studies", e.g. for decompressed chambers in hospitals - following a serious accident - have been carried out and guidelines drawn up on the basis of the findings.

ISPESL does not analyse the accident statistics for effectiveness, this is done by INAIL.

#### (8) BAuA (Germany): Detailed information on chemical and biological risks

- Dust-related, non-specific diseases of the respiratory tract  
In industrialised countries, these diseases are the third biggest cause of death. Prevention of non-specific diseases of the respiratory tract, unlike prevention of various pneumoconioses, is neglected to a significant degree. Comprehensive measures are urgently needed, such as technical exposure reduction, workplace monitoring (early diagnosis and individual early rehabilitation) and training on the connection between work-related and non-work-related causes of such diseases.
- Work-related diseases of the respiratory tract caused by combined exposure (Dust in combination with absorbed and non-absorbed gases and vapours)  
Since combined exposure often occurs at the workplace, the biological effects of combined substances, particularly dust with gases and/or vapours, should be investigated. As yet, there are no valid findings on this subject. The question of whether these workplace substances react with one another needs to be examined. In addition to in vitro and in vivo studies, epidemiological studies are very important. The most interesting thing would be to examine precisely exposure below and within the limit-value range. Valid and suitable methods need to be developed to describe individual exposure and the biological impacts precisely.
- Contact dermatitis  
This is one of the most common chemical-related workplace diseases. It is necessary to develop suitable methods for classifying substances as contact agents, agents which cause allergic dermatitis or systemic dermal toxins, as well as methods for evaluating personal exposure and the effectiveness of methods intended to reduce exposure.
- Environmental monitoring for air allergens (protein allergens, chemical allergens)  
Evaluation of risks and efficiency is a major problem. Studies are required to determine the dose-response relationship between basic allergen exposure and the frequency of work-related allergies (especially asthma). Since immunochemical

tests for certain allergens are much more sensitive than protein tests, they should become the standard. This type of test has been developed for micro-organisms, enzymes, natural latex and flour, for example. Data for specifying official limit values should be collected in order to protect employees against respiratory-tract sensitisation. Such methods make it possible to evaluate the efficiency of OSH measures and measures aimed at modifying processes so as to reduce air borne exposure to sensitising substances.

- Dermal exposure

Substances can be absorbed via the skin. There are a number of substances which can effect various organs in workers' bodies after they have been absorbed via the skin. More detailed knowledge concerning the relevance of this exposure is required. More use should be made of biomonitoring in order to keep track of exposure to such substances and, in particular, to improve prevention of nervous-system disorders.

- Work-related risks to the reproduction system

The potential risks to the human reproduction system caused by exposure to chemicals in the environment and at the workplace are increasingly giving cause for concern. It is difficult to detect fertility or development damage caused by substances at the workplace. Furthermore, due to the large number of substances, the knowledge on this subject is not sufficient. Thus, tools (questionnaires, evaluation programmes and intervention recommendations) should be developed which enable company doctors to improve their knowledge of diseases of the reproductive system and the relevant prevention measures.

#### (8b) SUVA (Switzerland): Projects

SUVA has conducted the following successful projects on electricity risks and successful risk reduction in three sectors:

- crushing points in injection moulding machines: risk reduced by factor 4,
- rotary printing presses: significant reduction,
- residual-current-operated circuit breakers on building sites: reduction by factor 5
- heavy-duty circular saws: successful reduction by means of weatherproof design.

#### (8c) ISPESL (Italy): Chemical risks

ISPESL considers itself competent in this area due to its involvement in what are known as "criteria documents" on classification of hazardous substances and other topics. Thus, the experience in this area is more at the generic level than the enterprise level. ISPESL is developing an exposure database on carcinogens based on measurements taken at companies. In 1999, work focused on asbestos with the aim of reviewing the effectiveness of the ban introduced in 1991 and the questions of substitution and the incidence and types of illness.

#### (9) BAuA (Germany): Noise I

##### Development of measures and methods for indicating emissions

Methods and principles need to be developed and implemented which ensure that the

noise emissions of loud machinery are indicated (by the manufacturer) and that specific methods of work are used, in order to facilitate the following:

- selection of quiet machines by the user (competition, market),
- estimation of the hazard in the enterprise (prevention by means of better forecasting methods) and
- adherence to state-of-the-art practice and technology.

In addition, the noise-emission indications should be used to describe and specify the state-of-the-art for noise emissions. Our assessments show that the potential for noise reduction is high, particularly in the case of machinery but also in other areas of workplaces, but that that potential is not utilised. If the effectiveness of such preventive measures were to be demonstrated to better effect, the chances of them being applied would be higher.

#### (10) BAuA (Germany): Noise II

Several aspects need to be borne in mind when considering preventive measures to avoid and reduce noise hazards, i.e.:

- high levels (over 80 dB(A)) are hazardous to hearing (noise-induced hardness of hearing), safety (accidents caused by incorrect behaviour) and general health; this affects almost all sectors; and
- in the case of medium levels (below 80 dB(A)), noise should be seen as part of the hazard to general health (cardiovascular system and (mental) stress), particularly at workplaces with high requirements. This is especially true where VDUs are used and in the service sector.

Consequently, the hazards need to be identified and evaluated.

#### (11) BAuA (Germany): Laser radiation

Lasers with very short pulses (ns, ps and fs) are increasingly being used in research, materials-processing and medicine. Investigations using pulses of a few ns have shown that the risks of such lasers need to be re-evaluated as they differ from those posed by conventional lasers. Research is thus required in this field.

#### (12) BAuA (Germany): UV radiation

Since diseases arising due to insufficient protection against UV radiation usually only become apparent after a very long time, it is not possible to evaluate the effects of such radiation. Appropriate parameters and indicators need to be developed first.

#### (13) BAuA (Germany): Visible and UV radiation

There has been a constant rise in the use of optical radiation sources in industry, research and medicine. Development of powerful LEDs, with the advantages of long useful life, high efficiency and flexible positioning, plus operation using safety extra-low voltage have led to a variety of new possibilities for application. However, application



is particularly problematic if long-term observation, e.g. by means of a display, is necessary. The hazards which can arise in the expected applications, especially due to the higher radiation concentration, need to be evaluated.

(14) BAuA (Germany): Plant safety

Investigations into incidents in processing plants have shown that more than a third of the incidents which have to be reported by law are caused by human error (e.g. errors in the operation of the plant). It would thus appear necessary to give more consideration to how human factors influence plant safety by examining safety issues and setting up safety-management systems plus risk-prevention plans. Such activities would also include identifying error sources in operation, cleaning and maintenance of plant and in fault minimisation.

(15) BAuA (Germany): Work equipment, ergonomics

The "ergonomics" risk type was largely evaluated in terms of the ergonomics of work equipment (i.e. tangible and intangible products). The ergonomics of work systems are linked to other risk types listed in the table (e.g. workplace environment, physical strain and psychological loads). Consequently, the evaluations in the table and the explanations thereof focus on work equipment.

(16) BAuA (Germany): Ergonomics

The ergonomics factor has not received sufficient attention in the past in all five prevention elements listed in the table - especially product design. This fact is currently reflected in the demand for

- suitable, practice-oriented tools for evaluating ergonomic aspects,
- criteria for selecting and procuring ergonomic products and
- examples of ergonomic best practice.

(17) BAuA (Germany): Ergonomics, changes in the world of work

The main area which has changed as a result of the development of new computer-aided technologies is the man-machine interface. Although miniaturisation has made design more flexible, the link between the work equipment and the human is increasingly created via standard operating tools, e.g. keyboard and mouse. The resistance involved (e.g. maximum force or torque) is decreasing but so is the range of required activities. One result is that problems are caused by the repetitive, monotonous movements. The rise in the significance of RSIs (repetitive strain injury syndrome in the hand/arm/shoulder area caused by repeated, swift movements requiring no force) is testimony to the fact that, rather than there being a decrease in the importance of ergonomics, the new requirements created by new technology need to be given more attention in the design of work equipment (development of suitable prevention measures and selection/implementation in companies). Guidance documents for selecting ergonomic products and descriptions of best practice examples are considered helpful in this respect.

## Annex 2: Notes

- The questionnaire annexes from twelve countries were evaluated; Germany and Italy both provided two questionnaires from different institutes (Germany: BIA and BAuA; Italy: ISPESL and INAIL).
- All of the information given in the annexes and in the interviews has been incorporated either into Table 5 (all risks) or Annex 1 (details).
- Most respondents do not consider prevention to be structured along the lines of the four elements used in the questionnaire. Many answers are very heterogeneous and not structured as desired. The comments tend to be proposals or what the respondents would *like* to see rather than the descriptions of proven solutions which the questionnaire was seeking. As a result, there are no findings regarding best practice. There is hardly any information on the effectiveness of measures.
- The respondents often discussed what they would like to see rather than citing specific approaches and evaluating the effectiveness of measures.
- This evaluation is slightly distorted because everything is described from the point of view of management. Although these opinions are important, readers should bear in mind that a survey of employees or supervisors would probably have produced different results. Some of the comments seem subjective (e.g. the following comment on the psychological factors: "Lack of time underlines people's own importance").
- Safety data sheets: the situation is likely to improve in the EU accession countries in future because they will also have to prepare safety data sheets.
- BAuA: a) and b) means that the questions were answered by two different people.
- Psychological loads should also have included sexual harassment at the workplace as an example because this subject is usually mentioned in that area.
- Some countries' respondents tended to give very similar answers on several occasions (e.g. Italy repeatedly mentioned the use of databases).
- Hungary did not stick to the predefined structure but *did* give a great deal of sector-specific information on OSH deficits. All in all, OSH still appears to be very underdeveloped in Hungary. The Hungarians do not expect to see any improvement in the near future because there is no money for improvement measures and no willingness to take action on the part of management.

**Table 6: Legislation related to the prevention of work-related health risks**

<i>Institution/ Country</i>	<i>Most important legislation mentioned</i>	<i>Most important requirements regarding employers' duties</i>	<i>Comments</i>
MKK Hungary	Law on Working Safety 1993 No. XCIII and other ordinances passed by ministries	Section 54/2/ of the "Law on Working Safety": It is the duty of the employer to evaluate the risks to employees' health and safety in terms of quality and also, if necessary, in terms of quantity.	
ISPESL Italy	The Occupational Safety and Health Act No. 626 is the key law on OSH and is based on the EC directive though it goes beyond the minimal requirements specified by the EU. Thanks to intensive advertising, Italian enterprises are very familiar with this Act.	Act no. 626 is much stricter than the EC framework directive when it comes to the required qualifications for occupational health and safety professionals; in addition, it contains more far-reaching requirements on employee participation.	There is also a poorly structured body of OSH legislation, consisting of around 100 regulations and acts.  The government is aiming for one single act on OSH.
CIOP Poland	Directive 89/391/EU (has been implemented at the national level).  Work codex, ordinance passed by the Minister of Labour and welfare rules (concerning general OSH provisions),  Polish standard PN-N-18002 "OSH-management systems. General guideline for risk evaluation at the workplace" (includes an explanation of the principles of risk evaluation).		
INCDPM Romania	Law 90/1996 – Labour Protection Law, Art. 18	General OSH standards  Specific standards for workplace safety	

<b><i>Institution/ Country</i></b>	<b><i>Most important legislation mentioned</i></b>	<b><i>Most important requirements regarding employers' duties</i></b>	<b><i>Comments</i></b>
SUVA Switzerland	Labour Act (enforced by the national and regional labour inspectors)  Act on Accident Insurance (main law, also implements some of the contents of the EU framework directive; enforced by SUVA and the enforcing bodies specified in the Labour Act (national and regional inspectorates)).		Work-related health hazards are subsumed under the heading "Health Protection" in the Labour Act and the Act on Accident Insurance.  However, SUVA's prevention activities beyond accident hazards and occupational diseases are still in a legal grey zone.
INSHT Spain			Spain has a rigid legal definition of the term "accident". It takes in all damage to health which occurs at the workplace. A list of 92 occupational diseases has been in existence, unchanged, since 1966. The legislation does not provide a possibility to make changes.





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