EN

OUTLOOK | 1 |

NEW AND EMERGING RISKS IN OCCUPATIONAL SAFETY AND HEALTH

EUROPEAN RISK OBSERVATORY

European Agency for Safety and Health at Work

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Outlook 1 – New and emerging risks in occupational safety and health

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FOREWORD

The Community Strategy for Safety and Health at Work 2002-2006 asked the European Agency for Safety and Health at Work to set up a risk observatory in order to assist in "anticipating new and emerging risks", as part of the development of a "genuine culture of risk prevention".

The Agency, therefore, took the first steps towards the establishment of a European Risk Observatory (ERO) by building upon its previous work on issues such as the changing world of work, and research and good practice information on emerging risks. One of the main tasks in the first phase of the ERO has been the publication of four foundation reports that combine expert forecasts with reviews of the scientific literature to highlight the emerging risks in four main areas of occupational safety and health (OSH): physical, biological, psychosocial and chemical emerging risks.

For the ERO, commissioning and publishing studies is only the beginning of its work. One of its key aims is to stimulate debate about its findings among the Agency's stakeholders. We try to do so in two ways: First, the ERO organises a series of seminars bringing together the foremost experts in each field and EU policy-makers, such as the social partners, and representatives from relevant Directorate-Generals of the European Commission, and other bodies such as the ILO and WHO. At these seminars, the results of the ERO's main reports are presented and discussed, and the feedback from the participants is used to identify possible priority topics for future ERO activities. Two such seminars have already been held, dealing with biological and psychosocial emerging risks, and further seminars are planned for 2009, focusing on chemical emerging risks, workplace violence and carcinogens.

These seminars have proven useful to stimulate debate, and allow the top experts in the field to share the latest scientific knowledge with policy-makers. However, although the contents and conclusions from these seminars are freely available from our website, there is only a limited number of participants whom we can reach in this way. We are therefore trying to share the findings of the ERO with our stakeholders in another way: with this dedicated publication, *Outlook*.

In this first issue of *Outlook*, you will find an overview of some of the main projects carried out by the ERO, together with short articles that cover the different aspects of occupational safety and health, from contextual features such as labour market issues and demographics, to specific emerging risks and safety and health outcomes.

Outlook is published in 22 languages in order to reach as many of our stakeholders as possible. If you would like to have more information on any of these topics, you can find an extended article –in English only– on the Agency's website: http://osha.europa.eu/en/publications/outlook. You will also find references to the reports and factsheets published by the Agency, all of which are freely available from our website.

We hope that you find *Outlook* interesting and useful. We are working continuously to improve the way in which we share the results of our work with our stakeholders, so we welcome any comments you may have on the contents and format of this publication.

Jukka Takala
Director
European Agency for Safety and Health at Work
March 2009

INTRODUCTION

The occupational safety and health status of the EU workforce is affected by many factors, not least its changing demographic structure, the spread of new technologies and a reduction in the importance of economic sectors that previously dominated, such as industry and mining. This is bringing about changes not only in the numbers of jobs in each sector, but also the types of jobs that are available. The age profile of the workforce is changing. New technologies are creating new categories of employment. Globalisation means that health threats that were once distant easily spread around the world in a short period of time. If the EU is to preserve the health of its workforce and maintain its economic strength and its competitiveness, it needs to meet these challenges proactively. This *Outlook* offers an overview of the present and future trends of relevance to occupational health, the main workplace risks and their prevention.

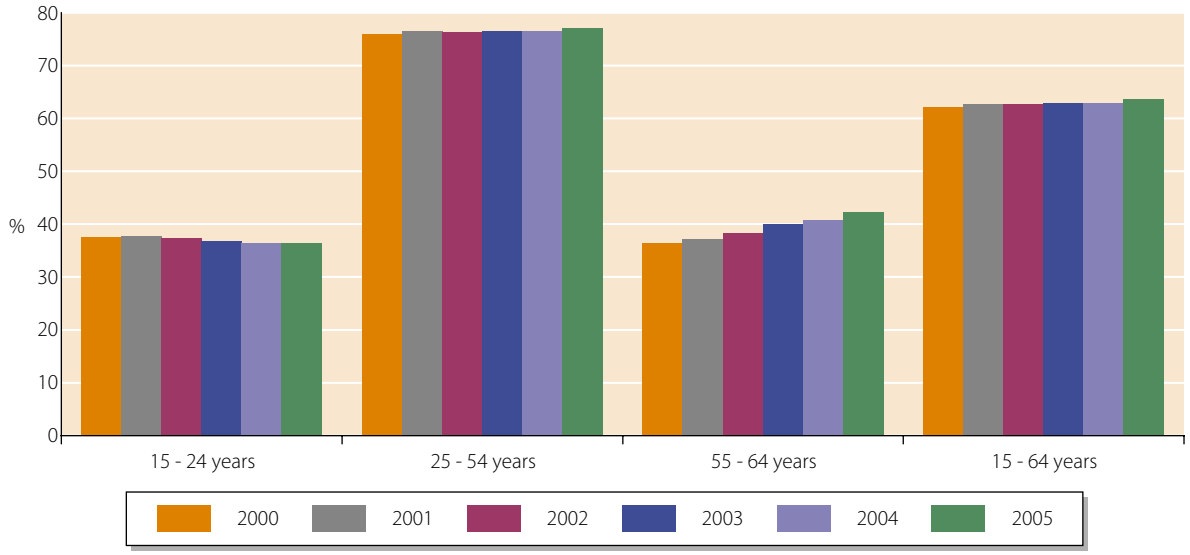
AGE

Recent changes in the age structure of Europe's workforce will have consequences for the safety and health of workers. Between 2000 and 2005, the total number of workers in the EU-25 aged between 15 and 64 increased by 8.3 million. The number of people in work decreased by 0.7 million among those aged 15 to 24 years, while it increased by 4.2 million among those aged 55 to 64 years.

Except for young workers (15–24 years), since 2000 employment rates have been rising within all age groups.

The ageing of the workforce is having an effect on the **gender balance**. In 2005, as in the five preceding years, the EU-25 workforce was still predominantly male. The male employment rate barely increased: it was 71.1% (for males 15–64 years) in 2005 compared to 71.0% in 2000 (+0.1). The female employment rate, on

Figure 1: Employment rates by age groups (%), EU-25



Source: Labour Force Survey – Eurostat

the other hand, increased from 53.5% in 2000 to 56.3% in 2005 (+2.8%).

The rate of employment is highest for workers aged 25–54 years (male 85.4%, female 68.9%) followed by workers aged 55–64 years (male 51.5% female 33.6%). 39.1% of the male population and 33.3% of the female population between 15 and 24 years were employed. Overall employment rates within the population aged 15–24 years are decreasing for both males and females.

Most EU workers aged 15–64 are employed in the following four **economic sectors**:

- Manufacturing (35.6 million)
- Trade (28.2 million)
- Health and social work (19 million)
- Real estate, renting and business activities (18.2 million).

A sectoral breakdown of employees aged 25–54 years is almost identical to this general picture, but the position is different in workers aged 15–24 years. These workers are most often employed in Trade (4.6 million), followed by Manufacturing (3.6 million), Construction (1.9 million), and Hotels and restaurants (1.8 million). There has been a large increase in the number of workers aged 15–24 in the Hotel and restaurant sector.

Employees aged 55–64 are most often employed in Manufacturing (3.6 million), Trade (2.8 million) and Health and social work (2.3 million). In this group Education takes fourth place (2.2 million).

With regard to **occupational category**, employment of workers aged 55 to 64 years is increasing in the category of Legislators, senior officials and managers. Among workers aged 15 to 24 years, jobs in the occupational category of Service workers and shop and market sales workers are on the increase.

In 2005, the most common occupational categories within the population aged 15–64 in the EU-25 were Technicians and associate professionals (31.5 million), Craft and related workers (27.5 million), Professionals (26.3 million) and Service workers (26 million). Together these occupational groups employed about 111 million (out of a total of 193.8 million) workers.

The occupational breakdown of the group aged 25–54 years is almost identical to this picture (respectively 25.6, 21.1, 21.9, and 18.6 million), whereas workers between 15 and 24 are mostly employed as Service workers (5.2 million), followed by Craft and related workers (3.6 million). Clerks (2.7 million) and Technicians and associate professionals (2.7 million) are in third and fourth place, closely followed by Elementary occupations (2.5 million). For employees aged 55–64, the most common occupations are Professionals (3.5 million), Technicians and associate professionals (3.2 million) and Craft and related workers (2.8 million). In this group Legislators, senior officials and managers take the fourth place (2.6 million).

Between 2000 and 2005, the greatest increase was seen among Technicians and associate professionals (+3.9 million), Professionals (+3 million), and Elementary occupations (+2.9 million). This increasing pattern is evident within the age group 25–54 years. The age group 55–64 shows the same trend; additionally in this group there has been an increase in employment as Legislators, senior officials and managers. For the 15–24 category, the pattern differs from the general picture: Service workers and shop and market sales workers show the biggest increase (+0.38 million) followed by Elementary occupations (+0.15 million) and Technicians and associate professionals (+0.13 million).

The occupational groups showing the largest decrease in workforce (15–34 years) were Craft and related workers (-1.5 million), followed by Clerks (-1.0 million). This decreasing pattern is the same for the age groups 15–24 years and 25–45 years. Within the age group 55–64 years, only Skilled agricultural and fishery workers decreased slightly in number (-0.1 million).

When it comes to work patterns, the numbers of people in **part-time and temporary work** tend to cluster around the higher and lower age groups. The highest percentage of part-timers occurs at the beginning and at the end of people's working lives (26% of workers 15–24 years and 20% of workers 50–64 years were classified as part-time in 2005). In the same year about 40% of workers aged 15–24 were in fixed-term jobs, compared with about 12% of workers aged 25–49 and 6% of workers aged 50–64.

Over the coming decades Europe's economically active population will include more workers aged 50

and above, with a corresponding reduction in the proportion of young people.

This changing age pattern will make it more important than ever to focus on reducing the risk of occupational accidents and improving workers' health, in particular the health of the oldest workers. Reductions in accident and occupational diseases rates, combined with effective rehabilitation programmes, will contribute to maintaining good health among the European workforce.

CHEMICAL RISKS IN SMES

Small and medium-sized enterprises (SMEs) represent 99.42% of all businesses in the EU.

SMEs are found in all sectors of the economy, but mainly in Distributive trades and Hotels and restaurants, where in 2003 they accounted for 73.4% and 80.6% of total employment respectively. In contrast, they accounted only for 20.9% of people employed in the Electricity, gas and water supply sector.

The incident rate of accidents at work relating to dangerous substances is generally higher in SMEs than in large ones. In total, SMEs account for around 80% of all occupational diseases caused by chemical agents.

This indicates that a large number of workers in SMEs are exposed to chemical substances that, due to inadequate protection and unsafe work practices, can pose a risk to their safety and health.

Workers in SMEs can be exposed to chemicals in a variety of industries, including construction, laundries, healthcare, personal services (hairdressing), metal, textiles, furniture and food manufacturing, transport and waste disposal.

Workers in SMEs exposed to chemical agents often suffer diverse health effects. Moreover, these companies generally have fewer resources than large companies to properly manage the risks. In addition, many of these SMEs have limited rights and means of accessing information about the chemicals in the products they buy and use.

Some, but not all, Member States have developed simplified models to assess and control exposures to chemical risks.

By **occupation**, the highest risk in terms of occupational accidents due to dangerous substances is in production of all types, with 37.8% of all such accidents. Some 10.5% of such accidents occur in the construction of new buildings, and with 10% in cleaning of premises and machinery and 7% in maintenance.

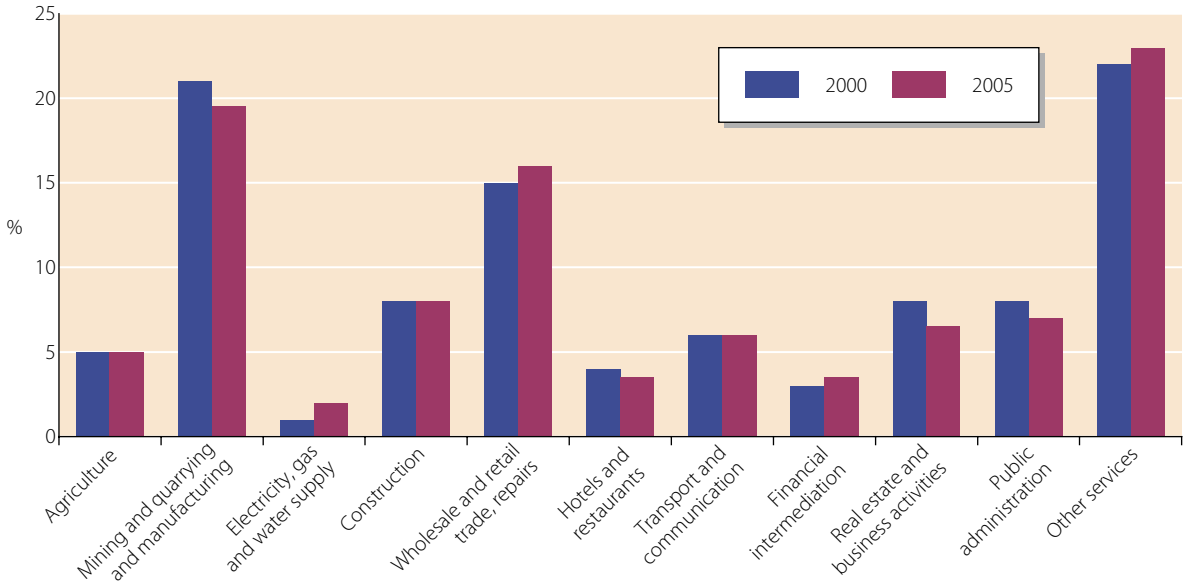
The main preventive measures that companies in general have to implement are listed in the EU Directive on Chemical Agents. This covers:

- elimination of hazardous substances and processes, or substitution with less hazardous alternatives;
- application of collective protection measures such as engineering controls or adequate ventilation and appropriate organisational measures;
- provision of suitable equipment for work with chemical agents;
- reducing to a minimum the number of workers exposed or likely to be exposed;
- reducing to a minimum the duration and intensity of exposure;
- appropriate hygiene measures;
- reducing the quantity of chemical agents to the minimum required for the type of work concerned;
- suitable working procedures including arrangements for the safe handling, storage and transport of hazardous chemical agents and waste;
- where exposure cannot be prevented by other means, application of individual protection measures including personal protective equipment.

EMPLOYMENT STRUCTURE BY ACTIVITY

The service sector now dominates the economy of the EU, making up 67.1% of the total EU-25 economy (69.1% for the EU-15). While some countries still have a relatively high share of traditional sectors including Agriculture and

Figure 2: Distribution of workforce by sector



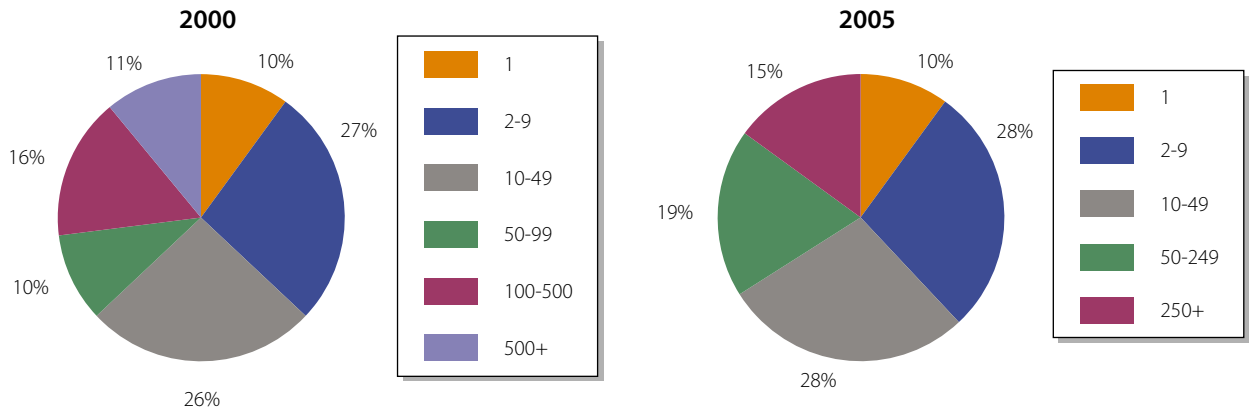
Source: ESWC, 2000, and EU-27 – ESWC - 2005

Industry, the transfer of jobs towards services is continuous. Between 1995 and 2002, there were particularly sharp falls in the EU-15 in the percentage of workers in Mining (22%) and in Electricity, gas and water supply (11%). The sectors that have seen the largest increase in numbers are Real estate, renting and business activities (47%) and Health and social work (18%). Figures for the period 2000-2005 can be seen in Figure 2.

There are also differences between the employment rates of men and women in various economic activities. Women are mostly employed in services. The level of employment of men is considerably lower in services, but higher in industry.

With regard to company size, 85% of workers are in small and medium-sized enterprise (SMEs), that is, in companies with fewer than 250 workers, and 63% of

Figure 3: Distribution of workforce by company size



Source: ESWC, 2000, and in EU-25 – ESWC, 2005 – 2005

workers are in companies with fewer than 50 workers. About 10% of workers are self-employed, without other employees.

The growing number of micro-firms and SMEs has particular significance from the perspective of safety and health. ESAW (European Statistics on accidents at work) indicates that the incidence rate of accidents at work is **higher in SMEs** than in companies with more than 250 employees.

The distribution of the workforce by company size and sector is shown in Figures above.

EXPOSURE TO NOISE AND HEARING IMPAIRMENT

Noise at work is a global problem, covering a wide range of industry sectors. Exposure to excessive noise can produce hearing impairment.

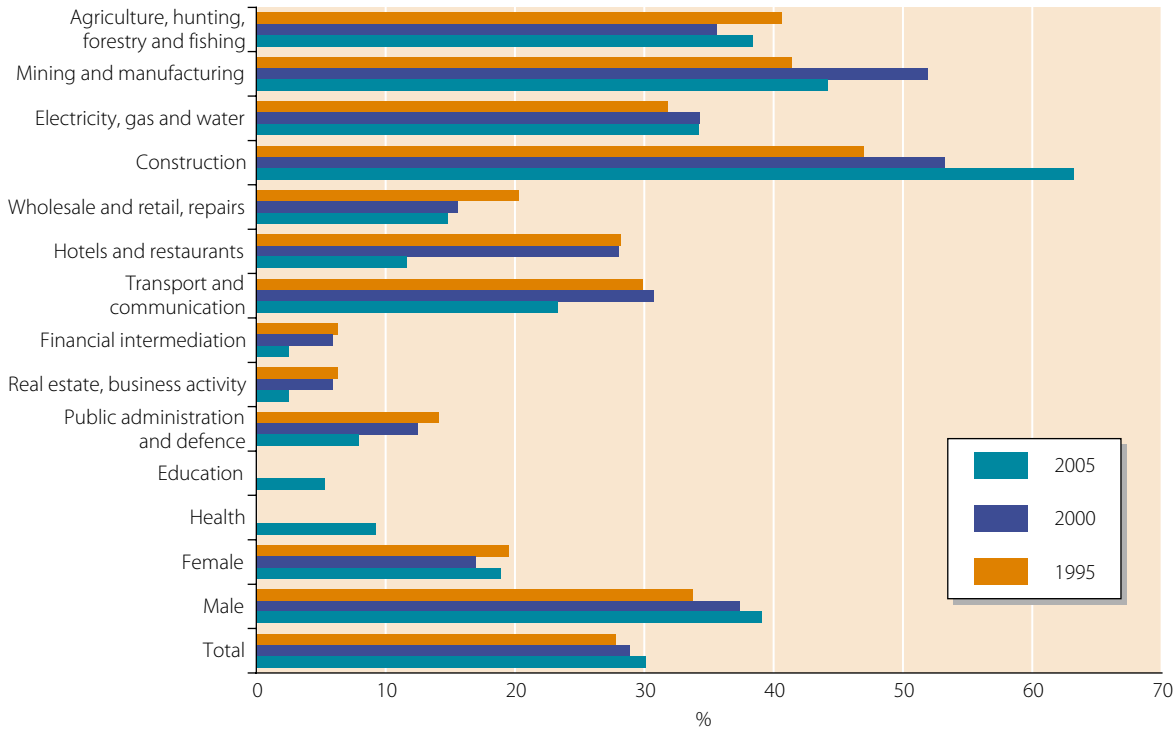
Noise-induced hearing impairment can be caused by a one-time exposure to a noise impulse (more than 140 decibels (dB(C)), or by exposure to high intensity (more than 85 decibels (dB(A)) sounds several hours each working day over an extended period.

In the EU-27, an estimated 60 million workers – 30% of the workforce – are exposed to noise.

Exposure to noise is common in Agriculture, Mining and manufacturing, and Construction, with more than 35% of workers in these sectors affected. The sectors that report the highest levels of work-related hearing impairment are Mining and manufacturing, Construction and Transport and communication. Blue-collar workers report the highest rate of hearing problems. Workers in this category are significantly more exposed to noise because they work with noisy processes and machinery.

Recent employment trends indicate that employment in two sectors with very high noise exposure – Mining and manufacturing, and

Figure 4: Percentage of workers exposed to noise at work at least a quarter of the time



Source: ESWC, EU-15, 1995 and 2000; EU-27, 2005

Agriculture – is decreasing. However, there has been a sharp increase in the proportion of exposed workers in the Construction sector in recent years. But many other workers are also affected by noise, even in sectors that traditionally are not considered as very noisy, such as education, call centres, and the entertainment sector.

Men are exposed to noise at work approximately twice as often as women, and they report experiencing hearing problems more than twice as often.

However, women make up the majority of workers in the service sector, where noise is becoming a problem.

Workers in the 10 new European Member States (NMS) seem to be more exposed to noise than in the EU-15. In 2005, 38.8% of workers in the 10 NMS reported exposure to noise, compared with 28.7% in the EU-15 and 28% in Bulgaria and Romania.

Age is not a significant differentiating factor in noise exposure: the variations of exposure between age groups are very small.

Directive 2003/10/EC of 6 February 2003 on 'the minimum safety and health requirements regarding the exposure of workers to the risks arising from physical agents (noise)' gives details of noise exposure limits, risk assessment, noise control at work, use of personal hearing protectors (PHP), workers' information and health surveillance.

Some important facts about work-related noise-induced hearing impairment include:

- The condition is often accompanied by tinnitus, or ringing in the ears.
- The cost of hearing impairment due to noise represents about 10% of the total cost of compensation for occupational diseases.
- The recognised incidence of hearing impairment differs depending on country and recognition policy. In 2005 the difference between the Member States was quite pronounced: 5.9% of workers in the EU-15 reported hearing problems, compared with 13.5% in the 10 New Member States and 9.7% in Bulgaria and Romania.
- The highest numbers of cases are registered in the age groups 40–54 and 55–60.

Noise is not the only stressor in the workplace that may have an impact on workers' hearing. Vibration is considered to potentially have a synergistic effect with noise on the hearing system.

A number of chemical agents are defined as **ototoxic** and are damaging to the hearing system. Those present in industrial environments include solvents, carbon monoxide and cyanhydric acid.

Noise-induced hearing loss was the fourth most common occupational disease recognised in the EU-12 in 2001. Fourteen million workers in EU-27, or 7% of the total, believe their work affects their health in the form of hearing disorders. The incidence rate of hearing impairment is 11.5 cases per 100,000 workers.

The effects of noise are not limited to hearing damage. It can lead to an increase in fatigue and stress, sleep disturbance, and even cardiovascular effects. At the workplace level, a very significant potential negative effect of noise is the masking of warning sounds and interference with communication, increasing the risk of accidents at work.

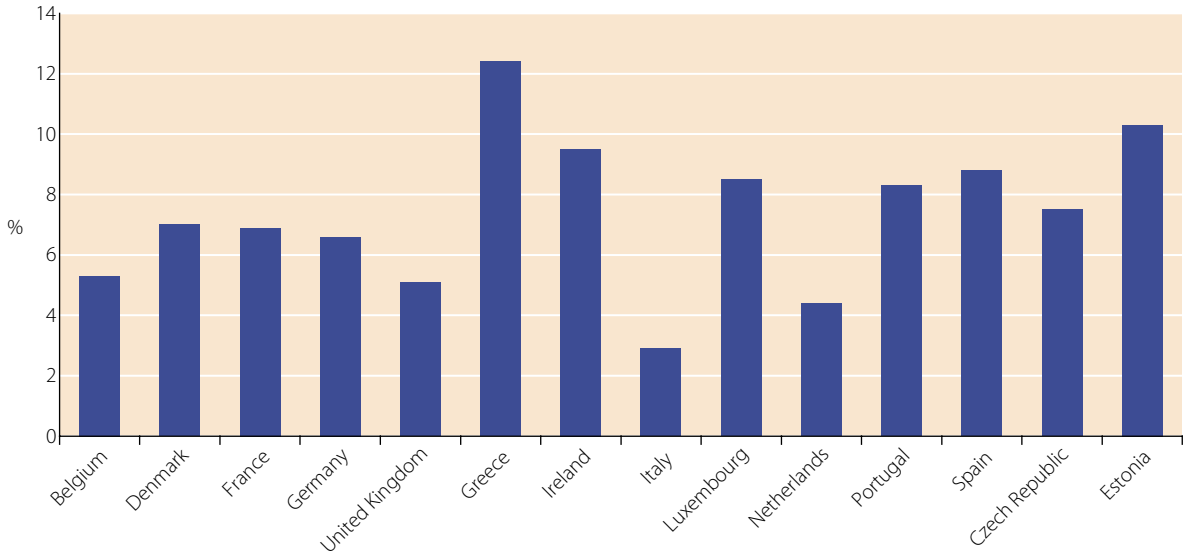
EXPOSURE TO ULTRAVIOLET RADIATION

Ultraviolet radiation (UV radiation) is one of the most significant physical risks in the working environment. Ultraviolet radiation is an electromagnetic, non-ionising radiation covering the range of wavelengths 100–400 nm. Excessive exposure to this radiation can be hazardous. The severity of the hazard depends on the wavelength, intensity and duration of exposure. Over-exposure can cause damage to the eyes, the skin, and the immune system.

UV radiation has been named as a carcinogenic agent in 36 EU industries. For 11 of these industries, it ranks first among exposures to other carcinogens.

According to a World Health Organisation report, in Europe in 2000, among diseases attributable to UV radiation, there were more than 2 million non-melanoma cases (squamous and basal cell carcinomas) and more than 67,000 cases incidents of malignant melanoma.

Figure 5: Estimation of the exposure to natural UV radiation



Source: CAREX, Eurostat

The workers exposed most to UV radiation are in the Agriculture and hunting, and Construction sectors.

Those at risk include not only outdoor workers exposed to natural UV radiation (solar radiation) but indoor workers, who are exposed to radiation generated by artificial sources.

The risk to health from artificial sources can be much higher than for naturally occurring UV: levels of UV may be higher and may include harmful wavelengths. Workers who are particularly at risk from artificial UV radiation include those involved in:

- dye and paint drying techniques;
- disinfecting applications;
- welding processes; and
- phototherapy.

Workers in these areas are subject to exposure limits and engineering and administrative controls, the use of personal protective equipment and medical examinations. These measures may apply to dentists, physiotherapists, lithographers, chimney sweeps, aircraft pilots and navigators, harbourmasters, painters, workers in the food processing industry and welders.

The cumulative nature of exposure to UV radiation and a possible increase in the sensitivity of people exposed are emphasised, as well as a common and growing use of UV-based technologies.

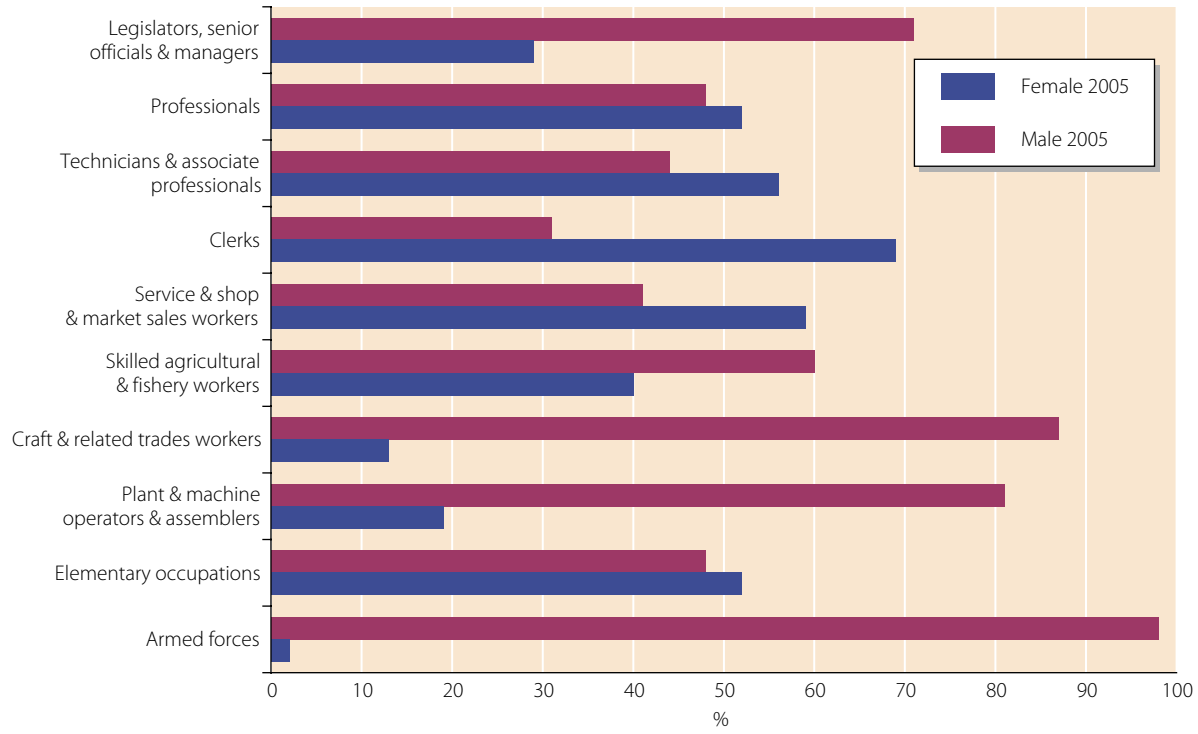
The estimated number of workers exposed to artificial UV radiation in the EU countries is about 1.2 million, which constitutes about 0.65% of the total workforce.

Existing information is not sufficient to create a full picture of occupational exposure to UV radiation in the EU. With regard to **solar radiation**, an estimated 14.5 million EU workers are exposed at least 75% of their working time; 90% of whom are men. These include farmers, silviculturists and horticulturists, farm workers, commercial garden and park workers, postmen and sorters, newspaper delivery workers, physical education instructors, trainers, coaches and childcare workers.

GENDER

There was a slight increase in the proportion of women in employment in the EU between 2001 and 2005. In the industrial sector the proportion of men is significantly larger than women, whereas considerably more women than men are employed in the services sector.

Figure 6: Gender distribution by occupation, EU-25



Source: ESWC - 2005

Although across the EU women have increased their representation in management, men still dominate the top part of the occupational hierarchy. For example:

- Only 24.5% (9.4% of men and 42% of women) of the EU-27 workforce has a woman as their immediate supervisor;
- More than 70% of corporate managers and senior government officials are men;
- Two-thirds of the self-employed are men, and this proportion increases for the self-employed with employees.

As a result of the gender differences described above, there are significant differences in risks and hazards to which working men and women are exposed.

Because of job and task segregation, men and women suffer different accident types. The difference in accident incidence rates for men (4,189 per 100,000 workers) and women (1,627 per 100,000 workers) (data for 2004, EODS) may be attributed to the fact that men are more often employed in higher-risk industries such as Mining, Construction or Transport. Using work equipment designed for men may contribute to women's work-related accidents and illnesses.

LABOUR MARKET: EMPLOYMENT STATUS

Demographic, social and economic phenomena all have their impact on the labour force. From a safety and health perspective, it is important to identify current changes and to keep pace with them. This requires a holistic, long-term approach.

According to the results of the Labour Force Survey (2004), 194.5 million people (out of the total population of 377.5 million) held a job or were involved in a business activity. Of these:

- 44% were women;
- 10.6% were under 25;

- 10.9% were between 55 and 64;
- 82.3% were in full-time jobs;
- 17.7% were in part-time jobs.

The employment rate in the EU-25, indicating the share of employed people in the population aged 15 to 64, reached 63.3% in 2004.

The main recent changes to the workforce structure are:

- The workforce is ageing rapidly. The employment rate of older people (55–64 years old) was 41.0% in 2004, up 4.4% from 2000. Retaining older workers in employment will become a major challenge for Europe in the future.
- There are now continent-wide measures to prevent the exclusion of workers with disabilities from work.
- Although the EU workforce is still predominantly male, more women are joining the workforce.
- There is an increasing need for workers to be better educated, partly because of the growing complexity of work processes resulting from the development of information technology.
- Increasing migration and greater mobility of the population are also having an effect on the EU, with workers migrating to countries with more employment prospects.

Although most European workers are in the permanent job (employee, full-time) category, the other categories, i.e., part-time workers, the self-employed, workers with temporary contracts, and family workers, constitute about 40% of the total number of people in employment.

In **part-time** employment considerable gender differences are observed: it is more common among women. Of the 34.3 million part-time workers in Europe, 78% are women. Part-time employment often comes at the beginning or the end of one's working life, especially for men.

Part-time workers are less exposed to a number of hazards and to poor ergonomic conditions, and are less likely to report job-related health problems than full-time workers.

However, those on **temporary** contracts also have less access to training and long-term competence development.

The incidence of occupational accidents among temporary workers is higher than among other groups of employees. They also have less job control in terms of the order of the tasks, pace of work and work methods; they also have low job demands, and are less informed about risks at work. These workers have a higher level of dissatisfaction with their jobs, but a lower level of stress than the average worker.

Working conditions for the **self-employed** often differ quite radically from those in permanent job, with full-time contracts. Self-employed people often have longer working hours and an uneven pace of work. The self-employed perceive that their health is at risk because of work more often than employees: 35.5% vs. 27.3%.

Changes in work processes and work organisation also result from the changing contractual relationships in the workforce. Within companies, working relationships are becoming more diverse and individualised. These processes lead to an increasing feeling of job insecurity among workers.

NANOTECHNOLOGIES

The term nanotechnology refers to technologies that involve the creation and manipulation of materials to develop materials and products of the nanometre size to exploit their new physico-chemical properties.

Nanotechnologies bring together the expertise of physicists, chemists, biologists, materials scientists, mechanical and electrical engineers as well as medical and cognitive researchers.

These technologies are seen as potentially beneficial in many diverse areas, but concerns have been expressed about their potential negative health and environmental effects; not only in the field of occupational health but in wider terms.

Nanotechnologies are currently one of the priorities for occupational safety and health research

in the EU-27. Workers in nanotechnology may be exposed to the novel properties of materials and products causing health effects that have not yet been fully explored.

Nanotechnologies operate on materials of tiny dimensions. One nanometre (nm) is equal to one-billionth of a metre. As an illustration, a human hair is 80,000 nm wide on average and a red blood cell is approximately 7,000 nm wide.

Nanotechnologies encompass the design, characterisation, production and application of structures, devices and systems by utilising materials that have at least one dimension of less than 100 nm.

At this small size and due to an increased relative surface area and quantum effects, materials can behave very differently from the way they behave when they are in a larger form, and can demonstrate specific novel physical and chemical properties. They can, for example, change properties such as size, weight, volume, speed, strength, hardness, durability, colour, efficiency, reactivity or electrical characteristics. This feature enables the development of new materials and devices with higher performance indicators and increased functionality.

Nanotechnologies have been used for decades in the field of semiconductors, and even longer in the field of chemicals. However, nanoscale materials are increasingly being used, or widely seen as having huge potential, in diverse areas to create new materials and devices with novel properties.

Their fields of application include: Information technology; Biomedical technology; Environmental technology; Energy technology; Manufacturing technology; Transport, aviation and space travel technology; Agriculture and nutrition; Security and military technology.

Employment in nanotechnology will grow to reach a predicted 10 million jobs worldwide in 2014. This will account for 11% of jobs in manufacturing. If the population and the occupational structure in the EU remained unchanged, that would mean almost six million people will be working in Europe's nanotechnology sector by 2014.

While the (potential) applications and benefits of nanotechnologies are many, there is concern about the effects nanoparticles may have on human health, as well as their environmental impact.

Because of their small size, nanoparticles can enter the body in three ways, via:

- the digestive system (ingestion);
- the respiratory tract (inhalation);
- the skin (direct exposure).

Once in the body, nanoparticles can move to other organs or tissues of the body. Such translocation is facilitated by the propensity of nanoparticles to enter cells, to cross cell membranes and to move along the nerves. Under certain conditions some nanoparticles can even cross the blood–brain barrier.

Factors that can alter the risk of nanoparticles penetrating into the body include:

- the mass, surface area or number of particles
- whether the material is dry powder or in solution
- the degree of containment
- the duration of exposure.

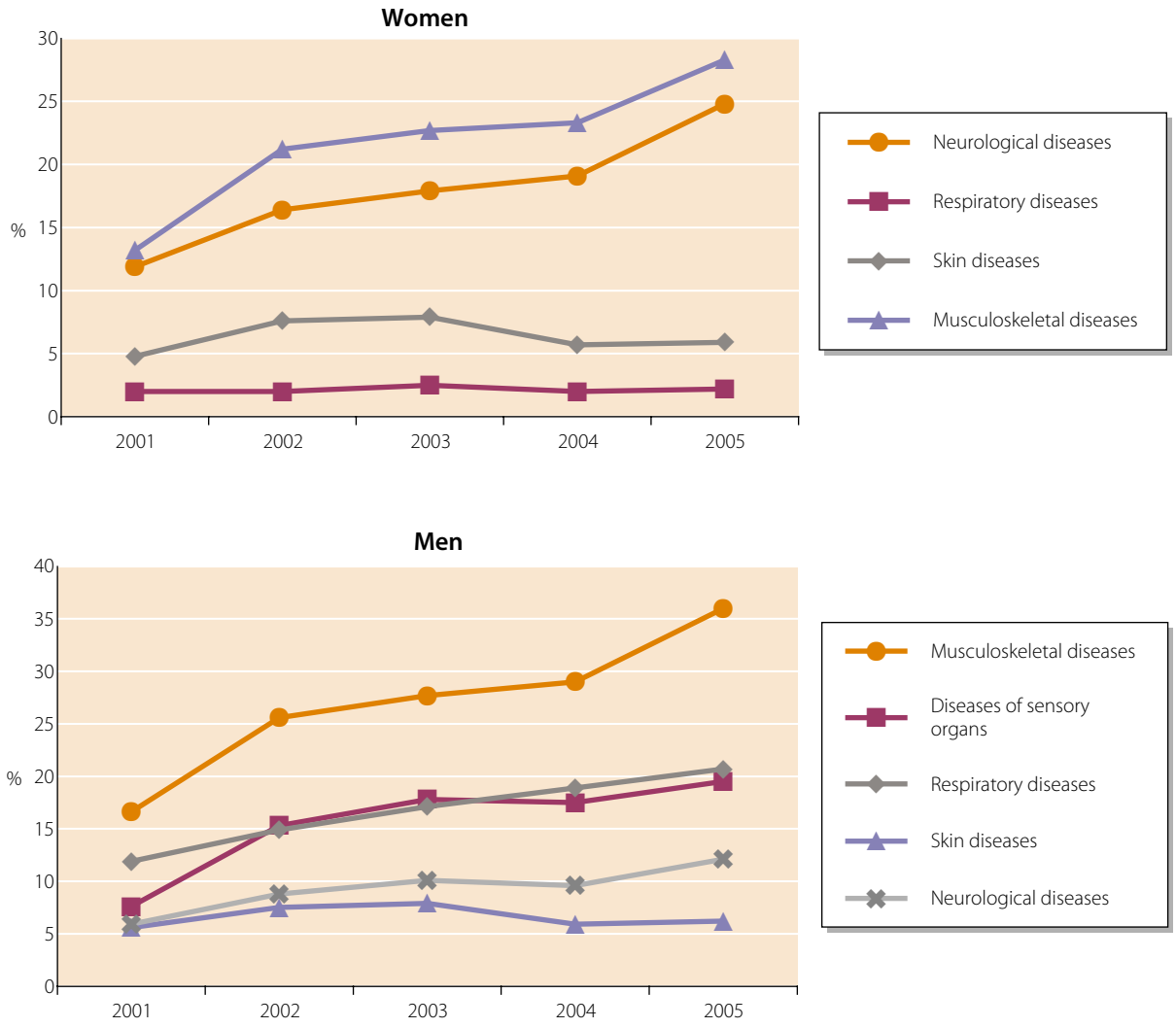
Further research is needed to realistically assess the safety and health implications of working with nanomaterials. The limited evidence available suggests that employers should take a precautionary approach when potential exposures to nanoparticles may occur.

Besides the potential health effects, ethical concerns are being raised with regard to nanotechnologies.

OCCUPATIONAL DISEASES

The concept of occupational disease is characterised by its relation to a national system of recognition and compensation. Typically, such recognition requires clear evidence that work is the cause of the disease, or contributed significantly to its development. As recognition and compensation schemes vary from one country to the next, collection of data on occupational diseases in the EU is a challenge. Only a limited number of diseases are recorded at the European level (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CEL

Figure 7: Incidence rate of selected occupational diseases (per 100,000 employed) 2001–2005 by disease group, women and men



Source: EODS

EX:32003H0670:EN:HTML). A wider concept of work related diseases can be used in estimating the magnitude of health problems attributed to work, see for example, occupational and environmental cancer http://osha.europa.eu/data/links/occupational-and-environmental-cancer-prevention-conference-presentations/.

Musculoskeletal disorders (MSDs) are the most common work-related disorders.

A total of 83,159 new cases of occupational diseases were reported in 2005. Among these, MSDs made up the largest category among both men and women – a total of 31,658 cases.

The other large disease categories are roughly the same for men and women, except for diseases of sensory organs, which rank second among men but are not among the top four for women.

The most commonly reported diseases in 2005 were: hand or wrist tenosynovitis (inflammation in tendons), hearing loss, lateral epicondylitis ('tennis elbow'), contact dermatitis (skin inflammation), carpal tunnel syndrome (nerve compression in the wrist), Raynaud's syndrome ('vibration white finger'), mesothelioma (cancer), and asthma.

When occupational diseases are examined by economic activity, Mining is associated with the

highest incidence rate. Its rate may be as much as 20 times that of the next highest branch. The rapid reduction in the size of the mining sector also means incidence rates of occupational diseases for this sector are somewhat inflated.

In 2005, the industry sectors with higher-than-average incidence rates of occupational diseases, apart from Mining, were Manufacturing, Agriculture, hunting, forestry and fishing, and Other community, social, personal services activities.

In the Manufacturing sector, rates and types of occupational diseases tend to be roughly the same for men and women. For other sectors it varies slightly. Economic activities among women that lead to high rates of occupational diseases include cleaning, food preparation, table waiting, and farm work.

A comprehensive assessment of the effects of occupational diseases would include all costs of all work-related ill-health. This would require specification of all direct and indirect costs, as well as determining what proportion of all health problems is related to work. Such an assessment would be likely to reveal that occupational diseases cost Europe tens of billions of euros every year.

OCCUPATIONAL STRUCTURE

Changes in the overall occupational structure are typically not rapid. Although change is slow and the distributions of occupations are different for men and women, it is possible to discern some recent trends in the EU:

- Young women are increasingly moving to higher occupational levels.
- Occupational groups that were very large in the past have become, in relative terms, smaller. These include Clerks among women and Craft and related trade workers among men.
- The categories Professionals and Technicians and associate professionals are growing.
- The proportion of workers in Elementary occupations has also increased.

This indicates that while some traditional men's occupations in the middle of the occupational structure have declined, the male workforce has become increasingly split between the top and bottom categories.

Technicians and associate professionals is a diverse collection of occupations. Some large groups included in this category are accountants, nurses, sales representatives, and technicians in various fields of engineering. Hence, possible work-related safety and health problems and adverse working conditions affecting these workers are equally diverse. However, they tend to report high levels of stress.

Elementary occupations is a somewhat smaller collection of occupations of low socio-economic status. It includes farm labourers, cleaners, building caretakers, and freight handlers. Workers in these occupations face a variety of adverse working conditions. Among these are repetitive hand/arm movements, monotonous tasks, and a mismatch between worker skills and job demands. The poor working conditions in this occupational category are evident in the occupational disease statistics.

PANDEMICS

Infectious diseases are a threat to public health in countries the world over, regardless of their level of social and economic development. Social, technological and environmental factors encourage the emergence of new diseases and the return of old diseases.

To combat emerging infectious diseases and the threat of pandemic, anticipation and preparedness are necessary in the occupational health as well as the public health context.

A **pandemic** can be defined as:

- an epidemic (an outbreak) of an infectious disease, and
- an agent infecting a large number of people, and
- an agent occurring over a very wide geographical area.

A high level of severity is implicit in the definition.

Any infectious disease emerging anywhere in the world should be examined systematically with regard to occupational risks, in particular when there is the threat of a pandemic.

Examining the **epidemiological (or transmission) chain** is an interesting and essential tool for biological risk assessment in the workplace.

The first step is to identify the reservoir(s) of the infectious agent, then the way(s) it can get out of the reservoir(s), by which route(s) it can be transmitted, and finally what is (are) the entrance(s) into the host, i.e. in this particular case the worker at the workplace. The same approach can be used to determine preventive measures: preferably acting directly on the reservoir to reduce the risk at the source, but failing that to break the transmission chain at the earliest possible stage.

This approach enables answers to be found for the main questions concerning occupational risk: Where? Who? When? How? These facts enable preventive measures to be identified and implemented. These should be adapted according to the evolution of the threat. If knowledge of the transmission route(s) is insufficient the precautionary principle should be applied.

In pandemic situations, protecting healthcare workers (HCWs) is a high priority from an occupational health as well as a public health perspective. They are exposed to a high risk during virulent epidemics of infectious diseases. For example, during the SARS outbreak, according to different sources HCWs accounted for 21% to 57 % of total cases reported. Healthcare employers have a reciprocal ethical duty of informing, protecting and supporting healthcare staff, as well as a legal obligation to do so. This would include putting in place occupational infectious diseases risk assessment and risk management programmes. This protection of HCWs should be integrated into the fight against nosocomial (hospital-acquired) infections.

Important points about worker safety in pandemics are:

- In a pandemic threat context, it is necessary to insist on including adequate respiratory protection among these prevention measures. Disposable filtering respiratory protective devices for particles (FFP1, FFP2, FFP3) protect against airborne infectious agents and also against droplets.
- Protection should be extended to workers who are travelling; not only to protect the worker but to prevent the spread of the disease into a non-affected area by a contaminated traveller.
- Workers should be given comprehensive information about places to avoid, hygiene of food, hand washing, and sanitary precautions in case of suspected exposure.
- In the case of a pandemic involving animals, workers in contact with animals should be informed about risks and protection organised for them as soon as the transmission from animal to humans is documented or even suspected. Livestock breeders, transport workers, abattoir workers and veterinarians are among the main categories of workers concerned. Preventive measures should be planned to reduce the likelihood of such disease leading to livestock depopulation.

In the case of **HIV and other bloodborne pathogens**, analysis has shown that there is no risk of transmission in most workplaces. The main occupational risk of transmission is essentially in the healthcare sector after accidental exposure to contaminated blood.

With the identification of the virus (HIV) and the availability of biological diagnostic tests, it was possible to come up with a better assessment of risk and prevention measures.

Exposure circumstances are the same as for hepatitis B and hepatitis C viruses; the prevention strategy is essentially based on the concept of universal precautions.

Malaria responds to the definition of pandemic as well, but it remains limited to geographic areas where the mosquito vector is widespread.

Severe acute respiratory syndrome (SARS), a newly emerged infectious lung disease, broke out in Southeast Asia in 2002/3. Wide dissemination of information to the public concerned, implementation

of control measures with isolation of patients and suspected cases, protection of HCWs as well as sanitary precautions for people travelling, all contributed to limiting the spread of the disease and stopped the outbreak relatively quickly.

Those most at risk from **avian or bird flu** are workers in contact with avian fauna, including poultry: breeders, farmers, veterinarians, transport and abattoir workers, but also those involved in culling activities and laboratory workers. Prevention programmes should be set up to protect such workers. Providing relevant information is a first step in such programmes.

A preparedness plan for workplaces should be set up including occupational risk assessment and anticipated prevention measures (such as availability of adequate respiratory protective devices) as well as the preparedness of businesses to maintain vital economic activity. Relevant information should be provided and updated as necessary.

WORK-RELATED ACCIDENTS

In the EU in 2004, 77% of work accidents are sustained by male workers. However, since 1998 the incident rate for males has dropped by almost 21%, while that for females has decreased by just 14%. Figures for 2004 showed that incidence rates of serious accidents in the EU-15 are almost exactly the same as those of the EU-25.

In 2004, for the nine main activity branches of the economy – Agriculture, hunting and forestry; Manufacturing; Electricity, gas and water supply; Construction; Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods; Hotels and restaurants; Transport, storage and communication; Financial intermediation; Real estate, renting and business activities – the incidence rate of serious and fatal accidents in the EU-15 was 3,176 (corresponding to almost 3.5 million accidents in the nine branches, or approximately 4 million in all sectors). The rate of serious accidents – requiring more than 3 days off work – has been falling since 1998. A further reduction is expected in the 2005 figure.

The accident rate is particularly high in the Construction sector, where the risk of an accident is almost twice as high as the average for the nine branches. Eight percent of the working population is in this growing sector. The rate for Agriculture is 1.5 times higher than the average; however the numbers employed in this sector are decreasing. Within the Manufacturing sector, companies manufacturing wood and wood products stand out for their high accident numbers – incidence rates are more than 2.3 times higher than average.

When it comes to a breakdown of accidents by age, workers between 18 and 24 have an incidence rate 1.4 times higher than the average.

Table 1: Changes in the incidence rates of serious and fatal accidents at work in comparison to 1998 = 100 (EU-15 and EU-25)

	Serious accidents						
	1998	1999	2000	2001	2002	2003	2004
EU (25 countries)	100	100	99	95	88	83	80(p)
EU (15 countries)	100	100	98	94	86	81	79(p)

	Fatal accidents						
	1998	1999	2000	2001	2002	2003	2004
EU (25 countries)	100	88	87	85	81	80	78(p)
EU (15 countries)	100	91	88	85	80	78	77(p)

Source: Eurostat [(p) – provisional value]

Companies employing 10–49 workers and 50–250 workers have incidence rates over the average (1.2 and 1.4 times the average respectively).

More than six million EU workers are affected by accidents at work each year. On average each accident leads to a loss of 20 working days. The incidence rate has decreased by 18.5% in the past five years. Although this development is promising, there are certain activities and groups that still have very high incidence rates, such as the Construction sector, young workers (18–24) and medium-sized companies. These categories require dedicated attention.

About 5% of accident victims cannot return to their previous type of work. About 1.8% of accident victims have to reduce their working hours, and 0.2% of them do not expect to return to work ever again.

WORK-RELATED STRESS

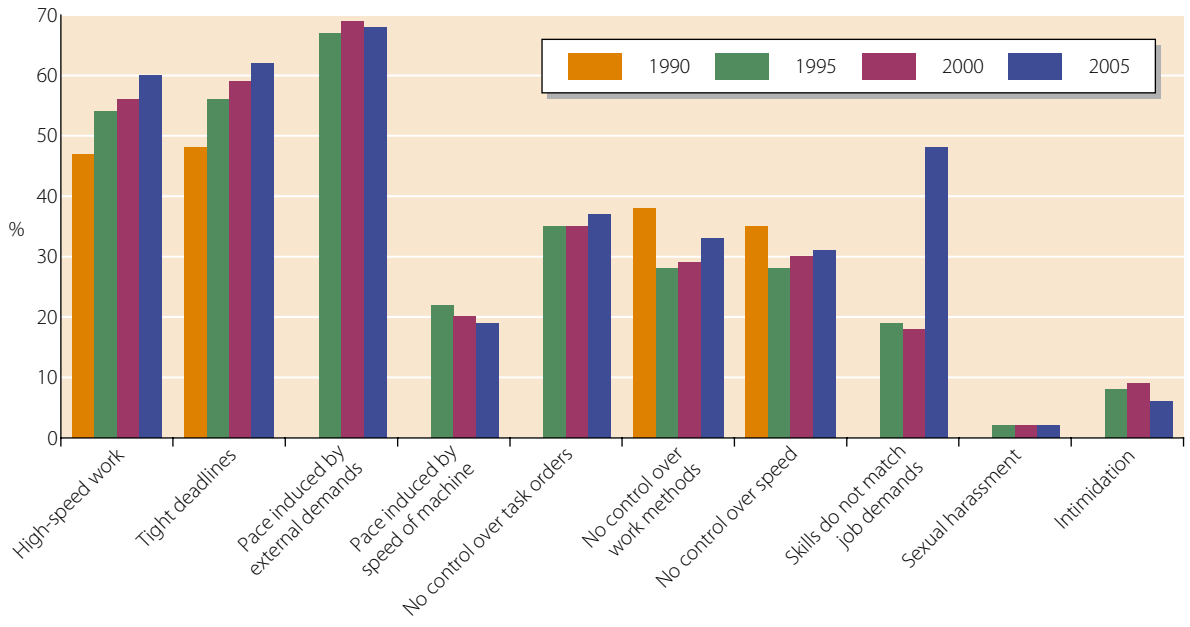
Work-related stress (WRS) is experienced when the demands of the work environment exceed the employee's ability to cope with (or control) them. If WRS is intense and lasts for some time, it can lead to mental and physical ill health. WRS can be caused by psychosocial hazards such as work design, organisation and management, high job demands and low job control, and issues such as harassment and violence at work. Physical hazards, such as noise and temperature, can also cause WRS.

Research suggests that between 50% and 60% of all lost working days are related to stress.

In 2005 a reduction in stress levels was reported for EU 27 figures; however the reduction in reporting of exposure to stress occurred mainly in the EU-15 countries (20.2%), while New Member States still reported high levels of exposure – more than 30%.

In the 15 Member States of the pre-2004 EU, the cost of stress at work and the related mental health problems is estimated to equate to between 3% and 4% of gross national product, amounting to EUR265 billion annually. Studies estimate that work-related stress alone costs the businesses and governments of those countries about EUR20,000 million in absenteeism and related health costs alone.

Figure 8: Distribution of some risks factors for work-related stress



Source: ESWC 1990-1995-2000-2005

Risk factors for WRS include:

- Work with a very high speed and to tight deadlines
- Work pace dictated by external demand or machine-dictated work pace
- Unforeseen interruptions at work
- Mismatch between skills and work demands
- Intimidation and sexual harassment.

Most of the causes of stress are related to the way work is designed and the way in which organisations are managed. Other sources of stress can be career development, status and pay, the role of the individual in the organisation, interpersonal relationships and the home-work interface.

There are no significant **gender** differences in the prevalence of psychosocial health risks. In 2005, 23.3% of men and 21% of women reported experiencing stress at work in the EU.

When it comes to **age** as a factor in stress, workers aged between 40 and 54 report being affected by WRS more often than other age groups. Workers between 15 and 24 report the least stress.

With regard to **economic sector**, the prevalence of psychosocial health problems is the highest in Education, Health and social work and Transport and communication.

Some research indicates that the **occupational group** most affected by stress are Legislators, senior officials and managers, and Professionals. A different classification of professions indicated that higher qualified blue-collar workers, such as skilled agricultural workers, are most affected by psychosocial risks.

The WHO predicts that levels of depression and stress will rise dramatically as new technologies spread and globalisation accelerates. The WHO predicts that the ageing of the population in the EU, by changing the proportions between working and retired populations, will not only increase the average age of the working population but will also increase the workload of the gradually decreasing number of workers, thus contributing to the development of stress.

Action needs to be taken to combat the predicted increase in stress. Work-related stress may be prevented or counteracted by job redesign (e.g. by empowering employees, and avoiding both over- and under-load), improving work organisation (fewer interruptions), by improving social support, and by promoting reasonable rewards for the effort invested.

YOUNG WORKERS

Europe's workforce in the coming decades will see an increase in the proportion of workers aged 50 and above, with a corresponding reduction in the proportion of younger people.

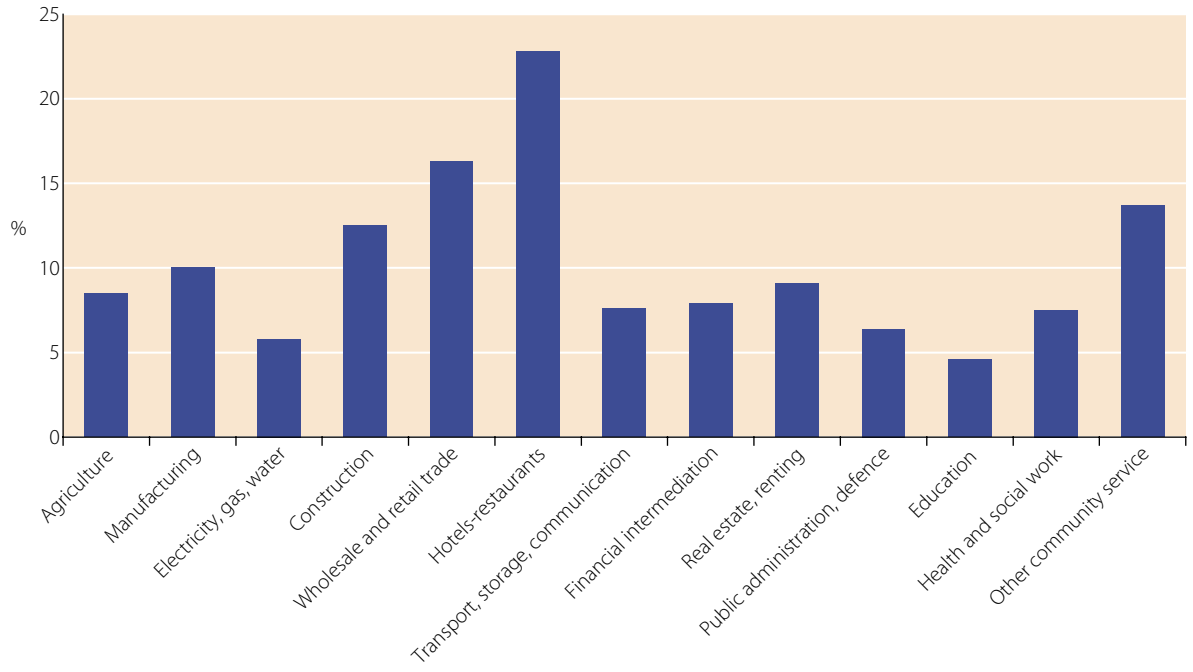
In 2005, about 193.8 million people were employed in the EU-25, including 20.4 million workers between 15 and 24 years old. Workers in this age group accounted for 10.5% of the workforce. Between 2000 to 2005, the proportion of young workers decreased by 0.9%. In the latter year the employment rate of workers aged 15–24 was 36.3%, compared to 63.6% of the population aged 15–64.

In the EU-25, unemployment rates of young workers are on average twice as high as overall unemployment rates for the population as a whole. There are also substantial differences across regions: regional unemployment rates for young people vary from 6.2% to 59.1%.

National figures indicate that young people are typically low-wage earners and that they have less access to social benefits than the working population as a whole.

More young males than females are in work, and the highest proportion of young workers are found in the Hotels and restaurant sector (22.7%), followed by Trade (16.3%). Typical 'young' occupations are Service workers, Shop and market sales workers, Armed forces and Elementary occupations. These jobs tend to involve a substantial amount of temporary or seasonal work, poor employment conditions and physically demanding work. 37.5% of young workers are in fixed-term jobs, compared to about 12% of the workforce as a whole. People employed on temporary contracts have less access to training and to

Figure 9: Proportion of young workers per sector in %, EU-25, 2005



Source: Labour Force Survey – Eurostat

participation in long-term competence development than those with permanent work contracts. Temporary workers also have less job control in terms of the order of tasks, pace of work and work methods. They also have lower job demands, and are less informed about risks at work.

In 2005, 25.7% of young workers worked part-time – an increase of 4.7% over 2000. Employees in the part-time category have the following characteristics: working in more favourable ambient conditions, working less at non-standard hours (evening work, night work and weekend work), less control over working time, less skilful work, less training, working in the social sector and hotel/restaurant sector, and not in construction, working in service/sales occupations and not as managers.

Some salient facts about young workers are:

- Young workers are more exposed to the following physical work factors: noise, vibrations, heat/cold and handling dangerous substances.
- Young workers in Hotels and restaurants and Construction are at risk from loud **noise**, and call/contact centre telephone operators are at risk of **acoustic shock** injuries.
- Young workers are also more likely to experience low frequency whole-body vibration, for example from driving or riding in off-road vehicles on uneven surfaces, or excessive movement. This may be associated with **back pain**, and other **spinal disorders**.
- Exposure to **heat** is common in the categories of Agriculture, Construction, Industry and Hotels and restaurants, suggesting that young workers are more at risk of this.
- Physically demanding work factors (such as painful positions, handling of heavy loads and repetitive work) seem to be more common among young workers than the working population as a whole.
- Young workers as a group wear more protective equipment than the average working population, but seem to be less informed about occupational risks.
- Young workers are more likely to report unwanted sexual attention compared to the overall working population. Young women in the

Hotels and restaurant sector and other service industries are particularly vulnerable.

- Young people have a higher accident rate, but fewer fatal accidents than older workers.
- Young men are particularly at risk of accidents at work. The top five occupational diseases among workers aged 15–35 years are: allergic effects, irritant effects of the skin, pulmonary disorders, infectious diseases and musculoskeletal disorders.
- Young workers have a lower than average risk of occupational diseases than older workers but the prevalence of acute diseases, such as allergic and toxic outcomes, may be higher among young workers.

If you would like further information about any of the topics covered in this issue of *Outlook*, please visit http://osha.europa.eu/en/publications/outlook.

The European Risk Observatory will continue to work on these topics, and many others related to new and emerging risks in occupational safety and health. For the latest information on our work please visit http://osha.europa.eu/en/riskobservatory or subscribe to the European Agency's electronic newsletter OSHmail (http://osha.europa.eu/en/news/oshmail/).

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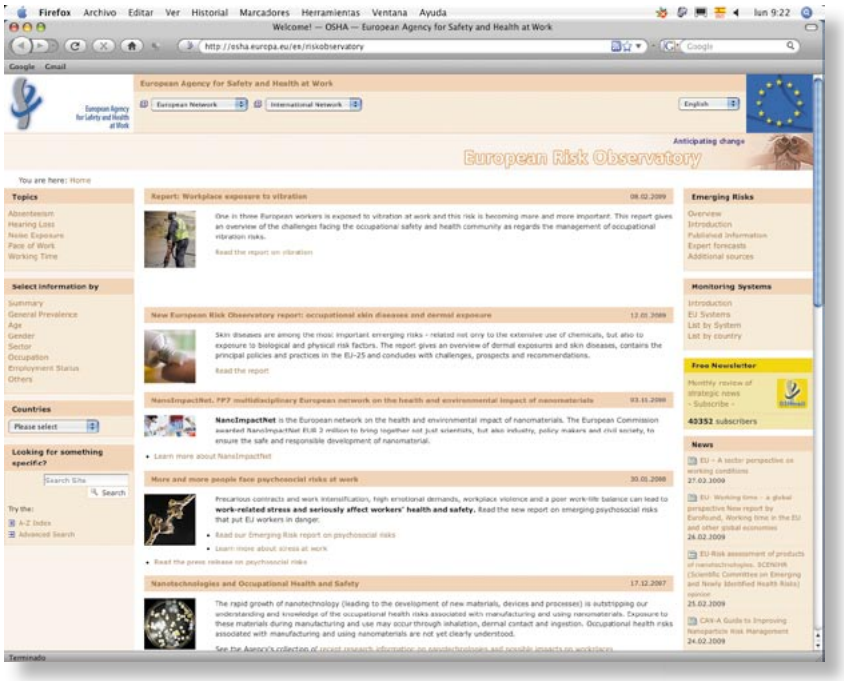

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