Research needs

Research on this challenge should contribute to understanding the specific biological properties of nanomaterials (ENM) and should identify their adverse effects. More in particular:

• exploring the nanoparticles’ characteristics that contribute to biological effects.
• investigating effects and mechanisms of different types of nanoparticles on biological systems.
• the development of new methods for predicting the toxicity of ENM (dose-response relationship).
• the development of a safety classification of ENMs based on physical and chemical characteristics.
• epidemiological studies.

Besides that, further research should be carried out with regard to nanomaterials’ characterisation and metrology, and specifically on:

• harmonised methods to assess occupational exposure and preliminary work for standardization.
• the effectiveness of instruments and the development of improved measurement tools.
• which characteristics of ENMs should be measured in workplace monitoring.
• the potential release and the fate of ENMs after emission (nanodustiness).
• the validation of existing exposure models when applied for ENM and for new model approaches (for regulatory risk assessment).

Finally, further research on exposure control and risk management is needed, in more particular:

• quantitative evaluation of the efficiency of ventilation and capture devices at workstations producing/handling ENMs.
• study on the effectiveness of respiratory protective devices in the laboratory and workplace.
• development of risk management guidance (appropriate control banding techniques).

Safety culture to prevent occupational accidents

Accidents at work continue to result in high rates of fatal and serious injuries, hospitalisation, work absence, disability and premature retirement. An estimated 6.9 million people in the EU27 had one or more accidents at work in 2007, 5,580 of which were fatal. There is a need for new evidence-based knowledge about the most effective initiatives for preventing accidents at work, particularly among vulnerable persons such as young workers, migrant workers and workers in small and medium sized enterprises. Heightening of safety culture in European enterprises and organisations can have a positive impact on occupational safety and health awareness, and on how they are perceived and dealt with. Diagnostic tools such as the Safety Climate Tool and the Nordic Occupational Safety Climate Questionnaire are an important contribution to promoting a strong safety culture in enterprises.

In addition, adoption of a ‘Zero accident vision’ has shown to be an ethically sustainable commitment strategy based on the idea that all accidents at work are preventable. Research in these areas should contribute to a better understanding of the more tangible conditions that contribute to establishing a positive safety culture in enterprises. It should lead to the development of comprehensive instruments for the assessment of safety culture and expand a ‘Zero accident vision’ in the European Member States.

Research needs

Research is necessary on the following topics:

• factors leading to an increased accident risk for certain groups of workers including young and older workers, migrant workers and newly appointed workers.
• the conditions and factors to establish a positive safety culture in enterprises of any size including regulation, social responsibility, leadership commitment, safety climate.
• the effectiveness of methods to promote a ‘Zero accident vision’ and workplace safety culture at enterprise level.
• the development of comprehensive instruments for the assessment of safety climate and of other OSH factors.

Further information:
This summary is part of the PEROSH report “Sustainable workplaces of the future – European research challenges for Occupational Safety and Health” The full report, as well as each of the research challenges separately, can be downloaded in pdf format from the PEROSH website: http://www.perosh.eu/OSHresearch2020

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Summary

Sustainable workplaces of the future – European Research Challenges for occupational safety and health

In line with the EU2020 Strategy for smart, inclusive and sustainable growth, one of the aims of the PEROSH research is to contribute to healthy, safe, innovative and sustainable workplaces, and in keeping people healthy and longer at work. Identification of the research needs and expected outcomes is important to keep abreast of the emerging trends and risks in this field.

As the result of a joint consultation process, the PEROSH partners identified seven research challenges for occupational safety and health (OSH) until 2020.

The challenges were identified within a framework of future topic scanning, using general forecasting exercises, literature reviews and stakeholder discussions, which were organised by the individual institutes.

The following seven main research challenges are considered to be essential for future research in OSH:

• Sustainable employability to prolong working life
• Disability prevention and reintegration
• Psychosocial well-being in a sustainable working organisation
• Multifactorial genesis of work-related musculoskeletal disorders (MSDs)
• New technologies as a field of action for OSH
• Occupational risks related to engineered nanomaterials (ENM)
• Safety culture to prevent occupational accidents
Sustainable employability to prolong working life

Over the next years, demographic change will continue to be a major driver of labour market developments in Europe. These developments will also have an important impact on occupational safety and health. For governments, enterprises and citizens alike, it will be of crucial importance to prolong working life in a healthy and productive manner. Research should contribute to a paradigm shift in OSH from its focus on work as a risk factor of ill health to work as a source of vitality, empowerment, healthy ageing and participation in society. A multi-sector approach should be developed to create a common ground. Working conditions, education, and training and motivation to prolong working life are key topics. This will lead to close cooperation of OSH and Human Resources Management, and to a bridging of the gap between OSH and healthcare.

Research needs

• Studies on the individual and organisational determinants of the prolongation of working life while maintaining good health and high productivity.
• Insight into cost-effective individual and organisational interventions and measures (regulations, legislation), in order to extend working life in good health and to maintain productivity.
• The cost-benefit analysis on the societal level demonstrating a positive return on investment on human capital to encourage the promotion of sustainable employability.
• Integrative multidisciplinary research on sustainable working conditions, workplace health promotion, and improvement of lifelong learning, career development and mobility, social innovation of the workplace system.

Disability prevention and reintegration

About 6% of the working-age population leaves the labour market permanently due to disability or ill health. The primary diagnostic causes for disability retirement are musculoskeletal diseases and mental disorders. Priority groups that should be targeted for disability prevention are young workers with long careers, ageing workers with a growing number of chronic diseases and partial disability, and workers in heavy and hazardous occupations. An important component in this process is the dialogue between worker, employer and healthcare provider and the empowerment of the disabled worker.

Research needs

In order to reduce and prevent the negative trend, the following actions are needed: (i) updated systems and strategies for occupational health and safety protection, and improvement of the working conditions leading to work disability, (ii) both national and corporate-level strategies, solutions and management of sickness absence, disability, job retention and return to work. More in particular:
• development of a holistic approach of disability, taking into account multiple risk factors and supportive factors.
• determination of work-related, socio-economic and individual factors needed to prevent disability.
• insight in the processes and factors to enhance return to work.
• development of intervention strategies based on work organisation and development, work environment, lifestyle, health service provision and OSH cooperation.
• studies into the role, quality and effectiveness of the healthcare provider and the occupational safety system in preventing work disability.
• models for integrated care and cooperation of different stakeholders.

Psychosocial well-being in a sustainable work organisation

Psychosocial risks are considered emerging risks across the European Union and a key challenge in modern occupational safety and health management. Findings reported that in Europe work-related psychosocial risks of career managers and workers due to its connection with risks for worker health and safety and with its subsequent cost for organisations. The increasing changes in the nature of work and organisations and the growing competitive nature of the global marketplace have increased workers’ exposure to psychosocial hazards and have resulted in the emergence of unknown hazards. Research in this area should contribute to a better understanding of the determining factors of physical, psychological and mental health and their respective impacts, and of the positive factors that may improve well-being, including the development of integrated approaches to the management of psychological risks.

Research needs

Research in this area should:
• investigate the influence of organisational and work related factors, including new ways of working, innovations in the production system and the use of Information and Communication Technologies.
• explore resources and positive factors such as job motivation, organisational flexibility, social relations, career prospects; as well as underevaluated factors, such as ethics, job insecurity, work-life balance, information overload, working hours that can have an impact on work-related stress, mental health and on the development of organisational and individual well-being.
• examine the effects of restructuring (company re-organisation, closures, acquisitions, downsizing, outsourcing, relocation).
• understand the connection between specific characteristics linked to vulnerable groups (ageing workers, gender differences, people in precarious employment) and psychosocial risks.
• analyse the underexplored impacts of work-related stress, such as work engagement and workaholism.
• develop effective organisational and workplace interventions to reduce work-related stress, violence and harassment.
• assess the socio-economic impact of work related stress and its consequences in terms of cost and of effects on workers and productivity.

Multifactorial genesis of work-related musculoskeletal disorders (MSDs)

Work-related musculoskeletal disorders (MSDs) are of immense importance in the occupational sphere. In Europe, work-related MSDs are leading the statistics for sickness absence and result in high direct costs (costs of treatment) and indirect costs (loss of production). Work-related MSDs represent the main occupational disease category affecting European workers. These disorders are widespread in all occupational sectors, but agriculture and construction are the two most affected sectors.

Usually, the causes of work-related MSDs are multifactorial and there are numerous work-related risk factors for the various types of MSDs. Workers are generally exposed to several factors at the same time and the interaction of the resulting effects are often unknown. Research in this area should contribute to a better understanding of work-related MSDs that allows for an evidence-based development of appropriate and more effective prevention approaches and risk assessments.

In order to obtain substantial achievements in the further development of effective MSD preventive measures, close cooperation between OSH research organisations in Europe will be required.

Research needs

The following research at EU level is required:
• insight into the interaction of combined physical and psychosocial risk factors on the genesis of work-related MSDs.
• connections between MSD and individual physical capacity.
• epidemiological studies, for example the analysis of specific work disability patterns.
• internationally concerted development of risk assessment tools and prevention strategies with regard to mixed exposures.
• research on how workplaces accommodate employees with MSD.
• exposure databases and data exchange within OSH research organisations.
• high quality MSD intervention studies including technical, organisational, person-oriented, cost-effectiveness interventions.

New technologies as a field of action for OSH

The emergence and rapid development of new technologies are changing the working conditions and the working environment. New technologies have a lot of potential to deal with existing and well-known OSH questions, such as the design of the man-machine interface and the real-time monitoring of work environment parameters. Simultaneously, new technologies stimulate research in a number of new domains of scientific development, such as the development and application of smart and functional materials. The challenge is to reduce possible OSH risks at an early stage by the usage of these new technologies. Moreover, the development of new technologies may lead to the emergence of new hazards and risks, and can overrule known solutions. Research should therefore support the development of a common European position with regard to new technologies and OSH in order to anticipate the possibilities and consequences of implementing technology.

Research needs

Research should look into:
• how to adapt the protective efficiency and functionality of personal protective equipment to new hazards and changes in the working environment.
• the way the development and use of virtual reality applications contributes to the design of safe workplaces.
• the effects of the implementation and use of adaptive wearable Information and Communication Technologies in work environments in terms of performance.
• the influence of the quality of air and the acoustic comfort of rooms in the working and living environment by using innovative technical solutions.
• the analysis and improvement of OSH for mobile workplaces.
• the cognitive aspects of new technology usage.
• the technology-mediated influence of user’s attitudes and behaviour.
• the impact assessment of work environments controlled by Work Assistance Systems.

Occupational risks related to engineered nano-materials (ENMs)

Engineered nanomaterials present new challenges to understanding, predicting and managing health risks to workers. As nanotechnology applications and uses expand, the safety of these emerging materials is identified as one of the research priorities. It has been shown that the physical characteristics of nanoparticles can influence their effects in biological systems, but results from available studies are insufficient to elucidate the potential health concerns. Research efforts have to address knowledge gaps with regard to the potential toxicity of nanomaterials, occupational exposure measurement and effective risk management procedures. In this research area, European level collaboration is an obvious choice due to the complexity of the issues.