

Women and the ageing workforce Implications for Occupational Safety and Health

A research review

Authors: Joanne O. Crawford, Alice Davis, Hilary Cowie and Ken Dixon (Institute of Occupational Medicine).

Reviewed by Sonja Hagen Mikkelsen (COWI) and Maria Albin (Lund University).

Edited by Robert Pederson and Alice Belin (Milieu Ltd)

This report was commissioned by the European Agency for Safety and Health at Work (EU-OSHA). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect the views of EU-OSHA.

Project management - Sarah Copsey (EU-OSHA)

**Europe Direct is a service to help you find
answers to your questions about the
European Union**

**Freephone number (*):
00 800 6 7 8 9 10 11**

(* Certain mobile telephone operators do not allow access to 00 800 numbers, or these calls may be billed.

More information on the European Union is available on the Internet (<http://europa.eu>).

Cataloguing data can be found on the cover of this publication.

Luxembourg: Publications Office of the European Union, 2016

ISBN: 978-92-9240-985-2

doi: 10.2802/082637

© European Agency for Safety and Health at Work, 2016

Reproduction is authorised provided the source is acknowledged.

Table of contents

Abbreviations	5
Executive summary	7
1 Introduction.....	13
1.1 The project ‘Safer and Healthier Work at Any Age’	13
1.2 Background: why be concerned about age and gender?	13
1.3 Scope of the review.....	15
2 Sex and gender differences in age-related changes	16
2.1 Introduction.....	16
2.2 Specific physiological changes in working women	17
3 Gender segregation in the labour market, OSH and sustainable work.....	20
3.1 Introduction.....	20
3.2 Horizontal segregation	20
3.3 Vertical segregation.....	21
3.4 Hazards and risks in female-dominated occupations and sustainable work	22
3.5 Differences related to employment arrangements	25
4 Specific OSH and health issues, female workers and implications for sustainable work	27
4.1 Introduction.....	27
4.2 MSDs.....	27
4.3 Psychosocial risks and health problems	30
4.4 Life-cycle approach to OSH, cumulative exposures and recognition of risks to female workers	32
4.5 Multiple exposures, female workers and sustainable work.....	34
4.6 Accidents, female workers and sustainable work	35
4.7 Night or shift work and sustainable work.....	35
4.8 Work and the menopause	36
4.9 Unpaid work and caring responsibilities.....	38
5 Female-dominated work and sustainable work.....	42
5.1 Healthcare	42
5.2 Education	44
5.3 Implementing measures in work predominantly carried out by women	45
6 ‘Groups’ of female workers and sustainable work	46
7 Risk prevention, health promotion, OSH systems and gender and sustainable work	47
7.1 Age- and gender-sensitive risk assessments	47
7.2 Workplace health promotion and diversity	49
7.3 OSH systems, labour inspection and strategies for sustainable work	51
7.4 Access to support services	53
8 Conclusions.....	55
8.1 Gaps in knowledge and support.....	55
8.2 Overall conclusions and possible policy implications.....	57

References	59
Appendix A: Summary of findings on the ageing workforce and the implications for occupational safety.....	67
Appendix B: Search protocol and selection methodology	80
Appendix C: Features of good practice: summary of findings (Weyman <i>et al.</i> , 2013).....	85

List of figures and tables

Figure 1: Gender differences in life expectancy and HLY expectancy at birth in EU Member States in 2010 (Marmot, 2013)	17
Figure 2: Percentage of workers aged 50-54 years who do not think they will be able to do the same job at the age of 60 (Eurofound, 2012)	24
Table 1: Employment (%) by age group and by gender for workers aged 50+, according to sector (Eurofound, 2012).....	21
Table 2: Employment (%) by age group and by gender for workers aged 50+, according to occupation (Eurofound, 2012)	22
Table 3: Examples of hazards and risks found in female-dominated occupations (EU-OSHA, 2013a)	23

Abbreviations

COPD	chronic obstructive pulmonary disease
EU-28	28 Member States of the European Union
EU-OSHA	European Agency for Safety and Health at Work
Eurofound	European Foundation for the Improvement of Living and Working Conditions
ENWHP	European Network for Workplace Health Promotion
EWCS	European Working Conditions Survey
HLY	healthy life years
HR	human resources
HSE	United Kingdom Health and Safety Executive
MSD	musculoskeletal disorder
NHS	United Kingdom National Health Service
NIOSH	US National Institute for Occupational Safety and Health
OECD	Organisation for Economic Cooperation and Development
OSH	occupational safety and health
PPE	personal protective equipment
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	randomised controlled trial
TAEN	The Age and Employment Network
TUC	United Kingdom Trades Union Congress
WHO	World Health Organization
WHP	workplace health promotion

Executive summary

This review was carried out as part of a larger project of the European Agency for Safety and Health at Work (EU-OSHA), initiated by the European Parliament. The project, called 'Safer and Healthier Work at Any Age', aims to enhance the implementation of existing recommendations, the exchange of best practices, and the further investigation of possible ways to improve occupational safety and health (OSH), and thereby improve the sustainability of work. The present review examines a number of issues related to gender, older female workers, OSH and sustainable work, however, it is not a comprehensive review. It was informed by desk-based research that reviewed existing information on these topics. It was also informed by a workshop on the topic organised by EU-OSHA (2015).

- **Why review the gender dimension of occupational safety and health, sustainable work and older workers?**

It is important to discuss how gender and age interact in relation to OSH and sustainable work, in order to inform policy, debate and future research on sustainable work. Age-related management that accounts for demographic change is crucial to the implementation of the objectives on increasing employment rates among women, in the context of the Europe 2020 Strategy. However, different measures may need to be taken to maintain and improve the OSH of older female workers. A gender-related dimension is important, for example, with regard to addressing measures to balance work and care responsibilities for older workers, and addressing the impact of physical work on women in relation to, for example, musculoskeletal disorders (MSDs), and the impact of stress and burnout resulting from emotionally demanding work carried out by women. Despite a growing body of work on the separate domains of gender and age in the workplace, there has been limited research on the intersection of gender and age and OSH in relation to safety and health issues and sustainable workplaces. Nevertheless, relevant information is available from studies on gender by EU-OSHA and Eurofound.

- **Sex and gender differences in age-related changes**

A number of changes in physical ability and health are associated with ageing, and these are influenced by sex (that is, biological) and gender (that is, socially constructed) differences, and can affect the ability of older women to work.

Women live longer than men, but they are also more likely to live longer with a chronic health condition or disability than men. The most obvious sex-specific age-related change is the menopause, although there has been very little research on the influence of the menopause on working women. Osteoarthritis and osteoporosis are diagnosed more frequently in women than in men, and are age related. Osteoporosis increases the risk of fractures in the workplace. Differences between men and women with regard to the prevalence of chronic conditions, such as chronic obstructive pulmonary disease, have been observed. These differences can also be explained by differences in the exposure to workplace hazards. Breast cancer is far more prevalent among women; evidence is growing for a link between long-term shift work, particularly night work, and breast cancer.

It is important to avoid stereotypes that relate to older workers, and older women in particular, and their work ability. For example, physical strength and endurance is very specific to individuals. For example, some older workers may be stronger than their younger colleagues. Likewise, the differences in physical ability between individual women can often be greater than those between men and women.

Declines in physical ability and health with age in women and men often do not affect work performance. Many chronic diseases are controllable. For example, while unpredictable in nature, various measures can be taken in the workplace to help those with arthritis manage their pain and fatigue. Older workers can also use their experience to adapt their ways of working. Simple measures can often be taken in the workplace to prevent early exit from work, such as equipment changes, changes in the way a task is performed, adjustments to working hours or a transfer to alternative work if necessary. Simple ergonomic measures to reduce workloads, for example lifting aids, have a positive impact on young and old workers, the only difference being that whereas they facilitate work for younger workers, they often make the work possible for older workers.

- **Gender-related differences between men and women exist across the work-life course**

According to the European Working Conditions Survey, gender differences exist across the work-life course and, generally, well-being is lower for women than for men. This gender gap widens after a woman has had children and remains wide for the rest of the life course. Vertical and horizontal

segregation in the labour market exposes women generally, and older women specifically, to different risks from those that men are exposed to. This affects women's health throughout their working lives. Vertical gender segregation leads to a concentration of women in jobs lower down the job hierarchy; this is due to a lack of promotion opportunities and career mobility (EU-OSHA, 2013a). Vertical segregation because of a lack of career mobility can lead to prolonged exposure to certain workplace hazards, such as repetitive work or work that requires awkward postures.

Horizontal segregation relates to the fact that men and women tend to work in different economic sectors. Older women are over-represented in the health and social work, education and other service sectors. In the context of sustainable work, it is important not to underestimate the physical and emotional demands of some women's work. Manual handling, highly repetitive and paced work, shift work, the risk of violence and harassment, and stress are issues that affect retention and the quality of the working life in many areas in which women work. As for other areas of OSH, strategies for sustainable work should address the sectors and jobs in which women predominate, such as health care, education, and cleaning and retail work, as well as male-dominated sectors, such as construction. This is also important in the context of an increased risk of developing MSDs as a result of desk-based work; this is especially relevant for relatively low-grade administrative workers, who have less control and variety in their work.

▪ **The menopause and workplace health promotion**

Other health issues faced by women related to, for example, the menopause, remain taboos in society and, therefore, in the workplace. Simple measures can be taken in the workplace to address such health issues; for example, access to drinking water can be provided, layered clothing can be used for uniforms, and flexible working can be arranged to facilitate doctor's appointments. However, more awareness raising and support for workplaces is needed, including advice on non-stigmatising measures, model policies and risk assessment checklists. In addition, more research on workplace implications is needed. Similarly, there is a need for more tailored approaches to addressing the promotion of men's health in the workplace, especially as different awareness-raising techniques are needed to engage men and women.

▪ **Gender-sensitive occupational safety and health strategies across the life course**

Workplace safety and health strategies for sustainable working, which start with younger workers, should be both age and gender sensitive. For example, a lifelong approach to sustainable work should encompass risk education and prevention for girls and boys in schools, and ensure that OSH education addresses the risks associated with female-dominated jobs and that OSH is included in vocational training in typical women's jobs.

▪ **Stress and musculoskeletal disorders**

Stress and MSDs can have a major impact on the sustainability of women's work. More attention needs to be given to these two issues, including a focus on risk prevention in jobs predominantly carried out by women. For example, in the case of MSDs, more attention needs to be given to work that involves prolonged standing or prolonged sitting, both of which are prevalent in some jobs often carried out by women, such as at supermarket checkouts or office administration work.

▪ **Rehabilitation**

A specific gender focus also needs to be given to rehabilitation from work-related illnesses and to ensure that programmes are accessible for women with childcare responsibilities. Non-recognition of the work relatedness of women's ill health can be a barrier to women accessing rehabilitation if such access is dependent on having a recognised occupational health problem. As an example of good practice for rehabilitation, the French work injury insurance organisation Anact (L'agence nationale pour l'amélioration des conditions de travail) has promoted a guide for the rehabilitation of female workers after treatment for breast cancer; this was developed by associations of occupational physicians (Anact, 2008). Breast cancer is one of the most common female cancers and affects mainly older women.

▪ **Incorporating age and gender dimensions into risk assessment and strategy development**

For the promotion of sustainable work, it is important to integrate age and diversity into risk assessment, so that OSH strategies promote diversity through risk prevention and by tackling risks at their source. This should be underpinned by key principles based on the importance of collective measures, consultations with employees and valuing diversity as a resource. Therefore, it is important to address age equality, gender equality and OSH in one policy and practice framework.

The close link between gender equality and sustainable work is demonstrated by an intervention that was employed by a French printing company. Women working in 'finishing' suffered from exceptionally high rates of MSDs. Ergonomic improvements were recommended but more had to be done to prevent exposure to repetitive tasks for long periods. An analysis of the length of time spent in different jobs by gender revealed that men were more quickly promoted from roles involving 'finishing' work than women, so one of the recommendations included promoting women's career path development and skill recognition, in order to prevent women from becoming trapped long term in repetitive jobs.

An example of integrated strategy development in a sector dominated by a female workforce is the strategy of the tripartite Working Longer Group (WLG) of the National Health Service (NHS) in the United Kingdom¹. This group was established to address the impact of the increase of the retirement age from 65 years to 68 years on the NHS workforce, which is 77 % female, with nearly two-thirds of nurses over the age of 40 years. The recommendations cover four main areas: data; pension options and retirement decisions; working arrangements and the work environment; and good practice occupational health, safety and well-being. The audit of existing evidence found that if older workers are in good health and their 'job fit' is right, they can work as productively as their younger counterparts. This highlighted the importance of fully implementing sector guidelines on health and well-being at work to ensure that a longer working life does not adversely affect an employee's health or ability to work effectively and safely. Specific recommendations were made with regard to developing and implementing a risk assessment framework, in order to assist organisations in addressing the cumulative impact of working for longer. For employers, this means supporting staff with health, safety and well-being issues throughout their working lives to enable them to work longer.

- **Family carers**

With an ageing working population and an increase in the retirement age, more workers are likely to have the responsibility of caring for sick relatives. Measures for the reconciliation of work and family life are increasingly recognised as being important in the context of the EU 2020 Employment Strategy and as a driver for gender equality. Currently, 80 % of the time spent caring for people with disabilities and older people is provided by informal carers, and the highest proportion of this care is provided by women of 50 years or older. There is evidence that older men are more likely to be carers for, for example, a sick spouse or elderly parent, than younger men. However, current strategies aimed at carers focus on young women with childcare needs.

Preconceptions regarding who may be affected by care duties should be avoided in order to develop appropriate reconciliation policies and practices, which are essential for promoting the employment of both older women and older men. Flexible working schemes and part-time policies, as have already been implemented for young parents, should also be considered, in order to prevent older carers, and especially older female workers, from exiting the workforce. As well as employment policies that allow the reconciliation of work and care by employees, an ageing population in Europe requires additional resources for the care of older and disabled people and services to promote independent living as part of an integrated strategy.

- **Mainstreaming diversity in national occupational safety and health strategies**

Labour inspectorates need to be able to support the process of incorporating age and gender considerations into sustainable workplace strategies without causing discrimination. To do this systematically, diversity should be mainstreamed into the strategies and activities of labour inspectorates. One example of how to achieve this is provided by the diversity mainstreaming strategy implemented by the Austrian labour inspectorate, the outputs of which include a range of gender mainstreaming tools, and training and diversity checklists for inspectors to use in companies. Another example is the research and advice for employers on different areas of diversity carried out and provided by the United Kingdom Health and Safety Executive. (EU-OSHA, 2014).

¹ <http://www.nhsemployers.org/wlr>

An example of an intervention in a workplace in which women predominate is given by a kindergarten in Denmark, which introduced a range of sustainable work adjustments to retain staff affected by repetitive movements and lifting. These adjustments specifically addressed the fact that workers had to bend frequently and that the available furniture was only apt for children and was not height-adjustable. Working time adjustments, external help with lifting, and advice on working methods and the prevention of MSDs were facilitated through trade union and worker involvement and access to a municipal health promotion programme, which included training for the kindergarten director. (EU-OSHA, 2016c).

Gaps in knowledge

More research is needed on the intersection between age and gender in relation to OSH and sustainable work. The following general knowledge gaps have been identified during the review:

- Further work is needed to improve the collection of data on hazards to which women are exposed, rather than making assumptions about work tasks and job roles, or correcting for sex and gender, in research studies.
- Because of horizontal segregation in certain sectors, such as cleaning and health care, women can be exposed to multiple hazards; further research is needed to examine this in relation to age and extending the working life.
- Further research is needed to understand why women report poorer mental health outcomes than men exposed to the same psychosocial risks.
- Further research is needed to strengthen our understanding of the impact of women's dual roles of paid and domestic work on their health, especially in the context of extending working lives.
- Studies need to include older women workers from different ethnic groups.

More specific research gaps have also been identified:

- Our understanding of the possible impact of the menopause on a woman's working life is still limited and this is an area for which further research is needed, in order to identify support strategies for the workplace.
- Further research is needed on the links between night work and breast cancer in women to increase our understanding of the potential cause mechanisms and to improve risk prevention strategies.
- Further research is needed on working with painful and fatiguing conditions.

Overall conclusions: taking account of gender issues in the occupational safety and health aspects of sustainable work

In the future, it will be important to create sustainable working patterns for older workers, with a specific focus on older female workers, through measures that address workloads, work tasks, flexible working hours, the work–life balance, support in the workplace for specific gender-related health issues, and workforce development. Strong policy frameworks, investment and resources are crucial for supporting actions, at strategic and practical levels, on the complex intersection between age and gender. This requires consistent, coordinated actions in order to address age, gender and OSH actions related to risk management, the adaptation of work, and the balance of work and care responsibilities across the life course. In addition, more research is needed on the intersection of age and gender in relation to OSH and sustainable work, and more practical support for the workplace is also needed. Older female workers are a valuable asset to organisations. It is important to counter stereotyped views of their abilities and avoid the double discrimination that older women may face in the workplace. The key findings are summarised below:

- *Sex- and gender-related differences in working conditions persist throughout the working life:* Sex- and gender-related differences between men and women influence the health issues they may face, what jobs they do, their conditions of work and the occupational risks they face throughout their working lives. Therefore, a gender-specific approach is needed for sustainable

work strategies, and policy plans should be assessed for any possible gender-specific impacts.

- *The cumulative physical and emotional impacts of women's work should not be underestimated:* Sustainable work strategies need to focus on the cumulative impact of the exposures women face throughout their working lives (a life-course approach) in particular sectors and jobs, including in relation to repetitive and monotonous work, prolonged standing and sitting, stress and emotionally demanding work, and paced and shift work.
- *In the workplace, support for risk assessments of the cumulative exposure to hazards that incorporate the complexities of age and gender is needed:* The assessment of cumulative exposures should take into account differences related to both gender and age; for example, older men and older women or older and younger women should be considered within one occupation/sector.
- *Segregation into low-level jobs without career promotion can lead to long-term exposure to hazards:* Attention needs to be paid to women's career development, to avoid them being trapped in low-level jobs resulting in long-term exposure to the same hazards.
- *The barriers to equal access to rehabilitation and vocational training need to be tackled:* Women of all ages need equal access to appropriate/adapted rehabilitation programmes, and vocational retraining should be adapted/relevant to the sectors and jobs they are usually employed in. Non-recognition of the work relatedness of some health problems, and child and other care obligations, can be barriers to access.
- *Simple non-stigmatising workplace measures can support women going through the menopause:* Understanding and support for female workers during the menopause are needed; such support could be as simple as providing access to drinking water. More research and practical, non-stigmatising advice for the workplace in this taboo area is needed.
- *Workplace health promotion strategies need different approaches for male and female audiences.*
- *Flexible work measures need to be relevant to carers of older relatives and to both men and women:* The workplace approach to family carers needs to be adjusted away from the current model that focuses on women who care for children, so that it is relevant to both male and female carers of older relatives.
- *Labour inspectorates need diversity strategies, and examples of such strategies exist:* Labour inspectorates need to adopt diversity strategies in order to routinely incorporate age and gender issues into their work, avoid discrimination in their practices and be able to support workplaces effectively.
- *More research on the age/gender intersection is needed:* More research is needed on the intersection between gender and age in relation to OSH and sustainable work, combined with more practical support for the workplace.
- *Older female workers should be viewed as a valuable asset and the double discrimination that older female workers may face should be addressed through awareness raising:* Simple measures can often be taken in the workplace to allow women with declining health or abilities to continue working. Measures to reduce work demands will often benefit all workers.

1 Introduction

1.1 The project ‘Safer and Healthier Work at Any Age’

This review belongs to a series of activities that have been carried out as part of a larger project of the European Agency for Safety and Health at Work (EU-OSHA), initiated by the European Parliament. The project, called ‘Safer and Healthier Work at Any Age’, aims to enhance the implementation of existing recommendations, facilitate the exchange of best practices and encourage further investigation of possible ways of improving occupational safety and health (OSH) to improve the sustainability of work across the life course, in the context of the ageing workforce.

The project supports the objectives of the EU Strategic Framework on Health and Safety at Work 2014-2020 to address the ageing of the workforce, emerging risks and the prevention of work-related and occupational diseases (EC, 2014). The Framework states that risks affecting particular age groups, workers with disabilities and women deserve particular attention and require targeted action. It also emphasises that OSH policy can contribute to promoting equal opportunities. It includes a specific action to promote the identification and exchange of good practice on ways to improve OSH conditions for specific categories of workers, e.g. older workers, inexperienced younger workers, workers with disabilities and women.

One of the objectives of the project was to prepare a review of the implications for occupational safety and health of the ageing workforce (EU-OSHA, 2016a) looking at the key issues in relation to OSH and sustainable work in the context of an ageing workforce. This general review, the conclusions of which are given in Appendix A, is complemented by the present review, which examines a selection of issues in relation to gender, women, OSH and sustainable work in the context of the ageing workforce.

1.2 Background: why be concerned about age and gender?

The number of women participating in the labour market has increased in recent decades. The proportion of women between the ages of 20 and 64 years who are employed has increased from 59.4 % in 2004 to 63.5 % in 2014 in the EU-28 (Eurostat, 2015a). In addition, the workforce is ageing. The employment rate of both men and women between the ages of 55 to 64 years has increased across the EU, from 38.4 % in 2002 to 51.8 % in 2014. When this is broken down by sex, the participation in work of women in this age group has increased more than that of men. Women’s participation in work increased from 29.1 % in 2002 to 45.2 % in 2014 (i.e. an increase of 16 percentage points), while men’s participation in work rose from 48.2 % in 2002 to 58.9 % in 2014 (i.e. an increase of a little over 10 percentage points) (Eurostat, 2015b). It is a target of the EU’s employment strategy (Europe 2020) to increase these rates further.

At the same time, both the official and the effective ages of retirement have been increasing throughout Europe for both men and women. In some countries, such as Greece and Croatia, the statutory retirement age has been set at 67 years; in other countries, such as Portugal, men and women are already working beyond the official retirement age (usually for financial reasons)². The rate of increase of the pensionable age for women can be steeper than that for men; for example, in some Member States, such as the United Kingdom, disparities in the official retirement age — with women retiring at an earlier age than men — have been removed.

Increases in the pensionable age mean that men and women may be working for a longer period of time across their life course, which may increase their cumulative exposure to workplace hazards. It also means that they will work, and be exposed to workplace hazards, until an older age. Both have implications for the sustainability of work, and economic incentives to prolong working life are likely to fail if they are not accompanied by measures to simultaneously improve working conditions. More broadly speaking, if work demands (physical or mental) are excessive, then early retirement may be used as a health-preserving measure. Changes in retirement benefits that prevent workers with limited economic resources from retiring may increase social inequalities in health (Burdof, 2015) and also gender inequalities. Vendramin and Valenduc (2014) also suggest that women’s more fragmented

² For more details on retirement behaviours across European countries, see EU-OSHA (2016b), Analysis report on EU and Member States policies, strategies and programmes on population and workforce ageing

careers may mean that they have to remain in work for longer (because of financial constraints and/or to accrue pension rights) and, consequently, this may mean that they are more likely to have to deal with work-impeding health problems.

There are key differences between men and women relating to their participation in work, first with regard to the type of sectors that they work in (horizontal segregation) and second in relation to opportunities for career progression within a company or sector (vertical segregation). There are also differences in relation to the type of employment contracts of men and women (e.g. part-time, temporary work, etc.).

1.2.1 Why review the gender dimension regarding OSH, sustainable work and the ageing workforce?

The biological differences between men and women are often described as sex differences; for example, it is only women who go through the menopause, pregnancy and childbirth. Gender, on the other hand, refers to the socially constructed characteristics of men and women that are learned, that vary between different cultures and that can be changed; for example, it can be either working men or working women that help to look after grandchildren and elderly parents (EU-OSHA, 2003a). Gender sensitivity is defined as 'the ability to perceive existing gender differences, issues and inequalities and incorporate these into strategies and actions' (EU-OSHA, 2003a).

One of the conclusions from EU-OSHA's general research review on ageing and OSH (EU-OSHA, 2016a) was that, as with all areas of OSH policy, gender issues should be taken into account in relation to sustainable work.

It is important to discuss how gender and age interact in relation to OSH and sustainable work in order to inform policy, debate and future research on sustainable work. Age management to handle demographic change is crucial for the implementation of the objectives on increasing women's employment rates in the context of the Europe 2020 strategy. However, different measures may be required to maintain and improve the OSH of older female workers. Women generally, and older women specifically, are exposed to a number of different workplace safety and health issues, and experience the impacts of their dual role at work and in the home and of physiological changes with age. Therefore, a gender dimension is important in, for example, addressing measures to balance work and care responsibilities for older workers, addressing the impact of physical work on women, such as musculoskeletal disorders (MSDs), and addressing the impact of stress and burnout resulting from emotionally demanding work carried out by women.

The gender segregation described above is a persistent feature of European labour markets (Eurofound, 2015a) and persists across working life. Gender segregation affects the hazards that women and men are exposed to across their working lives, in other words, it has an impact on their cumulative exposure to certain working conditions and hazards across their working lives. There can also be the perception that women are engaged in 'light work', which may lead to the erroneous conclusion that the sustainability of work is less of an issue for older women than for older men. This reinforces the need to consider the gender dimension in OSH and age management.

While a number of workplaces have put in place good practices to ensure that their older female workers can, and are willing to, remain in work for longer, the potential hazards and risks that the ageing female workforce is facing, and the related support needs, need to be more fully considered in policies and legislation related to OSH in the context of an ageing workforce. Despite a growing body of work looking at the domains of gender and age issues in the workplace separately, there has been limited research to date on the intersection of gender and age in relation to OSH issues and sustainable workplaces. Nevertheless, relevant information is available from previous studies on gender by EU-OSHA and the European Foundation for the Improvement of Living and Working Conditions (Eurofound). In a report on gender and OSH, EU-OSHA (2003a) concluded that older workers are not a homogeneous group and gender differences do exist (in OSH); that there is little specific literature on the health at work of older women as a group; and that policies on the ageing workforce should take account of gender.

1.3 Scope of the review

This report gives an overview of some of the key issues on gender, women, OSH and sustainable work that have been highlighted in previous studies by EU-OSHA and Eurofound. It also takes account of some of the themes from the general review on OSH and the ageing workforce (EU-OSHA, 2016a) and considers them further from a gender perspective. For each topic, the possible issues and risk prevention measures are considered. To supplement the previous studies of EU-OSHA and Eurofound, the results of a literature search were also used. The methodology for the search protocol and screening process used for the literature search are given in Appendix B. In addition, the results of a seminar organised by EU-OSHA on the topic of OSH and the ageing workforce (EU-OSHA, 2015) have served as an input to this review, in particular regarding the discussion that took place on possible policies and practices.

This report looks at gender issues in relation to OSH and sustainable work across the life course. Eurofound (2012) defined a sustainable work system as a system in which the criteria of biocompatibility (whereby work is adapted to the functional properties of the human), ergo-compatibility (whereby efficient work strategies have been developed) and socio-compatibility (involving self-fulfilment in social and family life and controlling one's life course) are reached.

The review recognises that considering workers only in terms of their chronological age is overly simplistic, as there are significant differences between individuals in the rate and nature of the ageing process. A 'life-course' approach to OSH examines OSH risks and controls across the entire workforce, whatever their age, thereby accommodating individual differences while ensuring an appropriate level of protection for all. Adopting a life-course approach improves risk prevention for all workers and reduces the damage to workers' health, while limiting early exit from work and improving the sustainability of work in jobs that have high physical demands. This is key to promoting sustainable work and thus to achieving longer working life and healthy retirement.

Features of such an approach include:

- being aware that changes made to reduce risks for older workers (e.g. by excluding them from the more demanding aspects of jobs) might increase the risks for the other (younger) workers who have to take these tasks on instead;
- recognising that, given the cumulative nature of many injuries (e.g. some MSDs), reducing the incidence of these injuries among older workers entails reducing exposures to risk factors, such as excessively heavy manual work, for younger workers.

The topics covered in this review include age-related changes such as the menopause, the effect of gender differences in employment across the work-life course, some specific hazards and risks, some female-dominated work sectors, rehabilitation, risk assessment, workplace health promotion and gender, age and OSH in risk prevention practices and OSH strategies.

This is not a comprehensive review and some other relevant aspects, such as pre-existing chronic disease and health disparities related to economic and social factors, are not covered, although they are recognised as being an important part of the equation. The general review (EU-OSHA, 2016a) does present models that show the interaction of factors inside and outside the workplace and how this affects work ability and hence the sustainability of work. These models show that public health, socio-economic and education policies can all have an impact on workers' health and ability to work. Furthermore, there is increasing evidence that work plays a key role in socio-economic health inequalities (Burdorf, 2015); for example, the unequal burden of exposure to hazardous substances across occupations is an important factor contributing to health inequalities in society (Montano, 2014). More in-depth analysis of the range of issues affecting women's occupational health and that are therefore of relevance to the sustainability of women's work can be found in EU-OSHA (2003a, 2013a, 2014).

2 Sex and gender differences in age-related changes

Key findings

- Women live longer than men but are also more likely to live longer with a chronic health condition or a disability.
- There are a number of physiological and cognitive changes associated with ageing that are influenced by sex (i.e. biological) and gender (i.e. socially constructed) differences and that can have an impact on the work ability of older women.
- The most noticeable sex-specific age-related change is the menopause, although there has been very little research on the influence of the menopause in working women.
- Osteoarthritis and osteoporosis are diagnosed more frequently in women and are age-related. Osteoporosis increases the risk of fractures at the workplace. While arthritis is unpredictable in nature, various measures can be taken in the workplace to help those with this condition manage their pain and fatigue.
- Differences between men and women in the prevalence of chronic conditions, such as chronic obstructive pulmonary disease, have been observed. These differences can also be explained by exposure to workplace hazards.
- It is important to avoid stereotypes of older workers and older women in particular. Declines in physical ability and health with age often do not affect work performance. Where they do, simple measures can often be taken in the workplace to prevent early exit from work. Such measures may be beneficial for both young and older workers.

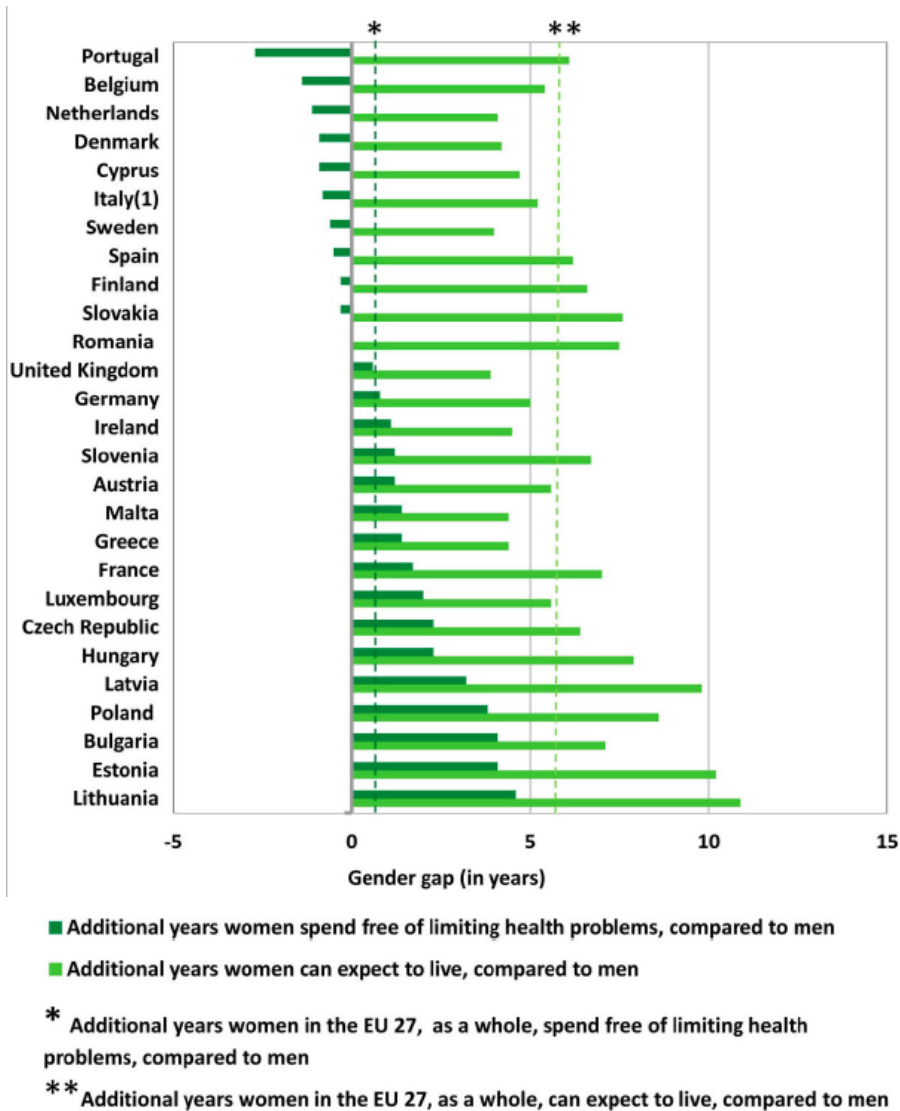
2.1 Introduction

The physiological and psychological changes associated with ageing are likely to be influenced by both sex and gender owing to the biological differences between men and women, and by the different exposures to workplace hazards experienced across occupations and sectors.

Marmot (2013) summarised data from across the EU in relation to gender differences in life expectancy and 'healthy life years' (HLY) expectancy at birth. The data presented in Figure 1 highlight that women generally have longer life expectancies than men across all EU Member States. However, when looking at life free of limiting chronic conditions, the difference between men and women is much smaller (not even one year). The ratio of 'life expectancy' to 'HLY expectancy' is therefore smaller for women than for men, illustrating the need to identify the causes of women's ill health in order to increase their potential to live free of disability or chronic conditions.

In addition, the increasing gap between average life expectancy and average HLY expectancy between EU Member States and between socio-economic groups is particularly problematic. Occupational class and educational level play important roles in determining health outcomes (Marmot, 2013; Burdof, 2015), and social disparities in health are increasing in several European countries. This means that workplaces have to adapt to increasing heterogeneity in health problems. The problem of obesity is one way to illustrate this: the overall prevalence of obesity is the same in men in women, but is higher and increasing in women with low educational levels.

Figure 1: Gender differences in life expectancy and HLY expectancy at birth in EU Member States in 2010 (Marmot, 2013)



2.2 Specific physiological changes in working women

While there are a number of physiological and cognitive changes that have the potential to affect work and OSH for all ageing individuals (as described in the general review of OSH issues and the ageing workforce (EU-OSHA, 2016a)) the following section identifies physical and cognitive changes that have the potential to affect ageing female workers specifically. Most of these changes, with the exception of the menopause, also occur to ageing men but, for either biological or social reasons, they have the potential to have a greater impact on female workers. It is important to recall that ageing is a very individual process and that the differences between people of the same age, at any age, are often greater than those between different age groups. Likewise, the differences between individual women can be greater than the differences between men and women.

The following section looks at differences between men and women in the prevalence of chronic obstructive pulmonary disease (COPD), stroke, asthma, and osteoarthritis and osteoporosis. The influence of the menopause on older working women is discussed in greater detail in section 4.

Differences between men and women in the prevalence of chronic conditions have been observed, for instance in relation to COPD, where there has been a large increase in the number of women being diagnosed (Aryal *et al.* 2014). Prevalence rates of clinically determined COPD increased in women from

50.8 to 59.2 per 1,000 between 1998 and 2009, whereas rates for men decreased from 108.1 to 74.3 per 1,000 during the same period. It is hypothesised that this is the result of changes in the work roles that women are now taking on (previously male roles) and other risk factors, including women being more susceptible to tobacco smoking and developing symptoms earlier with shorter exposure duration, and asthmatic women being more susceptible to COPD than asthmatic men. In addition, the under-diagnosis of COPD in women means that the actual figures may be higher and that not all affected women have access to treatment.

Sex-related differences in health outcomes were identified by Toivanen (2012) in her review of the social determinants of stroke. The review examined eight papers in relation to stress within the demands–control model and with stroke as an outcome. A positive association was found between high demands, low control and high strain in a job and the incidence of stroke for both men and women. However, in a further analysis of four papers that considered sex differences, stress (and specifically low levels of control of the job) was found to be a stronger predictor of stroke in women. This review was limited by its non-systematic nature and its lack of meta-analysis. However, it does show that psychosocial risks may have differing effects on men and women.

Differences between men and women have also been found in relation to adult-onset asthma, with women appearing to be more susceptible. Melgert *et al.* (2007) suggest that there are biological sex differences in relation to adult-onset asthma, which may be due to genetic differences, pulmonary differences and immunological influences. The influence of exposure to substances in the workplace cannot be ruled out owing to the nature of the work in which women dominate (see Table 3 in section 3 for examples of chemical exposures prevalent in work dominated by women), and also when women are more exposed than men doing the same work because of ill-fitting personal protective equipment (PPE) or being closer to the source due to height differences (see Kennedy and Koehoorn, 2003).

Osteoarthritis and osteoporosis are also diagnosed more frequently in women. Woolf and Pfleger (2003) reported that 9.6 % of men and 18 % of women over 60 years were affected by osteoarthritis. Sex differences in the prevalence of osteoporosis have also been identified, with a prevalence of 5 % of women at 50 years and 50 % of women at 85 years, compared with prevalences in men of 2.4 % and 20 %, respectively. In addition, the increased occurrence of osteoporosis can also lead to an increased risk of fractures in older women and potentially in older female workers. The pain, stiffness and tiredness that arthritis can cause can all vary in a single day or over a period of months. The uniqueness of each person's experience and the unpredictable nature of the condition can make it seem difficult to manage at work. Nevertheless, employers can support employees to find ways of working to manage their pain and tiredness; for example, accommodations can be made by allowing flexibility in working hours or in how they carry out work tasks, making changes to office chairs, equipment or technology to make tasks easier, or swapping certain tasks with other colleagues³. More research is needed into working with painful and tiring conditions such as arthritis.

Doyal and Payne (2006) pointed out that factors other than age, such as income, physical and psychological status, domestic circumstances, working conditions, class and ethnicity can dramatically vary the effect that a woman's health can have on her employment performance.

There has been very little research on the influence of the menopause in working women. The menopause is part of the natural process of ageing for women, and is defined as the point at which menstruation has ceased for 12 consecutive months. Symptoms and their severity and the experience of the menopause vary greatly between women. It may therefore affect women in different ways at the workplace. The menopause and work are discussed in more detail in section 4.

As mentioned above and discussed in the general research review (EU-OSHA, 2014a), ageing is a very individual process and it is therefore important to avoid stereotypes concerning older workers, and older women in particular, and their work ability. For example, physical strength and endurance are very specific to individuals, such that some older workers may be stronger than their younger colleagues. Likewise, the differences in physical ability between individual women can often be greater than those between men and women.

³ Based on advice from Arthritis Research UK (<http://www.arthritisresearchuk.org/arthritis-information/arthritis-and-daily-life/work-and-arthritis.aspx>, retrieved 10th May 2016).

Declines in physical ability and health with age in women and men often do not affect work performance. Many chronic diseases are controllable. Older workers also use their experience to adapt their ways of working. Simple measures can often be taken in the workplace to prevent early exit from work, such as equipment changes, changes in the way tasks are performed, adjustment to working hours or transfer to alternative work if necessary (Yeomans, 2011). Simple ergonomic measures to reduce workloads, for example lifting aids, have a positive impact on both young and older workers, the only difference being that, whereas these measures facilitate work for younger workers, they often make work possible again for older workers.

3 Gender segregation in the labour market, OSH and sustainable work

Key findings

- *Horizontal and vertical segregations in the labour market expose women and men to different hazards.* This will have an impact on their health across the work-life course.
- Gender differences persist across the life course both in and outside work.
- *Horizontal segregation results in exposure to different occupational hazards for men and women across the life course:* women are over-represented in health and social work, education and other service activities, whereas men work predominantly in construction, transport and agriculture.
- *Vertical segregation leads to a concentration of women in jobs lower down the hierarchy.* This can lead to prolonged exposure to certain workplace hazards, such as repetitive work and awkward postures, because of a lack of career mobility.
- *Part-time work is dominated by women* and can limit their access to support services, such as OSH and human resources management.
- *Older women's role in unpaid care work, in addition to paid work, increases their working day,* with the potential for stress and fatigue, especially where there is a poor fit between job and care responsibilities.
- Strategies for sustainable work should address sectors in which women predominate. The physical and emotional demands of some women's work should not be underestimated.

3.1 Introduction

How men and women participate in European labour markets and the work that they do vary greatly. The differences at work occur across many dimensions, including occupation and sector, contract type, pay and working time. These differences are a persistent feature of European labour markets (Eurofound, 2015a) and persists across working life.

Horizontal or occupational segregation refers to the fact that men and women tend to work in different economic sectors (EU-OSHA, 2013a). An example of horizontal segregation can be found in construction, where men make up the majority of the industry's workforce, whereas the sector of childcare is very female-dominated. Vertical, or hierarchical, segregation in the workforce describes the issue of segregation within the same sector in relation to position, status and/or hierarchy, with women typically concentrated lower down the hierarchy, regardless of sector. Differences in the participation of men and women in work also varies in terms of type of employment contract and working time (e.g. part-time work, temporary work, etc.). There remains an important gap between the genders regarding hours of unpaid work in the home, including caring for children and other dependants. These differences affect men's and women's experiences of work across their working lives. They will have an impact on the sustainability of their work and the measures required to achieve sustainable work for both men and women.

3.2 Horizontal segregation

Eurofound (2013) reported that 60 % of women and 64 % of men work in occupations where the majority of employees are the same gender. More women work in healthcare (77 % of the workforce), education (67 %) and the care sector, whereas men work predominantly in construction (91 %), transport (80 %) and agriculture (65 %) (EU-OSHA, 2013a; Eurofound, 2013).

A further breakdown of employment data identifies sectoral differences in employment patterns for women over 50 years (Eurofound, 2012). These include greater numbers of older women employed in education, healthcare and social work, as well as in non-profit services, associations or personal services (Table 1).

Table 1: Employment (%) by age group and by gender for workers aged 50+, according to sector (Eurofound, 2012)

	< 30 years	30–49 years	50+ years	All	Men 50+ years	Women 50+ years
A Agriculture, forestry and fishing	3	2	2	2	3	(1)
B-C-D-E Industrial activities and utilities	16	19	21	19	28	13
F Construction	7	8	6	7	10	2
G-H-I Wholesale and retail, transport and logistics, accommodation and catering	34	23	19	24	21	17
J-K-L-M-N Business services (ICT, finance, real estate, professional, technical and administrative support services)	15	14	12	14	12	12
O Public administration	5	7	10	7	10	9
P Education	6	9	12	9	8	16
Q Health and social work	9	12	12	11	4	21
R-S-T-U Other profit or non-profit services (including leisure, culture, associations, personal services, etc.)	6	5	5	5	3	8
Total %	100	100	100	100	100	100

Note: NACE Rev 2.1 sectors; bold numbers indicate significant gender gap among workers aged 50+. (1) indicates too few cases to be reliable.

This is confirmed by Vendramin and Valenduc (2014), who examined patterns of employment in the age group 55 to 64 years. Across the EU in 2013, those aged 55 to 64 years made up 26 % of the employed population, with no significant difference between the proportion of men and women in this age group. The government service, education, health and social work sectors employed a higher proportion of older workers than average, with more women of 55 to 64 years employed in these sectors than men in the same age group. These are working environments with specific hazards, which are discussed later in this report.

3.3 Vertical segregation

Vertical or hierarchical gender segregation in employment leads to a concentration of women in jobs lower down the hierarchy due to a lack of promotion opportunities and career mobility. Although it is reported that there are more female workers in certain sectors, such as healthcare and food production, men nevertheless are more likely to work in supervisory, management and technical roles within these sectors (EU-OSHA, 2013a). Additional findings report that, in 2010, 69 % of employees had a male as their immediate supervisor and more than 70 % of corporate managers and senior government officials were men (EU-OSHA, 2013a).

Table 2 shows differences in the occupational categories of men and women over the age of 50. It highlights that fewer women aged 50 and over hold management positions than men of the same age group, and that there are more women work in clerical support, service and sales positions, and in low-skilled jobs such as elementary occupations (Eurofound, 2012). Vendramin and Valenduc (2014) reported similar findings, with more than half of women over the age of 55 years employed in administrative occupations, as domestic cleaners and helpers, in education and as associate professionals (not health).

Table 2: Employment (%) by age group and by gender for workers aged 50+, according to occupation (Eurofound, 2012)

	< 30 years	30–49 years	50+ years	All	Men 50+ years	Women 50+ years
<i>Managers and professionals</i>						
01 Managers	3	6	7	6	9	4
02 Professionals	13	17	16	16	14	19
<i>Technicians, assistants and supervisors</i>						
03 Technicians and associate professionals	15	18	16	17	14	18
<i>Mid-skilled service workers</i>						
04 Clerical support workers	11	11	10	11	7	15
05 Service and sales workers	25	15	14	17	8	21
<i>Mid-skilled manual workers</i>						
06 Skilled agricultural and fishery workers	2	1	1	1	2	0
07 Craft and related trades workers	14	13	14	14	21	4
<i>Low-skilled workers</i>						
08 Plant/machine operators or assemblers	6	9	10	8	15	3
09 Elementary occupations	10	9	11	10	9	15
Total	100	100	100	100	100	100

Note: Bold numbers indicate significant gender gap among workers aged 50+.

There is evidence of higher levels of exposure to repetitive work in female workers (Doyal and Payne 2006; EU-OSHA, 2013a), some of which can be explained by vertical segregation and women remaining in more highly exposed jobs. Thus, while the risks for men in the workplace may be more visible from a risk prevention perspective (e.g. carrying heavy loads), women may be exposed to a greater risk of musculoskeletal injury through postural stress or repetitive tasks (EU-OSHA, 2013a). Vertical segregation can be a source of double discrimination for older women, as it can lead to a lack of career mobility or promotion opportunities, resulting in prolonged exposure to repetitive work or work involving postural constraints.

EU-OSHA (2013a) also suggested the concept of task segregation, where women and men have the same job title but carry out different tasks, leading to different types and levels of exposure. A common misconception is that women’s work is less physically demanding than men’s work. Examples of this include hospital cleaners, where female workers carry out seemingly ‘lighter’ tasks and men seemingly ‘heavier’ tasks. However, by analysing the tasks, studies have found that the physical workload for women is actually higher, is more repetitive and has more postural constraints (EU-OSHA, 2013a).

Another consequence of vertical segregation is differences in income levels between men and women. When income indicators are examined in female-dominated sectors, such as cleaning, sales and care work, it is found that women are at a higher risk of being in the lowest third of income than men in the same sector. Eurofound (2013) suggested that this indicates an undervaluing of women’s work compared with that of men.

3.4 Hazards and risks in female-dominated occupations and sustainable work

Because men and women have different job roles in different sectors and industries, and these differences persist across the work-life course, they are exposed to different working conditions and as such different OSH hazards across the work-life course. Consequently, they are likely to suffer from different work-related health problems. It should be noted that very little research exists on the specific impacts of age-related changes in women on occupational exposures and related health issues.

Table 3 shows examples of hazards and risks found in female-dominated occupations.

Table 3: Examples of hazards and risks found in female-dominated occupations (EU-OSHA, 2013a)

Sector	Exposures			
	Biological	Physical	Chemical	Psychosocial
Healthcare	Infectious diseases (blood-borne, respiratory, etc.) Needlestick injuries	Manual/patient handling Awkward postures Ionising radiation	Cleaning, sterilising and disinfecting agents Drugs Anaesthetic gases	Emotionally demanding work Unsocial hours Violence from third parties (patients/colleagues)
Nursery workers	Infectious diseases, particularly respiratory Gastrointestinal infections	Manual/child handling Awkward postures Noise		Emotionally demanding work
Cleaning		Manual handling Awkward postures Slips and falls Wet hands (causing dermatitis)	Cleaning and disinfecting agents	Unsocial hours Violence/harassment
Food production	Infectious diseases (e.g. animal-borne and mould spores) Organic dust	Repetitive movement Sharp objects Cold temperature Noise	Pesticide residues Sterilising agents Sensitising additives	Monotony Low level of control in assembly line work
Catering and restaurant work	Infectious diseases (e.g. animal-borne and mould spores)	Noise Manual handling Repetitive movement Sharp objects Hot surfaces Slips and falls Heat	Passive smoking Cleaning agents Cooking fumes	Violence and harassment from third parties (clients/colleagues) Unsocial hours Low level of control
Textiles and clothing	Organic dusts	Noise Repetitive movement Awkward postures	Dyes and other chemicals, including formaldehyde Stain removal solvents Dusts	Monotony Low level of control in assembly line work
Laundries	Infected linen (hospitals)	Manual handling Awkward postures Heat	Dry-cleaning solvents	
Call centres		Overuse of voice due to talking loudly or poor acoustic environment Awkward postures Excessive sitting	Poor indoor air quality	Violence (verbal abuse) from third parties (clients) Monotony Low level of control over pace and content of work
Education	Infectious diseases from contact with children	Prolonged standing Overuse of voice due to talking loudly or poor acoustic environment	Poor indoor air quality	Emotionally demanding work Violence and abuse from third parties (students/parents)

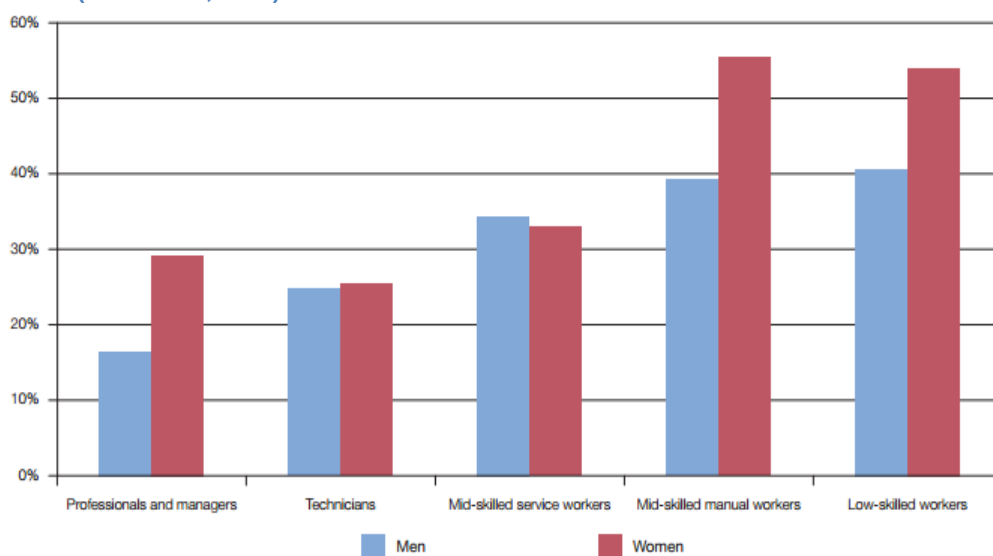
The types of hazards and risks that predominate in this table include highly repetitive and paced work, awkward postures, manual handling, violence or harassment, and stress and emotionally demanding work. These, together with shift work (prevalent, for example, in healthcare work), are all issues affecting retention and the quality of working life in many areas in which women work. In particular, prolonged, cumulative exposure to such working conditions is likely to have implications for the sustainability of work. It is therefore important not to underestimate the physical and emotional demands of some women’s work in relation to sustainable work. For example, Yeomans (2011) and Doyal and Payne (2006) point out that the type of work that women tend to be employed in, including cleaning, factory work, retail work and hairdressing, is often seen as light manual work, although it is usually physically demanding, as tasks can involve moving heavy loads, sustained static muscular effort, working in awkward postures and short-cycle repetitive movements. The same point is made by EP (2011). As noted above, a lack of career mobility or promotion opportunities can result in prolonged exposure to work hazards whose health effects can be cumulative in nature. A lack of control over work — which is also prevalent in Table 3 and is related to employment in lower positions in the job hierarchy — is a factor linked to stress.

The physical demands of the types of manual work carried out by women, referred to by Yeomans (2011) and Doyal and Payne (2006) above and given in Table 3, need to be recognised, and suitable accommodations may need to be provided for older workers. Any such accommodations or redesign of the workplace need to be suitable for female workers, rather than designed to accommodate only average male employees, to avoid increasing risks of MSDs in women (Yeomans, 2011). However, as pointed out in the general review (EU-OSHA, 2014a), the first priority is to introduce measures to reduce risks to all workers along the work-life course.

Therefore, as with other areas of OSH, strategies for sustainable work should address those sectors and jobs in which women predominate, such as healthcare, education, cleaning and retail work, as well as male-dominated sectors, such as construction. This is also important in the context of desk-based work, where women lower down the job hierarchy may have less control over how they work, the variety in their work, the pace of work, the breaks they take, etc.

Results from the European Working Conditions Survey (EWCS) also point to the need to address the sustainability of women’s work. Eurofound (2012) asked workers in Europe about their ability to continue to work up to the age of 60, as an indicator of job sustainability. Figure 2 shows that, for most occupational groups, the proportion of women who do not think they will be able to do the same job at the age of 60 is higher than the proportion of men.

Figure 2: Percentage of workers aged 50-54 years who do not think they will be able to do the same job at the age of 60 (Eurofound, 2012)



For both genders, mid-skilled manual workers and low-skilled workers are least likely to think that they could continue working. The gender difference in the replies is most pronounced for these two groups

and for professionals and managers. For low-skilled female workers, Eurofound identified a number of work-related issues that can have a negative impact on job sustainability, including exposure to awkward and painful positions and poor career prospects. For high-skilled female workers, the question of the lack of reconciliation between work and non-working time seems particularly important (Eurofound, 2012).

However, work sustainability also needs to be examined from a life-course perspective. Older workers need to be able to make the best use of their changing abilities without risk of injury or illness. The occupational hazards and related risks that we are exposed to when we are young will influence our health as we get older, and may determine whether we reach retirement age as healthy workers or exit early with a work-related disability. Therefore, good work environments and practices are needed to ensure that younger workers reach later life without injury or illness, and strategies for sustainable work must begin with improving the working conditions of young men and women from the start of their working lives. It is therefore also relevant to look at gender differences in relation to the OSH of young workers, as these will influence gender differences in occupational health in later life.

A report by EU-OSHA on the OSH of young workers (EU-OSHA, 2007) found that young workers work mainly in services sectors, in low-skilled occupations and on a temporary basis. Young female workers in particular are more prone to working in temporary contracts in low-skilled service jobs. Important findings from the report were that these young workers appear to be given the heaviest, noisiest, etc., types of work, are at a higher risk of accident and injury, and are less likely to receive OSH information and training. It also found indications that rates of MSDs are increasing among young women. Combined with evidence that they may experience barriers to accessing occupational health services and rehabilitation services, these are worrying findings for sustainable working life. These findings, including the gender differences, need to be recognised and taken account of in OSH strategy and actions. Both young women and young men and the sectors in which they work should be covered in workplace interventions and activities by OSH authorities and other stakeholders. In addition, both 'female' jobs and 'male' jobs should be covered in vocational education (EU-OSHA, 2013a) and, in addition, risk education should be provided in schools (EU-OSHA, 2013b).

Of course, horizontal segregation affects both men and women when it comes to OSH. Granville and Evandrou (2008, 2010) showed, for instance, that the coal and asbestos industries, which are largely male-dominated, have a major impact on men's health in the United Kingdom. However, the risks to men's health in the traditional sectors in which they predominate have tended to receive more recognition and attention (EU-OSHA, 2003a).

As previously mentioned, the rise in official pension ages across the Member States can mean a longer working life, with continuous exposure to the same hazards where there is a lack of career mobility and continuing to work at an older age. Older working women are exposed to similar occupational risks to younger women, but can be more vulnerable to the development of certain health problems if their health or physical capacity has declined because of the extended duration of their exposure to these risks. However, there is limited literature on older working women in relation to physical occupational hazards.

3.5 Differences related to employment arrangements

The type of employment in which individuals work and working arrangements have an impact on their exposure to OSH hazards and risks and their access to OSH services across their working lives. Women are more likely to work part-time, as homeworkers, usually in the informal economy (as distinct from teleworking) or by providing domestic services in other people's homes. Homeworking in the informal economy and domestic services, in particular, are associated with poorer working conditions (EU-OSHA, 2003a, 2013a), which is an issue for safety and health throughout their work-life course. There are also specific OSH issues for part-time working, which is much more prevalent among female workers.

Employment data from Eurofound (2012) show that 42 % of women over the age of 50 are employed part-time, compared with only 12 % of men. Part-time employment is most common among older women (over 55 years), for whom it is seen as a means of remaining in the labour market while dealing with personal health issues or caregiving for others. Part-time work is also more common among women of all ages than among men, as many employers (for business reasons) only offer part-time employment,

for example in home care-related work, restaurants or shops, which are all sectors in which the majority of workers are women. Life stage can also have an impact on the type of employment sought by men and women. Workers with young children may want to work shorter or more regular hours, and gender segregation may be reinforced by choosing employment in family-friendly sectors (Eurofound, 2013).

Eurofound (2012) showed that occupations where individuals work fewer than 20 hours of paid work per week are predominantly female, including cleaners, retail staff and teachers. For part-time workers, evidence suggests that their access to advice and training is limited, both generally and specifically in relation to OSH. In addition, part-time workers are often not consulted in risk assessments, meaning that potential workplace hazards for this group are missed. Some workers may have several part-time jobs (EU-OSHA, 2013a), may be exposed to hazards in each and may not have the employment rights of full-time workers.

Certain groups of workers, including part-time workers, homeworkers and domestic workers, do not have the same access to support services, such as OSH and human resources (HR) management. This issue will be covered again later in the report.

4 Specific OSH and health issues, female workers and implications for sustainable work

4.1 Introduction

Owing to demographic change, many EU Member States are raising their official retirement ages (and in some countries it is as high as 67 years) and/or are providing economic incentives to prolong working life. However, efforts to extend working life in Member States are not necessarily accompanied by equal efforts to address how extending working life will have an impact on occupational exposure and, consequently, on workers' health. In some cases, earlier retirement can be a way of preserving health and reducing the risk of disability. One of the main issues that arises from extending working life is that the duration of exposure to hazards in the workplace will increase, and workers will be exposed to risks until an older age.

Because men and women have different job roles in different sectors and industries, they are exposed to different working conditions and, as such, to different OSH hazards. Consequently, they are likely to suffer from different work-related health problems. Types of working conditions, such as flexible working, may have different implications for men and women. One aspect of ageing that is unique to older women is the menopause.

The following section covers a range of OSH, health and work issues from a gender perspective, describing the issues and workplace measures in relation to sustainable work. It includes gender differences in relation to a number of physical and psychosocial OSH hazards and the associated risks and health problems. In most cases, an age effect has also been included (either because the research includes data on older age groups or because the impact of longer exposure time has been researched).

The general review (EU-OSHA, 2014a) also provides further information regarding various hazards and risks, including shift work, MSDs and stress.

It should be noted that very little research exists on the specific impacts of age-related changes in women on occupational exposures and related health issues.

4.2 MSDs

Key findings

- MSDs in the upper body are more frequently reported by women than by men, probably because of task segregation, and the prevalence of symptoms related to MSDs increase with age.
- More attention needs to be given to risk prevention in jobs predominantly carried out by women, including in relation to prolonged standing and prolonged sitting work, which is prevalent in some women's jobs, for example supermarket checkouts or office administration work.
- Measures such as workplace layout and equipment need to be suitable for female workers.

4.2.1 MSDs, female workers and OSH issues for sustainable work

The most commonly reported health problems across the EU are MSDs. The most recent survey identified that, across the EU, 22.8 % of workers reported muscular pain and 24.7 % reported back pain (EU-OSHA, 2013a). European data on recognised diseases identify that the incidence rate of MSDs is lower in women than in men, apart from carpal tunnel syndrome and tenosynovitis of the hand or wrist (EU-OSHA, 2013a). When looking at the broader category of 'work-related health problems' (i.e. problems not necessarily officially recognised as occupational diseases), the 2007 Labour Force Survey ad hoc module on work-related accidents, health problems and hazardous exposures showed that, while men (of all age groups) were more likely than women to report back problems as their most serious work-related health problem in the previous 12 months, women were more likely than men to report neck, shoulder, arm or hand problems (Eurostat, 2015c).

Some studies have confirmed these findings. De Zwart *et al.* (2000) looked at the reporting of certain MSD-related symptoms within a sample of workers of working age. These data showed that there were

significantly more complaints of neck, shoulder, arm or wrist pains in women than in men. However, this research did not identify any difference in occupational exposure that could explain this outcome. Doyal and Payne (2006) found that women reported more musculoskeletal symptoms than men and it appeared that the incidence (and sometimes severity) of these symptoms increased with age.

Horizontal segregation can explain some of these findings. As mentioned before, healthcare and social care are sectors in which women make up the majority of the workforce. Certain tasks within these sectors, and in particular the handling of patients, can involve significant physical loads. Based on findings from the National Institute for Occupational Safety and Health (NIOSH), EU-OSHA (2003a) found that, in the USA, the reporting rate of over-exertion injuries for healthcare workers was double the national cross-sector average, and for homecare workers was three times the national average.

Task segregation can play a role in the occurrence of certain types of MSDs in women. Messing (1993, cited in Doyal and Payne, 2006) found that female train cleaners were employed to clean toilets on trains, which resulted in the adoption of poor musculoskeletal postures when carrying out this work, as they spent 25 % of their time in crouched postures. Heilskov-Hansen *et al.* (2014) examined gender differences in task distributions and task exposures in painters. A postural and load analysis was carried out examining men and women painters over the period of one working day per participant. Differences were found in the proportions of different tasks (standing, brush painting, roller painting and spraying) between the sexes. In addition, Meyland *et al.* (2014), in examining muscular load in house painters, found that women worked at approximately 50 % higher relative muscular loads than men. This may explain why there is a higher prevalence of musculoskeletal complaints in women when carrying out similar work tasks (Nordander *et al.*, 2013).

While no specific research was identified on the combination of age and gender and the occurrence of MSDs, vertical segregation can result in women remaining in occupations with more repetitive and monotonous tasks, with less control over the pace of their work and involving more postural constraints (EP, 2011). Over time, this extended exposure may lead to an increased occurrence of MSDs.

4.2.2 MSDs and OSH measures for sustainable work for women

Women report more musculoskeletal symptoms than men in the age range of 50-59 years, as a result of both horizontal segregation (e.g. working in sectors involving a lot of manual handling, such as healthcare) and vertical segregation (e.g. working in occupations involving highly repetitive tasks).

The increase in the reporting of MSDs in older women reflects a number of different issues, including assumptions about women's work being less physically demanding than it perhaps is and vertical segregation, leading to women carrying out highly repetitive tasks and lacking opportunities to move between different work tasks.

When considering MSDs, the risk assessment process should:

- involve a diverse mix of people (in terms of age, gender, full-time/part-time) in developing and carrying out risk assessments;
- ensure that all work tasks are risk assessed for both genders;
- ensure that all work tasks are risk assessed for all working arrangements (e.g. full-time/part-time);
- ensure that work tasks are risk assessed to reduce the risk of over-exertion injuries; and
- test risk reduction measures on a diverse mix of employees.

To help prevent work-related MSDs among women, workplace layouts, equipment and tools, etc., need to be suitable for the female working population (Yeomans, 2011). There are examples of ergonomic interventions to prevent MSDs among female workers in EU-OSHA (2014).

The following example describes measures taken in a printing company in France to reduce MSDs, specifically targeting older female workers.

Good company practice: printing company, France (EU-OSHA, 2014)

A French printing company identified high rates of sickness absence and of complaints of musculoskeletal aches and pains in one of their finishing workshops. On analysing the data, it was found that those affected were mostly older female employees, but it was unclear whether this was due to sex differences and age-related changes or to other factors such as duration of employment. An objective examination revealed that finishing assistants were particularly affected, which was a mostly feminine position (as men tended to work as machine operators). The women tended to be employed long term in this job, while men might start in this job, but be promoted from it quickly.

The role of the finishing assistant was analysed and it was found to involve carrying loads of up to 35 kg every 45 seconds (around 11 tonnes per day) and working in awkward postures and with arms raised when loading the machine. Employees also had to stoop over the production line, adding stress to the back, shoulders, arms and knees. The company took a number of intervention measures, including reducing the loads, reducing working height and providing rotating platforms for the pallets. As well as workplace design changes, the intervention examined how staff were represented within the company's decision-making forums and improved the representation of women on different committees. Recommendations were also made regarding improving career mobility among these workers. Staff development specifically targeting women was improved, including recognition of their skills and a renaming of the job to 'assembly operator'.

The evaluation of this intervention is ongoing, but the main success factors included the involvement of both senior management and workers in the project, and a greater understanding of the fact that the risks that female workers are exposed to may be different from the risks faced by male workers.

Given the prevalence of work-related MSDs among female workers and the major impact that this may have on the sustainability of their work, more attention needs to be given to its prevention in jobs with high rates of MSDs that are predominantly carried out by women. In particular, more attention in terms of MSD prevention needs to be given to work involving prolonged sitting or prolonged static standing, which are prevalent in some women's jobs, such as at supermarket checkouts, office administration work, hairdressing and retail shop work (EU-OSHA, 2013a).

4.2.3 Sedentary work

Because of both horizontal and vertical segregation, women tend to work in more sedentary occupations than men (e.g. administrative office work) and more frequently work with computers than men. According to the fourth EWCS (Eurofound, 2008), more female workers (48.5 %) than male workers (43.1 %) worked with computers. In all age groups, women reported greater use of computers at work than men. The difference between the genders is much larger in low-skilled occupations than in high-skilled occupations, reflecting the difference in the types of jobs done by low-skilled males (e.g. plant workers, craft workers, etc.), that is, more physical jobs, and some low-skilled women (e.g. clerical support), that is, more sedentary work, often combined with lack of control over the way of working, the pace of work or when breaks can be taken, etc.

As mentioned, prolonged sitting in static postures, even if the workstation and equipment are ergonomic, is also a risk factor for MSDs. The general review (EU-OSHA, 2014a) referred to guidance on making office work more physically dynamic, including through more moving about in the office.

Sedentary work has been associated with rises in metabolic syndrome, which increases the risk of diabetes and cardiovascular disease. The nature of sedentary work also means that people have reduced levels of physical activity, further contributing to the risk of developing health problems. Inactivity is associated with health risks such as coronary heart diseases, type II diabetes and certain types of cancers (EP, 2008).

Although no studies have been identified on the impact of sedentary work on older working women, it can be assumed that longer cumulative exposure increases the risks of developing health problems in older women.

4.3 Psychosocial risks and health problems

Key findings

- Work-related stress may have a major impact on the sustainability of women's work along the life course, and more attention needs to be given to its prevention along the life course, including a focus on jobs predominantly carried out by women.
- Women, and in particular older women, are more prone to harassment and psychological violence than men.
- Control and prevention measures to reduce psychosocial risks within the workplace are well developed and should be adapted, with both age and gender considered.

4.3.1 Psychosocial risks, female workers and OSH issues for sustainable work

Work-related stress is commonly reported among the EU workforce. For example, stress, depression and anxiety were the second most commonly reported work-related illnesses, after MSDs, according to results from the United Kingdom Labour Force Survey (2008/2009), and more working days were lost owing to stress, depression and anxiety than to MSDs (Yeomans, 2011). Findings presented in the general review (EU-OSHA, 2016a) included the following: work-related stress, anxiety and depression increase with age and then decrease after the age of 55 years, which may be due to a 'healthy worker effect', that is, when those that have 'burnout' as a result of long exposure to psychological risks may have left the workforce or changed job; and being in good-quality work is generally associated with increased well-being compared with being out of work. Taken together, this suggests that preventing work-related stress across the life course and promoting quality work are important for the sustainability of work.

Because of the sectors in which they are over-represented, such as healthcare, education and the retail trade, women are more likely to interact with third parties in their daily jobs and are thus often exposed to a certain type of violence at work, whether from colleagues or superiors or from customers, patients and relatives, students and parents, etc. (Doyal and Payne, 2006, cited in Payne and Doyal, 2010). The fifth EWCS (Eurofound, 2013) showed that women of all age groups report more frequently than men that they have to deal with angry clients almost all of the time. This is supported by figures from the United Kingdom for 2005-2006, which suggest that the incidence of workplace violence for those aged between 55-59 years was higher for women than for men (Labour Force Survey tables of HSE, 2008, cited in Payne and Doyal, 2010). EU-OSHA (2003a) specifies that men tend to experience more physical violence and assault, while women tend to experience more intimidation and psychological violence. According to the fifth EWCS, negative health outcomes are reported by workers experiencing discrimination, verbal abuse, threats and humiliating behaviour, physical violence, bullying and sexual harassment. Older women may face both age and sex discrimination.

In relation to the workplace, research on harassment has shown that older women are more likely to report experience of harassment than older men (Parent *et al.*, 2007, cited in Payne and Doyal, 2010; Villosio *et al.*, 2008). Women are also more likely to suffer from bullying at work (10 % of women versus 7 % of men). Again, this may reflect the sectors that women are employed in, as there appears to be an increased risk in female-dominated public sectors (EU-OSHA, 2003a).

The research by Campos-Serna *et al.* (2013a) identified that women reported higher strain, iso-strain (i.e. workers with a score above the median for job demands) and effort-reward imbalance than men. In addition to general frustrations about role conflict and fairness in the workplace, it is interesting to note that women experience greater frustrations in male-dominated workplaces while men experience greater frustrations in female-dominated workplaces, compared with gender-neutral workplaces (Purvanova and Muros, 2010). Even when the work demands are (or, based on job title, appear to be) the same, responses to psychosocial risks may be different between men and women. Arvidsson *et al.* (2006) studied air traffic controllers subjected to the same work demands and identified that women reported lower decision latitude, particularly regarding influence and freedom at work, but reported greater social support than men.

In terms of impacts, the systematic review by Theorell *et al.* (2015) found an association in both genders between depressive symptoms and low decision latitude, job strain and bullying. Manty *et al.* (2015) researched workers aged 40 to 60 years, comparing those with repeatedly high levels of job control with those with repeatedly low levels of job control. The analysis identified that declines in health were associated with low levels of job control. As seen in Table 3 in section 3.4, a low level of job control is frequently a characteristic of work in female-dominated occupations. Purvanova and Muros (2010) investigated two aspects of burnout: emotional exhaustion and depersonalisation. The research concluded by suggesting that burnout was experienced more by women than by men. When the two aspects of burnout are separated, women were more likely to report emotional exhaustion and men are more likely to report depersonalisation (Matlin, 2004, cited in Purvanova and Muros, 2010).

When age is taken into account, EU-OSHA (2013a) highlighted that younger women are more at risk of threats or actual violence, bullying or harassment. The fifth EWCS also shows that the proportion of female workers reporting that they have to deal with angry clients decreases with age. This is further supported by the European study on OSH risks to vulnerable groups of workers (EP, 2011), which shows that young women are particularly vulnerable to unwanted sexual attention, especially in the hotel and restaurant sector. In 2005, 6 % of female workers under 30 years — and 2 % of all workers — reported being exposed to unwanted sexual attention.

Women of different age groups are likely to be exposed to different psychosocial risks, depending on the sectors they work in and their position at the workplace. They are also likely to have different coping mechanisms and, similarly to older men, older and more experienced women may have developed better coping mechanisms than their younger counterparts. Owing to increased experience, older individuals may identify ways of dealing with intimidation and violence in the workplace, including taking individual prevention measures before they occur.

4.3.2 Psychosocial risks and OSH measures for sustainable work for women

As described in section 4.3.1, women are more likely to be employed in sectors where there is a higher exposure to psychosocial risks, for example in public-facing roles. At the same time, because of their involvement in informal care work, older women have greater daily workloads and are more exposed to emotionally demanding tasks than men, and are at risk of cumulative exposure to psychosocial risks both within and outside the workplace. A better fit between work and life outside work, for example through flexible working, and a more even distribution of domestic chores would benefit women.

When burnout is examined, women report more emotional exhaustion than men. Generally, women report poorer psychosocial working conditions with lower levels of control, higher emotional demands and, in some sectors, higher rewards in their jobs, but also more monotony and more psychological harassment. There is, as yet, no specific research available that evaluates the impact of psychosocial risks on older female workers. However, increased stress and burnout due to increased duration of exposure to psychosocial risk is a potential problem that needs to be investigated.

Control and prevention measures to reduce psychosocial risks within the workplace are well developed and should be adapted, with both age and gender considered, and applied to risk assessment processes. The following box presents key elements in relation to tackling harassment and bullying at the workplace:

Key elements for workplace policies to tackle harassment and bullying

- A clear definition of harassment and bullying.
- Detailed provisions for preventive measures.
- Detailed provisions for dealing with incidents.
- A complaints procedure and an individual responsible for it.
- Protection and support for victims of bullying or harassment.
- Awareness training for all staff on the impact of such behaviours.
- Specific training for those responsible for dealing with incidents.

4.4 Life-cycle approach to OSH, cumulative exposures and recognition of risks to female workers

Key findings

- Improving the recognition of the risks in women's work remains of key importance for the sustainability of women's work.
- Occupational cancers are more frequently recognised in male-dominated sectors and there is limited research related to both age and gender aspects. Links between night work and breast cancer have been found. Many cancers are long-latency diseases and are more likely to affect older workers.
- It is important to recognise where and how women are exposed so that preventive measures can be taken that are also appropriate for female workers. For example, differences in exposure can be due to ill-fitting PPE, tool design or work organisation.

While MSDs and stress can be associated with cumulative exposures, this section looks at some hazards and health problems that are cumulative in nature and are more associated with men's work. It also looks at the recognition of work-related cancers in women and their implications for sustainable work, as well as respiratory diseases and asthma. It also briefly covers noise and vibration.

4.4.1 Cancer

According to EU-OSHA (2003a, 2013a) work-related risks to women have tended to receive less recognition in terms of data collection, research and linkage to medical diagnosis, as compensable occupational diseases and in relation to risk prevention. According to a recent report on the situation of older working women in United Kingdom, health and well-being issues specific to older women are frequently overlooked by employers (Scottish Commission on Older Women, 2015). However, the situation has improved to some extent in some areas, owing to a wider recognition of the need to take a gender-sensitive approach to OSH (EU-OSHA, 2013a). Nevertheless, improving the recognition of the risks in women's work remains of key importance for the sustainability of women's work, especially in relation to prolonged exposure to hazards whose effects are cumulative in nature or have a long latency period. While this is a common issue concerning all types of risks, the issue in terms of occupational-related cancers will be explored further here.

The recognition of occupational exposures and cancer in women is perceived to be low (EU-OSHA, 2003a, 2013a). Historically, much of the data on occupational cancers has been collected on men rather than on women. This reflects trends in occupational diseases in general, as mentioned above, as national data show that occupational diseases affecting female workers are significantly less frequently reported and recognised than those affecting male workers (Tieves, 2011, cited in EU-OSHA, 2013a). This is probably because of a focus of the data collection on male-dominated industries, where exposures to carcinogens and dangerous substances are reportedly higher than in other sectors of the economy. For instance, data published by EU-OSHA (2003a) identify that 20-30 % of working men, compared with 5-20 % of working women, may have been exposed to lung carcinogens including asbestos, diesel exhaust, nickel, silica, beryllium, cadmium and chromium.

However, EU-OSHA (2013a) highlighted that, through the recent recognition of night work being linked to breast cancer, more data are being collected on women and workplace exposures. This is discussed further in section 4.7. The recognition of a link between night work and breast cancer has promoted a broader understanding of organisational factors that have the potential to cause cancer, and may increase the research on the impact of other 'softer' workplace risks on the occurrence of cancer, rather than the traditional physical or chemical risks previously studied. French data suggest that similar rates of cancers due to workplace exposures have been found in men and women for three specific carcinogens. Furthermore, rates of mesothelioma are increasing in women (EU-OSHA, 2013a). In addition, a potential link has been found between occupational chemical exposure and cancer in middle-

aged healthcare workers, hairdressers, cosmetic industry workers and home service workers, all of which are predominantly female professions (EU-OSHA, 2003a, 2013a).

In investigating occupational cancer, including breast cancer, a number of issues have been highlighted in relation to women at work, including death certificates not including occupational information, non-inclusion of women in occupational exposure assessment as more women join the workforce, and the exclusion of women from samples because they work part-time.

Gender differences need to be given more consideration in the collection of exposure data and the development of risk reduction measures, in particular:

- gender considerations need to be included in routine data collection;
- further research is needed on female-dominated occupations with high levels of harmful exposures;
- gender considerations need to be included in the analysis of existing data where this has not been done before;
- jobs need to be analysed by task, rather than by job title.

Although there is limited research related to both age and gender aspects, many cancers are long-latency diseases and are more likely to affect older workers.

4.4.2 Noise and vibration

Cumulative exposure to noise and vibration can have an impact on health and therefore on the sustainability of work and health into retirement. Overall, women are less exposed to occupational noise (Campos-Serna *et al.*, 2013a; EU-OSHA, 2013a) and vibration (EU-OSHA, 2013a) than men.

However, in some sectors, including food production and textiles, women may be exposed to high levels of noise (EU-OSHA, 2013a). Fredriksson *et al.* (2015) measured noise levels in a female-dominated obstetric care facility and evaluated the impact of the noise levels using a questionnaire. The measured noise levels exceeded 80 dB(A) in 46 % of the shifts monitored and 55 % of staff self-reported noise-related symptoms. The data analysis identified significant associations between noise exposure and the occurrence of tinnitus, and between noise exposure and auditory fatigue. In addition, because of horizontal workplace segregation, in general women are exposed more than men to moderate levels of noise, for example work in school classrooms (Sjodin *et al.*, 2012). Noise levels below those that can cause hearing damage can nevertheless have physiological or psychological impacts, such as increasing blood pressure and levels of stress. Further research is needed to examine the health impacts of this exposure in the context of extending working lives.

Regarding vibration, investigation shows that 30 % of women working in manufacturing environments are exposed to vibration, meaning that, in these working environments, vibration is equally an issue for women as it is for men. It is also suggested that, for a given level of exposure, women may suffer from vibration-related symptoms at a higher rate than men (EU-OSHA, 2003a). Further research is required to find out if this is due to physiological differences or differences in exposure because of, for example, ill-fitting PPE, tool design or work organisation.

In general, there is a lack of research on women and gender differences in relation to risks such as noise and vibration (EU-OSHA, 2003a, 2013a). Rectifying such gaps in the knowledge are important for improving the sustainability of women's work.

4.4.3 Respiratory disease and asthma

Work-related respiratory diseases and asthma have an impact on the sustainability of work and health into retirement, but less research has been done on exposure in women in particular.

Information on self-reported respiratory disease across the EU-27 shows that 6 % of men and 3 % of women reported respiratory difficulties associated with work (EU-OSHA, 2013a).

However, data collected in the United Kingdom (HSE, 2009, cited in EU-OSHA, 2013a) identified that, after the age of 65 years, specific respiratory diseases were reported more by women than by men,

including mesothelioma and pneumoconiosis. Both of these are long-latency diseases, which can explain why they are more commonly reported among older age groups. However, even in the younger age groups, sex differences have been identified. Women aged 35-54 years are more likely to report allergic alveolitis than men of the same age, and women aged 25-34 years are more likely to report bronchitis and emphysema than men (HSE, 2009, cited in EU-OSHA, 2013a).

In addition, evidence has shown that reporting rates of occupational asthma have increased for women across the EU. Toren and Blanc (2009) analysed data on asthma caused by occupational exposures. Only five papers provided estimates for both men and women, but they estimated an average reporting rate of 11.5 % for women, compared with 9.1 % for men. Occupational asthma in women predominates in industries such as bakeries, cleaning, healthcare and beauty (EU-OSHA, 2013a). An example of a known cause of occupational asthma appearing in a new context is in eyelash extensions using cyanoacrylate glue (Lindstrom *et al.*, 2013). Finally, evidence shows gender differences in the fitting of PPE and, in particular, respiratory protective equipment, with the latter usually designed to fit males, with a poor fit for women resulting in increased exposure for them (Kennedy and Koehoorn, 2003). Differences in stature between men and women can result in women being closer than men to the source of a hazardous substance (Kennedy and Koehoorn, 2003).

Although it has been shown that there is an increase in respiratory symptom reporting with age (EU-OSHA, 2013a), the impact of relevant occupational exposures on older working women, including considerations of longer exposure time and cumulative exposures, are not well researched. There is evidence that, similarly to carcinogens, data collection on exposure to fumes, etc., and the occurrence of respiratory diseases has focused on male-dominated sectors, and female-dominated sectors, such as the cleaning and hairdressing industries, have been less investigated. Health effects from exposure to cooking fumes in the restaurant sector is another under-researched area.

4.5 Multiple exposures, female workers and sustainable work

Key findings

- Older working women can be subject to multiple occupational exposures, which can have a cumulative or synergistic effect. They can also be subject to the combination of occupational and non-occupational exposures (e.g. physical work and emotionally demanding caring responsibilities).
- Actions should be designed that target multiple exposures, owing to older women's roles in unpaid caring work.

Although individual research studies predominantly consider exposure to one particular hazard, it is clear that, in the workplace, individuals may be exposed to more than one hazard at the same time. This can include, for example, exposure to both physical and psychosocial hazards, but also exposure to several chemicals in the workplace. Combined exposures can have either an additive or a synergistic effect: additive means that the combined effects on health are the sum of the individual effects, whereas synergistic means that the combined exposures have an impact greater than the sum of the exposures (EU-OSHA, 2013a). Antagonistic effects, where the effects of one hazard are reduced by exposure to another, can also occur but are uncommon. Table 3 in section 3.4 lists the potential multiple exposures in certain sectors that are female-dominated (EU-OSHA, 2013a).

Looking at multiple exposures is particularly interesting in the context of an ageing female workforce, as cumulative effects, in particular synergistic ones, may appear only after a certain duration of exposure, thus having a greater impact on older women. It is apparent that, depending on the sector in which they are employed, men will also be subject to multiple exposures in their work. In addition to multiple occupational exposures, exposures to non-occupational hazards can also result in an increased susceptibility to workplace hazards. For example, work at home (including the manual handling of children or older adults, exposure to cleaning chemicals and the provision of care), which is predominantly performed by women in most societies, can have an additive or even synergistic effect in combination with exposures experienced in the workplace.

More research is needed into the effects of multiple exposures to work hazards across the life course.

4.6 Accidents, female workers and sustainable work

Key findings

- There is mixed evidence on whether or not the incidence of non-fatal accidents is higher among older women than other groups of women.
- Slips and trips are a common cause of workplace injuries among all workers. Workplace measures to reduce the risks of slips and trips would benefit all workers.

When examining European data on standardised incidence rates of accidents at work resulting in over three days of absence, the general review (EU-OSHA, 2016a) noted that rates are substantially higher for men than for women in all age groups, with occupation being the dominant factor influencing accident rates. However, the data also show that, among women, rates are higher in the 55-64 age group than the average for all ages together.

Doyal and Payne (2006) partly confirmed this finding by reporting that women are less likely to suffer from a major incident than men, but that the most common age to suffer a serious injury is between 45 and 54 years (Doyal and Payne, 2006). This same report identified that the incidence and severity of slip, trip and fall injuries among women increases with age in comparison with men.

Nevertheless, the evidence is mixed. For example, two reports that analysed the United Kingdom Labour Force Survey data (HSC, 2000 cited by Yeomans (2011); Davies and Jones, 2005 cited by Yeomans (2011)) showed no substantial variation between age groups.

Slips and trips are a common cause of workplace injuries among all workers. Workplace measures to reduce the risks of slips and trips would benefit all workers. Risk prevention measures can include improved lighting, non-slip footwear suitable for women, well-maintained flooring and keeping workplaces orderly and floors free from obstacles.

4.7 Night or shift work and sustainable work

Key findings

- There is an emerging body of research showing links between night work and breast cancer, but more research is needed on these links and the effect of duration of exposure in older women.

The link between night work and breast cancer has only recently been recognised as an occupational risk (EU-OSHA, 2013a). The International Agency for Research on Cancer (IARC) has classified shift work, when it causes disruption of the body's circadian rhythm (body clock) as a probable carcinogen (IARC, 2010). Since 2008 the Danish National Board for Industrial Injuries has offered compensation to women who developed breast cancer following a long history of shift working. Continued exposure to night work by extending working life might therefore be considered a risk factor for older female workers and more research is needed on the links between breast cancer and night work and the effect of duration of exposure in older women.

Based on existing evidence, the following aspects should be considered when measures are developed to protect the health and well-being of women working nights and shifts (Crawford *et al.*, 2009; Blok and De Looze, 2011), including:

- limiting night work for older workers that report difficulties (Yeomans, 2011);
- giving these workers priority transfer to day shifts;
- giving them a choice of preferred shifts;
- shortening their working hours;
- reducing their workload;
- arranging more frequent health checks;
- giving training and counselling on sleep management, diet, exercise and stress.

Providing older workers with increased control over work is recommended to help reduce stress (Griffiths *et al.*, 2009), and may be particularly beneficial to female workers needing to accommodate care commitments outside work, for example.

However, risk prevention measures for older working women need to be adopted based on a life-course perspective, and considerations should be given to the potential negative effects of some of these measures on younger staff, for example replacing older workers in night work by younger workers or transferring some of the workload from older colleagues to younger ones. Particularly because of the possible cumulative health effects of working shifts, measures are needed to improve shift working for all workers.

The general review (EU-OSHA, 2016a) includes some additional information on preventing risks from shift work.

4.8 Work and the menopause

Key findings

The menopause remains a taboo in society and, therefore, in the workplace.

- Simple workplace measures can support women going through the menopause, for example access to drinking water can be provided, layered clothing can be used for uniforms and flexible working can be arranged to facilitate doctor's appointments.
- More research and practical, non-stigmatising advice for the workplace are needed.

The menopause remains a taboo in society and, therefore, in the workplace, and research and practical advice related to the workplace on the subject remain sparse.

Griffiths *et al.* (2010) carried out an exploratory study to investigate the experiences of women working through the menopause and to identify factors that could improve this experience. A number of symptoms have been attributed to the menopause including hot flushes (or flashes), palpitations, night sweats, sleep disturbance, fatigue, poor concentration, irritability, mood disturbances, skin irritation and dryness of the skin. It is unclear if sleep disturbance caused by the menopause leads to fatigue, poor concentration and irritability, or whether these are distinct (unrelated) symptoms of the menopause.

It is important to note that not everyone suffers from these symptoms to the same extent, and many women may encounter few problems. However, some women will experience symptoms that significantly affect their well-being, and these may also affect their performance at work. Griffiths *et al.* (2010) surveyed 912 women within the age range of 45-55 years who were assessed as being in perimenopause (43 %), natural menopause (30 %) or surgical menopause (8 %) or who used hormones (18 %). The survey found that approximately half of the respondents found it somewhat or fairly difficult to cope with work, with only 5 % reporting that it was extremely difficult to cope with work. The rest of the sample did not find it difficult at all.

In examining menopausal symptoms in relation to work, poor concentration, tiredness, lowered confidence, feeling depressed and poor memory were found to have a significant impact on work capacity. The study also noted that hot flushes were a major source of distress. A report by the European Risk Observatory (ERO) in 2013 highlighted the fact that, for many women going through the menopause, the psychosocial context is as important as physical or biological parameters; those with higher levels of control over their work are more likely to develop coping strategies than those who report low levels of work control'.

The report by the Scottish Commission on Older Women (2015) from United Kingdom, expressed concerns that if misunderstandings and misinformation around the menopause cause difficulties for women, and discourage them from seeking support from their employer, this may leave them with no support to accommodate or overcome any problems and they may therefore struggle to maintain their usual level of performance.

The study by Griffiths *et al.* (2010) also identified the work factors that made symptoms more difficult to cope with. These included

- hot and poorly ventilated environments;
- formal meetings; and
- high visibility work such as formal presentations.

The study went on to identify a number of different coping strategies used at work, including:

- adjustments to the work environment, such as opening windows or using fans;
- adjusting work routines, such as changing working hours, taking days off and flexible working patterns;
- active coping strategies, such as discussing issues openly with managers;
- compensatory strategies, including through the use of technology; and
- avoidance tactics, such as withdrawal from challenging or difficult situations.

Other considerations for the workplace were also identified by Griffiths *et al.* (2010). These include:

- management awareness — because many women do not disclose symptoms, an increased awareness would enable managers to deal more sensitively with any problems arising;
- flexible working — many women found this helpful in dealing with issues around disturbed sleep;
- the temperature of the work environment — having some control over the working temperature was found to be helpful by those sampled;
- development of formal and informal sources of support — support from the employer, such as through HR, an occupational health professional or a diversity advisor, as well as more informal sources, such as peer support from other women also going through the menopause, were viewed positively.

It is important that employers create and maintain a positive workplace culture that supports menopausal women (STUC *et al.*, 2014). In the UNITED KINGDOM, the Trades Union Congress (TUC) has also developed guidance to help manage workers going through the menopause, based on their own research and the cited study (TUC, 2011). Simple, non-stigmatising measures that could be taken in the workplace were identified, including providing access to drinking water, using layered clothing for uniforms and arranging flexible working to facilitate doctor's appointments.

Guidance for union representatives on dealing with issues around the menopause (TUC, 2011)

- Employers should ensure that all line managers have received awareness training on the effect of the menopause on the individual and their work, and on the adjustments necessary to support women who are experiencing the menopause.
- Employers can ensure that, as part of a wider occupational health awareness campaign, issues such as the menopause are highlighted, so that all staff know that the employer has a positive attitude towards the issue, thereby avoiding individual embarrassment. Guidance on dealing with the menopause should be freely available in the workplace.
- All women should be given information on the support available to them for any issues that arise as a result of the menopause. Traditionally, the menopause is viewed as a social taboo, leaving many women feeling uncomfortable about discussing it with their line manager, especially if their line manager is a man, and other options should be made available. This may be through HR, for example, or a welfare officer. Many employers have employer assistance programmes that can act as a go-between.
- Sickness absence procedures should make it clear that they are flexible enough to cater for menopause-related sickness absence. Women should experience no detriment because they may need time off during this time.
- Working time arrangements should be sufficiently flexible to ensure that they meet the needs of menopausal women, who may require more breaks during the day or need to leave work at short notice.

- Risk assessments should consider the specific needs of menopausal women and ensure that the working environment will not make their symptoms worse. Specific areas that need to be addressed include temperature and ventilation. The assessments should also address welfare issues, such as toilet facilities and easy access to cold water.

More awareness raising and support for workplaces is needed, including advice on non-stigmatising measures, model policies and risk assessment checklists. In addition, more research on workplace implications is needed.

4.9 Unpaid work and caring responsibilities

Key findings

- More workers are likely to have care duties for sick relatives as the general population ages.
- Women are more likely to be informal carers of family members than men, although older men are more likely to be carers than younger men.
- The needs of family carers are different from those with childcare responsibilities.
- The approach taken by workplaces in dealing with family carers needs to be adjusted, with a shift away from the current model that is focused on women caring for children, to be relevant to carers of older family members and to both women and men.
- As well as employment policies that provide for the reconciliation of work and care responsibilities for employees, an ageing population in Europe requires additional resources for the care of older and disabled people and services promoting independent living as part of an integrated strategy.

Measures for the reconciliation of work and family life are increasingly recognised as being important in the context of the Europe 2020 employment strategy and as a driver for gender equality. Although men generally work more paid hours than women (42 hours per week versus 38.8 hours for women), when the impact of unpaid work and caring activities is added (using a combined measure of paid working hours, commuting hours and unpaid working hours), women are found to work on average 64 hours per week, compared with men's 53.4 hours per week (Eurofound, 2013). The report from Eurofound identified that much of this is the time spent caring for others (26.4 hours per week for women versus 8.8 hours per week for men).

With an ageing working population and the increase in pension age, more workers are likely to have care duties for sick relatives. According to Eurofound's European Quality of Life Survey (Eurofound, 2014), 19 % of working men and 29 % of working women aged 50 years and over provide care at least several times a week for their children or grandchildren, while the figure is 20 % and 21 %, respectively, for those who are retired. In addition, with increasing life expectancy, people aged 50 years and over also often care for partners or relatives with health problems or disabilities. Of those in employment, 31 % of men and 36 % of women care for relatives, with 10 % of men and 14 % of women doing so at least several times a week.

Figures from the United Kingdom 2011 census and other sources, compiled by CarersUK, also highlight the extent to which 'eldercare' is an issue for workers, in particular older working women (CarersUK, 2014). The majority of carers are of working age and around one in every nine employees has caring responsibilities. The peak age bracket for caring responsibilities is between 50 and 64 years, with one in five people in this age bracket being carers. However, the number of carers over the age of 65 years is increasing more rapidly than the general carer population. While the total number of carers in the United Kingdom has risen by 11 % since 2001, the number of older carers rose by 35 %. This has implications for the sustainability of work, as official retirement ages are rising, and in some countries it is as high as 67 years. Around half of the United Kingdom's caring population combines work with unpaid caring responsibilities and many find that they have to give up work because of these responsibilities.

The figures also illustrate how the burden falls more on older working women than older working men: one in four women aged 50-64 years has caring responsibilities, compared with one in six men. Women are more likely to be what is commonly referred to as ‘sandwich carers’ (i.e. combining eldercare and childcare) and are also more likely to give up work in order to care. Qualitative research in the United Kingdom found that men tend to care for their partners or children while women also care for parents and grandparents (TUC, 2014).

While the highest proportion of care is provided by women of 50 years or older, older men are more likely to be carers than younger men, for example caring for a sick spouse or elderly parent. Caring for a sick adult and childcare have different requirements, while current strategies aimed at carers often focus on younger women with childcare needs.

As highlighted by a report on flexible employment options (Hunt, 2006), caring for adults differs from caring for children in a number of significant ways:

- Caring for a child is usually chosen and planned, whereas caring for an adult often results from unforeseen circumstances.
- Adults are often cared for outside the carer’s household and adults’ needs are less predictable, with sudden demands creating unexpected pressures.

It appears from Eurofound’s data (Eurofound, 2014) that combining work and caring for partners or relatives is more problematic than combining work and caring for children. This may be because of easier access to childcare support than to eldercare support. With working and caring every day for elderly or disabled people, 21 % of carers report having work–life balance problems, compared with 16 % of people who are looking after children or grandchildren.

According to Eurofound (2014), while different forms of state and employer support may be offered to assist people caring for family members, these tend to support workers who are providing childcare — in general, younger workers. Support for people aged 50 years and over providing care for partners or elderly parents is generally less available, although conflict between work and other aspects of life is common for men and women in this situation.

Using data from the Labour Force Survey, the report of the EU Expert Group on Gender and Employment (EC, 2010) looked at flexibility in the organisation of working time, with a particular focus on the areas of flexible working time schedules, working from home and working atypical hours. Overall, the report noted that flexibility in terms of working time schedules still appeared to be relatively limited and differed by Member State. The only countries where the majority of employees have flexible working time schedules are Denmark, Finland, Germany, Norway and Sweden. In countries with the lowest levels of flexibility in working time, notably the eastern and southern European Member States, flexibility practices are not common (Plantenga and Remery, 2010).

Although flexible working time is still not the norm in the United Kingdom, carers have been given specific rights (CarersUK, 2014).

Rights of carers in the United Kingdom (CarersUK)

The United Kingdom is one of the Member States where legislation on flexible working for carers has been introduced, and where good practice recommendations can be found. From 30 June 2014, the right to request flexible working has been available to all carers in the United Kingdom if they have been employed for 26 weeks continuously. Previously it was available only to certain parents and carers. Individuals now have the right not to be badly treated, treated less favourably or dismissed from their job just because they have requested flexible work. Employers can refuse a request only if they have good business reasons for it. The request can cover changing hours, times or places of work. Examples of flexible working include flexi-time, home working or teleworking, job sharing, part-time working, school term-time working, shift-swapping or self-rostering, staggered hours, compressed hours and annualised hours.

The report of the EU Expert Group on Gender and Employment (EC, 2010) suggested that, as long as ‘flexibility’ continues to be considered as mainly a ‘female’ way of organising working time, the use of

these schemes may offer limited choice. The report of the Scottish Commission on Older Women from the United Kingdom (2015), concluded that ‘Public policy has not kept up with the changing realities of the complex patterns of caring demands placed on older women, either in respect of valuing and integrating the contribution made by unpaid carers into health and social care systems; or by incentivising employers to recognise and accommodate the needs of unpaid carers in the workplace’. In addition, Eurofound (2014) points out that if older carers, who are also in paid employment, are unable to provide the hours of care they want to give, then the demand for formal care will increase, implying greater public expenditure. Caring responsibilities may make it more difficult in the first place for people aged 50 years and over to remain in, or take up, employment.

Expanding and creating forms of support to facilitate this group of carers would benefit this growing segment of the population and facilitate longer working lives (Eurofound, 2014). Carers say that continuing to work gives them financial security, a break from caring, a sense of identity, self-esteem and social contacts. The EU Expert Group on Gender and Employment (EC, 2010) found that flexible working time schedules are often considered a mechanism to support working parents in combining work and family life. Eurofound confirms this by proposing that measures are taken to facilitate caring and part-time employment.

A civil service trade union in the United Kingdom, the Public and Commercial Services Union (PCS), has negotiated company policies that provide support for carers. It suggests that employers consider offering some of the following (PCS, 2016):

- flexible working options for all employees;
- reduced hours or career breaks for a specific period;
- paid or unpaid leave at short notice;
- time off during working hours to deal with emergencies or to take someone to an appointment;
- private space and time to make phone calls;
- a helpline or information/advice service;
- counselling services or a welfare officer — trained practitioners who offer impartial and confidential support;
- a carer support group or focus group;
- expenses to cover the costs of care if the carer is away from home on business or training;
- monetary allowances (vouchers) towards the costs of elderly care;
- training courses — general courses such as on stress or time management may help to cope with changed circumstances;
- occupational health services — to help monitor employees’ health and to provide advice on concerns.

Siemens in Germany provides an example of how a company policy for carers can work (Eurofound, 2002).

Good company practice: Siemens, Germany

Older female workers are often carers of elderly relatives. Employed carers in Germany report high levels of stress and very often experience work interruptions or have to miss work altogether. In addition, they are prone to financial loss, for example as a result of unpaid time off, and they often miss business meetings and training opportunities and lose out on promotions. The greatest negative consequence for employers is the loss of qualified, committed and experienced employees.

Siemens is one German company that has implemented a policy for carers for their employees. The measures involve flexibility in working time, place of work and leave options, as well as an information and referral service and counselling and advice in coaction with company-based social work measures.

Preconceptions regarding who may be affected by care duties should be avoided, in order to develop appropriate reconciliation policies and practices, which are essential to promoting the employment of both older women and men. Flexible working time schemes and part-time policies as have already been implemented for young parents should also be considered for all carers, to avoid older carers, and especially older female workers, dropping out of work. In addition, there is a continued need to promote a more equal share of care responsibilities between women and men.

According to the Confederation of Family Organisations in the European Union (COFACE), 80 % of the time spent caring for people with disabilities and older people in Europe is provided by informal carers (Uherecky, 2015). As well as employment policies that provide for the reconciliation of work and care responsibilities for employees, an ageing population in Europe requires additional resources for the care of older and disabled people and services promoting independent living as part of an integrated strategy.

5 Female-dominated work and sustainable work

As previously mentioned, both female-dominated and male-dominated work sectors need to be covered in actions and strategies to promote sustainable work. The following section includes the results from interventions carried out in two sectors — healthcare and education — and the measures and recommendations formulated based on these interventions. These sectors have been chosen because, in addition to being female-dominated, they employ a large proportion of working women over the age of 50 years and because OSH studies or interventions have been carried out in relation to age and gender and the good practices identified. The general review (EU-OSHA, 2016a) also addressed the cleaning sector and provided some additional information in relation to the healthcare sector.

5.1 Healthcare

Key findings

- An example of integrated strategy development is the strategy of the Working Longer Group of the United Kingdom National Health Service. Recommendations included developing and implementing a risk assessment framework to assist organisations in addressing the cumulative impacts of working longer by supporting staff with health, safety and well-being issues throughout their working lives.
- Training programmes in the healthcare sector to promote patients' resources are a 'win-win' solution, as they improve caregivers' working environments and improve patients' sense of dignity and control over their situation.
- If older workers are in good health and their 'job fit' is right, they can work as productively as their younger counterparts.

5.1.1 OSH hazards and risks in the context of an ageing workforce

Women of all ages have a high rate of employment in the healthcare sector. However, it is also a sector in which the age of the workforce is increasing (EU-OSHA, 2013a) and in which there are a number of hazards for which long-term exposure is problematic. These include physical workload and emotionally demanding work. Workers may be exposed to a very wide variety of hazards in healthcare and it is recognised as a high-risk sector (EC, 2011).

In particular, risks include patient lifting, exposure to cleaning and sterilising chemicals, exposure to psychosocial hazards (such as violence and aggression), shift work and night work, and exposure to infectious agents. Stresses and strains arising from awkward and static postures when treating patients can also give rise to problems.

Reducing musculoskeletal problems is a particular challenge in the context of extending working life in the healthcare sector. For example, the United Kingdom Health and Safety Executive (HSE) reports that one in four nurses has, at some time, taken time off as a result of a back injury sustained at work (EC, 2011). The HSE also reports that over 5,000 manual handling injuries are reported within health services each year, approximately half of which happen during the handling of patients.

Psychosocial issues are also a key issue among healthcare workers. The Nurses' Early Exit (NEXT) study found that nurses in general were not satisfied with their job. According to the study, 15.6 % of nurses in Europe think frequently and seriously (several times a month) of leaving the profession early (EC, 2011). Prolonged exposure to stressful situations can lead to burnout, which shares features with stress, mainly relating to emotional exhaustion or excessive fatigue, but differs from stress in that it also includes factors related to depersonalisation, personal concern and personal fulfilment.

Finally, there is increasing evidence linking night work and breast cancer (EC, 2011; EU-OSHA, 2014). Extending working life could mean increasing this risk if exposure to night work is prolonged.

The issue of extended duration of exposure to hazards is critical for older women, as it can increase the risk of injury, ill health, fatigue and burnout, and can cause an inability or lack of desire to continue to cope with very physically and psychologically demanding work. Thus, all of these hazards and related

risks may either act as push factors outside the workplace or result in workers reaching retirement age in poor health.

5.1.2 Measures and recommendations

An example of integrated strategy development in a female-dominated sector is the strategy of the tripartite Working Longer Group (WLG) of the National Health Service (NHS) in the United Kingdom⁴. The WLG is a partnership group of trade unions, NHS employers and health department (ministry) representatives. It was established to review the implications of the NHS workforce working for longer to an older retirement age. This group was established to address the impact of the increase of the retirement age from 65 years to 68 years in the NHS workforce, which is 77 % female, with nearly two-thirds of nurses over the age of 40 years (Lee, 2015).

The WLG's recommendations are based on an audit of research on the impact of extending working life in the healthcare sector (Weyman *et al.*, 2013). The recommendations cover four main areas: data, pension options and retirement decisions, working arrangements and the work environment, and good practices in relation to occupational health, safety and well-being. The audit of existing evidence found that, if older workers are in good health and their 'job fit' is right, they can work as productively as their younger counterparts. This highlighted the importance of fully implementing sector guidelines on health and well-being at work to ensure that a longer working life does not adversely affect an employee's health or ability to work effectively and safely. Specific recommendations were made with regard to developing and implementing a risk assessment framework, in order to assist organisations in addressing the cumulative impact of working for longer. For employers, this means supporting staff with health, safety and well-being issues throughout their working lives to enable them to for work longer (EU-OSHA, 2015; Lee, 2015).

The audit report identified good practice and evidence-based measures in relation to managing older workers in the healthcare environment (see Appendix C for details). One such measure is to train healthcare workers and other staff that handle patients to promote the patient's resources, and to enable him or her to participate more actively in the process of moving, thus reducing physical strain on the worker. Additional benefits to this approach include contributing to the goal of maintaining a sense of dignity and self-control for the patient (EC, 2011). However, the report concludes that there are still a number of evidence gaps with regard to successful measures to managing an ageing workforce in this sector (Weyman *et al.*, 2013).

There is a vast range of different jobs in the healthcare sector. Different types of work may need different approaches to age management and, within these, there may be specific needs according to gender. The ambulance service, for example, is one where questions about the sustainability of working conditions have been raised. It is also a work area that has opened up to women. As the study by Weyman *et al.* (2013) makes clear, OSH aspects, including age management, must be integrated into all managerial development processes, that is, corporate strategy, HR and organisational development (EC, 2011). Good OSH management aimed at extending working life in healthcare is not based on just one solution, but is dependent on a variety of measures and factors, including stress prevention, ergonomics, improved work organisation, work health promotion, training and development, and senior management commitment. EC (2011) provided risk prevention measures for the healthcare sector, which, if implemented, would benefit all workers along the life course.

The following below highlights an example of the improvements that can be made to reduce MSDs in the healthcare sector (EC, 2011).

Good company practice: Berufsgenossenschaftliches Unfallkrankenhaus Hamburg (BUKH), Germany

The project started in the nursing sector with approximately 600 healthcare workers. A staff survey revealed a high level of exposure to physical hazards but, at the same time, the desire of the nursing staff to be able to pursue their occupation for as long as possible. The setting up of 'Health circles', through which the staff could discuss issues related to their working conditions, created an environment in which issues could be expressed and concrete solutions could be generated.

⁴ <http://www.nhsemployers.org/wlr> accessed 9 May 2016

High absenteeism rates were a major concern in the organisation. The project's objective was therefore to take action to reduce days lost owing to illness, prevent the occurrence of occupational diseases, improve the quality of care and increase job satisfaction and well-being of the staff. To this end, a coordinated package of measures was put together including selection and purchase of handling devices and training of senior management and employees. The project involved staff from the OSH and health promotion department and from the HR department, as well as worker representatives.

Another objective of the measures adopted by 'Health circles' related to preparing for demographic change and keeping employees at work long enough to avoid a shortage of skilled staff and allow for the transmission of knowledge and know-how.

5.2 Education

Key findings

- A combination of measures is recommended for the retention of staff in the education sector, including improvements in working conditions and measures to improve career mobility.

5.2.1 OSH hazards and risks in the context of an ageing workforce

Education is another female-dominated sector in which individuals are exposed to multiple hazards, including infectious diseases, poor indoor air quality, prolonged standing, medium to high levels of noise, risk of voice loss, emotionally demanding work, and exposure to violence and aggression and to stressful situations.

Some hazards relevant to sustainable work are more recognised, such as the emotional demands of the work and the risk of violence. The extent of other hazards and health problems are less recognised. One example is voice disorders (EU-OSHA, 2005a) although there is a growing body of research concerning voice disorders among teachers. A study by Roy *et al.* (2004) found that being a teacher, being a woman and being between 40 and 59 years of age, were among the factors positively associated with having experienced a voice disorder in the past. Cantor Cutiva and Burdorf (2015) identified that, in a survey of 621 Colombian teachers, 69 % reported voice-related symptoms. Statistical and survey data reviewed by the United Kingdom National Union of Teachers (NUT) showed: an increased prevalence of voice disorders among teachers compared to other professions; and a third of head teachers reporting that voice problems had caused teachers to take time off work (NUT, undated). Prevention measures include improvements in classroom acoustics, avoiding speaking for long periods of time and instruction for teachers about voice care (NUT, undated; EU-OSHA, 2005b). The possible adverse effects of exposure to classroom noise is mentioned in the section 4.4.2. on noise.

Education is a work area which has been undergoing considerable change, for example to respond to curriculum changes, extending the breadth of teachers' duties (classroom and non-classroom), changes in the management and provision of education, and changes in the role of teachers. Technology, among other things, means that the way in which education is delivered has changed and will continue to change. Technology also provides new mediums for harassment of staff, for example so-called cyber harassment (as per the 2010 European Trade Union Committee for Education (ETUCE, 2010) Practical Guidelines for Anti-Cyber Harassment Measures in Education). While this section focuses on teaching staff, it is important to consider non-teaching support staff as well.

5.2.2 Measures and recommendations

To prevent early retirement and avoid shortages of skilled labour in the future, the sector needs to create more sustainable working conditions, which will allow the sector to retain older workers at the same time as attract new recruits. According to a report of the Organisation for Economic Co-operation and Development (OECD), the provision of financial incentives and of opportunities for professional

development, and the improvement of working conditions, are needed if serious (teacher) shortages are to be avoided (Santiago, 2001).

The Victorian TAFE Association, a vocational education and training provider in Victoria, Australia, produced a toolkit for managing their ageing workforce (Andrews *et al.*, 2005). According to an analysis of resources in the organisation, the priorities were staff development and retention, while also managing workloads and enhancing flexibility. The toolkit provides a framework strategy for managing an ageing workforce, which applies from the moment the worker enters the organisation to the moment they leave, and beyond. The strategy incorporates both OSH and HR elements and recommends the following:

- promoting and implementing lifelong learning strategies;
- monitoring development activity by age;
- encouraging employees to build their résumé, assisting them in documenting skills developed on the job that may not be formally recognised;
- encouraging job mobility, particularly among older workers, to increase their exposure to new challenges and work variety;
- undertaking assessments of physical, environmental and organisational risk factors in the workplace for older workers;
- initiating health and well-being programmes that aim to counteract health issues associated with each age group.

5.3 Implementing measures in work predominantly carried out by women

Key findings

- OSH measures need to be suitable for female workers, not designed to accommodate only the average male employee.
- Consideration needs to be given to the suitability of risk prevention measures for women in work where women are in the minority.

As mentioned in section 3, the type of work that women tend to be employed in — including cleaning, factory work, retail work and hairdressing — is frequently physically demanding in terms of moving heavy loads, sustained static muscular effort, working in awkward postures and short-cycle repetitive movements. Ill-fitting PPE, tool design or work organisation can cause or increase exposure to hazards, and any measures to reduce OSH risks for the female workforce or to accommodate older workers (such as equipment or a redesign of the workplace) need to be suitable for female workers rather than just designed to accommodate average male employees (Yeomans, 2011). To improve the sustainability of work for all workers by protecting them from exposure to hazards across the life course, OSH measures also need to be suitable for both men and women, including in situations where women are in the minority. An example is suitable PPE for female construction workers, as well as the design of tools and equipment and the layout of workplaces. Removing such barriers to employment can help encourage more women to enter such sectors.

Examples of the implementation of OSH measures that are suitable or designed for female workers are given in EU-OSHA (2014).

6 ‘Groups’ of female workers and sustainable work

Key findings

- Young women and the sectors in which they work should be included in strategy and actions on young workers.
- Part-time and other ‘atypical’ workers may not have the same access to OSH support services.
- There is a lack of information on the experiences of older female workers from different ethnic groups.
- Cultural and language barriers may be two factors that make it more difficult for older women from ethnic groups to obtain support. They may face multiple levels of discrimination based on age, sex and ethnicity.

This section briefly considers OSH and sustainable work in relation to certain groups of female workers.

Section 3 discusses the concept of the life-course approach to OSH, which starts with improving the OSH of young workers, such that younger workers reach later life without injury or illness. In this section, the importance of including the sectors in which young women predominate in OSH strategy and actions aimed at young workers was raised, as was the fact that this also needs to include both workplaces and vocational training. As cited in the general review (EU-OSHA, 2016a), Crawford *et al* (2009) reporting on musculoskeletal symptoms in nurses identified that nurses reported musculoskeletal problems as a result of previous employment and working in healthcare on entry to the profession. Thus prevention of injuries during training can be seen as a key component of reducing the risks of injury at this time.

Section 3 also covers some issues related to part-time working, including that part-time and other groups of ‘atypical’ workers may not have the same access to support services, such as occupational health services, which may have an impact on the maintenance of long-term health and well-being.

In the United Kingdom, according to the Scottish Commission on Older Workers (2015), the (work) experiences of older female workers from different ethnic groups are rarely considered in most published reports, and there is almost no freely available data on employment rates for older women by ethnicity. Where there are data, the sample size may be too small to allow detailed analysis.

Based on an analysis of data by one United Kingdom review on the OSH of ethnic workers, South Asian males (in particular Bangladeshis) and Black Caribbean men are much less likely to remain in employment if they have a limiting long-term illness. For women, this effect is even more extreme for South Asians with limiting long-term illness; these women are less likely to remain in employment and Bangladeshi women with a disability actually appear to leave the workforce (Szczepura *et al.*, 2004).

Cultural and language barriers may be two factors that make it more difficult for older women from ethnic groups to obtain support or assert their rights in the workplace, and may also affect their ability to access relevant support services and obtain medical advice and care outside the workplace. Raising issues such as the menopause may be even more taboo in certain ethnic groups. They may face discrimination in the workplace on three levels: because of their age, because of their sex and because of their ethnicity.

This report has mentioned that anthropometric differences between men and women are important for the fit between the workplace, tools and PPE, where women can be at an increased risk if the average man is used as the design standard. In addition, if the design standard is the average Caucasian man, this could mean a still greater misfit for women from some ethnic minorities (EU-OSHA, 2003a).

7 Risk prevention, health promotion, OSH systems and gender and sustainable work

This section will consider the integration, or ‘mainstreaming’, of gender into OSH systems, services and risk prevention methods in relation to sustainable work. It will consider risk assessment, which is the key tool in the European OSH risk prevention framework for the workplace, workplace health promotion, OSH systems and labour inspection and access to occupational health and rehabilitation services.

7.1 Age- and gender-sensitive risk assessments

Key findings

- Workplace risk assessment needs to cover the cumulative exposure to hazards and incorporate the complexities of age and gender.
- This includes taking account of broader issues, such as that a lack of career movement for women can result in long-term exposure to the same hazards.
- Support for age- and gender-sensitive risk assessments is needed.

For the promotion of sustainable work, it is important to integrate age and diversity into risk assessment, so that OSH strategies promote diversity through risk prevention and so that risks are tackled at their source. This should be underpinned by key principles based on the importance of collective measures, consultations with employees and valuing diversity as a resource. Therefore, it is important to address age equality, gender equality and OSH in one policy and practice framework.

Taking a gender-sensitive approach to OSH means giving consideration to gender differences in the risk assessment process and the implementation of measures to reduce risks and promote sustainable work. Equally, gender issues need to be taken into account in broader age management activities in workplaces.

A number of aspects should be considered regarding gender and risk assessment:

- It should be ensured that the diversity of the workforce, including a balanced representation of gender, age and type of employment arrangements, is represented in workplace committees, groups and other data collection routes for risk assessment and risk reduction measures.
- Considering that job titles are not always the best indicator of what people actually do at work, work tasks should be examined, taking into account both gender and age, to get a better understanding of the actual tasks carried out, and the hazards that workers are exposed to when carrying out those tasks.
- Workers with non-standard working arrangements, such as part-time or temporary workers, should be covered by risk assessment procedures.

In addition to gender, consideration should also be given to age, in order to cover the full diversity of the workforce. Improved understanding is needed of the different roles played by different groups of workers within an organisation, as well as the physiological changes associated with age and gender. This will allow better evaluation of the risks that different groups of workers face and the necessary mitigating measures. In addition, given that sustainable work strategies need to focus on the cumulative physical and emotional impacts of work, the assessment of cumulative exposures to hazards should take into account differences related to both gender and age; for example, older men and older women or older and younger women should be considered within one occupation/sector. Taking an age- and gender-sensitive approach need not be complicated, with the first step being to ensure that the different groups of workers are considered and consulted during risk assessment. However, support for risk assessments that incorporate all of the complexities of age and gender is also needed.

Therefore, a number of additional aspects should be considered regarding age, gender, risk assessment and measures for sustainable work, although this is not a definitive list:

- considering older men and older women and young male and young female workers during risk assessment;
- considering the physical and emotional load in older women's work;
- paying attention to whether or not there is a lack of control over how tasks are done, decision-making, the pace of working, etc.;
- considering measures for both male and female family carers;
- recognising the menopause as a work issue and providing non-stigmatising support;
- investigating the length of exposure over time and the reasons for prolonged exposure (e.g. lack of career mobility), particularly where there is a high incidence of certain work-related ill health complaints or injuries among a group;
- considering if equipment or workstations are suitable for women as well as for men, including when adjustments are made to support continued working in the case of a women with health or ability changes;
- ensuring that young workers, including female workers, older workers and older female workers, are consulted.

Information and checklists for diversity-sensitive risk assessments are given in EU-OSHA (2009) and for gender-sensitive risk assessments are given in EU-OSHA (2003a, 2003b, 2014) and WHO (2011), with examples of good practice interventions given in EU-OSHA (2014).

The close link between gender equality, cumulative exposure to hazards and sustainable work, and how to take account of this during risk assessment, is demonstrated by the intervention in a French printing company referred to in section 4.2.2, where women working in 'finishing' suffered from exceptionally high rates of MSDs. Ergonomic improvements were recommended, but more had to be done to prevent exposure to repetitive tasks for long periods. An analysis of the length of time spent in different jobs by gender revealed that men were more quickly promoted from roles involving 'finishing' work than women, so one of the recommendations included promoting women's career path development and skill recognition, in order to prevent women from becoming trapped long term in repetitive jobs.

The following box provides an example of a company initiative that was put in place to help address the risks faced by a specific group of workers, namely older female workers.

Good company practice: improving the work capacity of older female workers, the Food Service Centrum, Finland (Eurofound, 2005, 2009)

The Food Service Centrum in Finland provides catering services to the education and healthcare sectors and local government. The work in the company is mostly physical, with few opportunities for non-physical work. The company, conscious of the ageing of its workforce, decided to implement a well-being programme to support the work ability and well-being of its kitchen workers, half of whom were over 45 years of age and many of whom were female, and to improve the company's productivity.

To do that, it set up the Senoriita group, which aimed to give female employees over 45 years the opportunity to discuss any hazards, risks and health issues they experienced. Participants in the Senoriita group reported being highly satisfied following the initiative, particularly with regard to the information they received about physiological and psychosocial aspects of women's ageing and insights regarding how to manage these changes. A key component of their satisfaction was discussing these issues with women of the same age. At the company level, the measurement of psychosocial and well-being indicators was improved, as was the company's work ability index.

This particular measure was set up to complement other initiatives within the company, which included allowing older workers with limited work capacity to work part-time while receiving a partial pension, providing training to workers on new electronic equipment, and individual interventions to improve work ability.

Taking gender and age into account during the risk assessment procedure is only part of the solution. It is equally important that services provided to a company, such as occupational health services, also take a gender- and age-sensitive approach.

7.2 Workplace health promotion and diversity

Start box

Key findings

- Approaches to workplace health promotion should be tailored to ensure that they are both age and gender appropriate.
- Workplace health promotion should be complementary to an effective risk prevention system.

There are many social and economic factors that interact to strongly influence health and well-being. For example, women are more likely than men to report that their general health is poor or that they have a long-standing illness. This is partly attributable to women's lower economic status. (Marmot, 2013). While the causes of this may be outside the workplace, there is a link between economic status, type of work and working conditions, and workplace health promotion (WHP) activities, which go beyond just healthy lifestyle education, have a role to play. WHP is not part of the European OSH legal framework. It should be complementary and supportive of an effective risk prevention system in the workplace, and should play a role in improving the health and well-being of workers. However, there can be differences in terms of who participates in WHP programmes at both an individual level and an organisational level, as highlighted in the general review (EU-OSHA, 2016a).

A study undertaken for EU-OSHA on WHP looked at its diversity, in terms of who participates, who does not and why (EU-OSHA, 2012). The review found that different employee groups, including different gender groups, have different patterns of participation in relation to different types of WHP activity. In addition, these differences in participation are not uniform across the various WHP activities. Gender- and age-sensitive interventions should take these findings into account to ensure equal access to, and participation in, WHP of men and women and different age groups. The literature indicates that the likelihood of participating in WHP:

- decreases with age; and
- is lower in males.

Motivation for employees to participate in WHP is:

- lower if they have a low educational attainment level;
- lower in association with adverse health behaviour; and
- associated with work-related issues, such as support from managers and co-workers, an inability to participate during working hours and low control over the work situation.

The groups most likely to be recruited for WHP activities are not necessarily those that are most likely to exhibit sustained participation in them. In general, the review of the literature observed that:

- Male employees, employees with a high educational attainment level, employees in managerial positions and married employees are more likely to be recruited for WHP.
- In contrast, female employees, employees with a low educational attainment level, employees in non-managerial positions and unmarried employees are more likely to show sustained participation in WHP activities.
- In addition, sustained participation was observed to increase with age and among women.

Studies covered in the review also suggest that:

- Male employees were less likely to participate in WHP activities focusing on nutrition and different kinds of treatment (such as massage, physiotherapy and psychological assistance)

than female employees, whereas there were no differences in terms of gender for activities focusing on physical exercise, smoking cessation and the reduction of stress.

- Women were significantly more likely to engage in physical activities when they were offered a fitness centre, on-site exercise classes or paid time to exercise at work, while men were significantly more likely to participate in competitive activities in sports leagues. This study also observed that the likelihood of participating in physical activities attenuated with age, and those employees over 60 years were significantly less likely to engage in them.
- Older employees were more likely to take part in smoking cessation and stress reduction programmes than younger individuals, whereas no significant age differences were observed when it came to participation in programmes that focused on nutrition, physical exercise and treatment.
- Regarding participation in health screening, younger workers tend to participate because of incentives, while older employees see an added value in the health screening itself. The onset of chronic disease in older workers, and the fact that their health might not be as good as they want it to be, might have an influence on this behaviour.

Research therefore suggests that individualised approaches to WHP will lead to higher employee enrolment. For example, the STUC *et al.* (2014) suggested that employers should include the menopause in workplace health campaigns. Different strategies and messaging for WHP are required for men and women (World Economic Forum, (2008) cited by Men's Health Forum (2008)) and understanding the variation in participation and recruitment trends across sub-groups of workers may be useful to help further tailor WHP programmes, as well as to better target communication and marketing strategies at different groups to encourage active participation and commitment.

As part of a life-course approach, the workplace can be an opportunity for early interventions on health promotion targeting young workers. However, as suggested above, it is important to remember that young men and women will have different needs and motivations from older men and women in terms of participation in these interventions (EU-OSHA, 2007, 2012).

A low educational attainment level or lower pay have also been identified as barriers to involvement in WHP. For women evidence suggests that obesity is more prevalent among women with a low educational attainment level than other groups (Roskam *et al.*, 2010, cited in Marmot, 2013). The qualitative research of Nobrega *et al.* (2016) on workplace interventions to reduce obesity in workers with a low educational attainment level or with lower pay identified that unusual or inflexible working arrangements, such as working long hours or non-traditional shifts, limited participants' ability to follow guidance on diet and exercise. Difficulties in accessing better food choices and in planning breaks in the work schedule were identified as barriers. On the other hand, participants identified both physical and psychological demands as being related to being overweight. The authors conclude that working conditions should be the starting point for workplace programmes on obesity. The study provides one example of how work may influence health inequalities which are commonly perceived to be lifestyle issues.

Thus, WHP initiatives need to take into account work organisation and working arrangements, involve workers in the development of programmes and collectively identify facilitators and barriers to allow implementation to be more effective. The following example describes a WHP intervention focused on one specific target group: men in the postal sector.

Good company practices: ‘male-friendly’ staff wellness programme reduces absence at Royal Mail, United Kingdom (EU-OSHA, 2014)

The Royal Mail wished to reduce sickness absence by developing a tailored and more engaging health promotion programme for their male employees. Male manual workers were targeted with booklets produced by the Men’s Health Forum⁵, written in the format of a well-known series of car maintenance manuals. This style of presentation was both recognisable and engaging, and felt to be more attractive to men. Wives and partners were also engaged to encourage their partners to take part in the health promotion activity. After evaluating the intervention, the company saw a reduction in its sickness absence rates, as well as lower staff turnover and greater employee satisfaction.

7.3 OSH systems, labour inspection and strategies for sustainable work

Key findings

- A gender-specific approach is needed for sustainable work strategies, and policy plans should be assessed for any possible gender impacts.
- OSH systems need to be able to provide practical support for the workplace on the intersection between age and gender.
- Labour inspectorates need to adopt diversity strategies to routinely incorporate age and gender issues into their work, avoid discrimination in their practices and be able to support workplaces effectively. Examples of this exist.
- Older female workers should be viewed as a valuable asset, and the double discrimination they may face should be addressed through awareness raising.

The importance for the promotion of sustainable work of an effective OSH system to support workplaces and that covers small businesses and all workers was discussed in the general review (EU-OSHA, 2016a). This includes legal and enforcement measures; services for enterprises and organisations, such as occupational health services; incentives; awareness raising and campaigns; knowledge and solutions; networking for the exchange of good practice; and cooperation between employers and workers.

EU-OSHA (2003a) highlighted the importance of systematically mainstreaming gender into OSH systems, strategies and actions. As sex- and gender-related differences persist throughout the working life, a gender-specific approach is needed for sustainable work strategies, and policy plans should be assessed for any possible gender impacts. OSH systems need to be able to promote a risk prevention culture in general, but they also need to be able to provide practical support for the workplace on the intersection between age and gender, especially for small businesses.

Labour inspectorates need to be able to support the process of incorporating age and gender considerations into sustainable workplace strategies without discriminating. By mainstreaming diversity into its strategy and practice, labour inspection can be equipped with the appropriate tools and expertise to systematically apply its activities to a diverse workforce. One example of how to achieve this is provided by the diversity mainstreaming strategy implemented by the Austrian Labour Inspectorate.

Firstly, a Total Quality Management project carried out within the Austrian labour inspection highlighted the need for systems to avoid gender stereotyping in this process. A gender mainstreaming framework and strategy were put in place resulting in information, a survey, tools (indicators, guidelines and checklists) and cooperation in pilot sites. Implementation was through a gender mainstreaming group and an intranet portal. Gender-related issues, such as the need for work–life balance measures, were mainstreamed into the organisation and into the working conditions of inspectors — which helps to make inspectors more aware of gender issues — and were also mainstreamed into the daily OSH work of labour inspection. Implementation actions included training and inspection checklists for inspectors

⁵ Men’s Health Forum: <https://www.menshealthforum.org.uk/> accessed on 9 May 2016.

to use in companies. The project was then extended to cover all areas of diversity, so, as well as age and gender mainstreaming approaches, other diversity areas were subsequently integrated into Austria's OSH strategy. The labour inspection systematically includes diversity in its advice to workplaces, and in its campaigns and guides, such as actions to combat MSDs, specific advice for cleaners and age projection tools for small businesses. It carries out gender and diversity impact assessments, for example when developing strategies and plans (EU-OSHA, 2014). The diversity mainstreaming strategy means that age and gender have been included in the Austrian national OSH strategy 2013-2020, which defines the approach to the prevention of work-related and occupational diseases as a holistic one, including a life-course perspective. Within this approach, gender and diversity aspects are highlighted and the importance of dealing with psychosocial and MSD prevention are named as targets (EU-OSHA, 2014).

Another example is the single equality scheme of the United Kingdom HSE, which resulted in research and advice for employers on different areas of diversity (EU-OSHA, 2014).

The example in the following box shows how an external health programme can support an intervention in a small, female-dominated workplace. Factors enabling this intervention included access to a municipal health promotion programme, which included training for the kindergarten director and partial funding of assistance from an external occupational therapist.

Good workplace practices: Kindergarten, Denmark (EU-OSHA, 2016c)

An example of an intervention to promote sustainable work in a workplace in which women predominate is seen in a small kindergarten with 19 employees in Denmark, which introduced a range of sustainable work adjustments to retain staff affected by repetitive movements and lifting. These adjustments specifically addressed the fact that workers had to bend frequently and that the available furniture was only suitable for children and was not height-adjustable. A partially funded external occupational therapist provided help in determining risk prevention measures and provided individual advice on working methods. Hydraulic, height-adjustable changing tables and chairs were acquired and the load was spread by having fathers helping to move furniture. Exercise programmes and physiotherapy were made available to staff at low cost. These measures to prevent MSDs were facilitated through trade union and worker involvement and access to a municipal health promotion programme, which included training for the kindergarten director.

On the basis of this review, an OSH strategy for sustainable work with a gender focus would need to include a focus on the cumulative impact of the exposures women face throughout their working lives (a life-course approach) in particular sectors and jobs, including in relation to repetitive and monotonous work, prolonged standing and sitting, stress and emotionally demanding work, and paced and shift work. A strategy for a lifelong approach to sustainable work should encompass risk education and prevention for girls and boys in schools, and ensure that OSH education addresses the risks associated with female-dominated jobs and that OSH is included in vocational training in typical women's jobs.

Mechanisms for collaboration between employers and workers are also an element of the OSH system. Although not developed under OSH social dialogue, an example of integrated strategy development through collaboration between the social partners in a sector dominated by a female workforce is the strategy of the tripartite WLG of the NHS in the United Kingdom (Lee, 2015), which was described in section 5.1.2.

The general review (EU-OSHA, 2016a) highlighted that, because of the complex interaction between influences within and outside the workplace, an integrated policy approach, which considers all of these influences, is essential for supporting workers throughout their working lives, and to ensure that support is offered if early exit from the workforce is unavoidable. In particular, cooperation is needed between OSH, employment, education, public health and social security activities. Again, a gender-focused approach to cross-policy actions on sustainable work will be needed to ensure that these strategies and actions are equally supportive of and appropriate for both men and women. For example, gender differences related to pre-existing chronic diseases, social and economic disparities in health and access to OSH infrastructure are aspects relevant to a broader, cross-policy gender focus. Marmot (2013) concludes that the public health sector needs to tackle health inequalities in its own core activities, but that there must also be wider engagement with other sectors. Schulte *et al.* (2012) provided a framework for the interaction between personal and occupational risk factors in the safety and health of the workforce in relation to public health research and intervention.

The general review (EU-OSHA, 2016a) found a need to promote the value of older workers to employers and highlighted a role for OSH systems in doing this through awareness raising. In particular, older female employees are a valuable asset to organisations, and it is important to counter stereotyped views of their abilities and the double discrimination that they may face in the workplace, that is, as older workers and as women.

7.4 Access to support services

Key findings

- Gender inequalities in OSH systems and in access to services can have an impact on the sustainability of women's work.
- A lack of recognition of the work-relatedness of some health problems among women, as well as childcare and other care obligations, can be barriers to access to support services.
- Women of all ages need equal access to appropriate/adapted rehabilitation programmes and vocational retraining adapted/relevant to the sectors and jobs they are usually employed in. Barriers to equal access to rehabilitation and vocational services need to be tackled by focusing specifically on gender.

EU-OSHA (2003a, 2013a) has identified some gender inequalities in OSH systems and in access to services and these can have an impact on the sustainability of women's work.

Certain groups of workers, including part-time workers (see section 3.5), who are predominantly female, do not have the same access to support services such as OSH and HR management.

The general review (EU-OSHA, 2016a) highlighted the importance for sustainable work of access to occupational health services, including occupational health surveillance over the life course. However, small businesses and their employees, as well as 'atypical' workers such as self-employed or 'casual' workers, are often not covered by such services. Women working in these circumstances may be at a particular disadvantage in relation to accessing services owing to the lower status of their jobs, for example if employed on a casual basis in a small business in the catering sector.

The lack of access to support mechanisms may have an impact on the maintenance of long-term health and well-being, especially in the context of extending working life. One Swedish example highlights differences in accessing support, where only 59 % of women (mostly blue collar workers) have access to support mechanisms compared with 64 % of men. The gender gap is especially pronounced for the youngest age group. The gender gap, however, has declined since the previous survey in 2011, where it was much more marked in the two youngest age categories (Arbetsmiljöverket, 2014).

Accessing other services, such as medical care, is something that becomes more frequent as the population ages. While there is widespread recognition that, during pregnancy, women require more frequent health checks, without any penalties in the workplace for their absence, such consideration is not generally given to older workers. The United Kingdom TUC notes that this is a particular issue for older women experiencing menopausal symptoms. A separate issue raised by EU-OSHA (2003a) is that medical practitioners may be less likely to consider work-related factors when treating woman's ill health than men's, in which case causal factors and, therefore, prevention measures may be missed.

EU-OSHA (2013a) identified that there were 44.6 million people within the EU with either a long-standing health problem or a disability. Working with a chronic health problem or a disability will become increasingly common as the workforce ages. Thus, the issue of the rehabilitation of workers with limitations in their work ability following a health problem and their reintegration in the workplace is of critical importance in the context of population ageing.

Older women who suffer from a disability are at risk of a triple discrimination, that is, in relation to their gender, age and disability. EU-OSHA (2013a) identified that women with a disability generally receive lower compensation for their loss of work ability and experience greater difficulty in the process of reintegrating into the labour market with limited work ability. It has been shown that the services offered for vocational rehabilitation are biased towards industrial sectors, which are mostly male-dominated, rather than service or public sector work, which are mostly female-dominated. This occurs if access is

dependent on having a recognised occupational health problem, as occupational diseases in sectors dominated by men are more likely to be formally recognised. In addition, counsellors' advice has been found to differ according to gender, with women receiving less advice in terms of re-employment prospects. Furthermore, rehabilitation schemes are not always able to take into account women's needs, such as their family carer responsibilities, during the rehabilitation period.

A specific gender focus needs to be given to rehabilitation after work-related illnesses and the design of programmes. As an example of good practice for rehabilitation, the French work injury insurance organisation Anact has promoted a guide for rehabilitation of female workers following breast cancer, which was developed by an association of occupational physicians (Association CINERGIE, 2008). Breast cancer is one of the most frequent female cancers and affects mainly older women.

8 Conclusions

Addressing exposures to safety and health risks and better risk prevention for all employees in the workplace remains a priority for improving health and well-being in the EU. Although this review examines gender issues in relation to the older workforce, it is important to stress a working ‘life-course’ approach, starting as early in working life as possible, as the duration of exposure is an important factor in relation to chronic conditions and disability. Long-term exposure can have negative impacts, for instance when it comes to exposure to chemicals or to awkward postures, but it can also have positive impacts, for instance if younger workers are involved in WHP from the start of their careers, improving their lifestyle choices and thus their long-term health. By introducing these opportunities at an earlier age, there is likely to be better health across the life course and workers are likely to be healthier at retirement.

This review highlighted a number of sex-specific physiological and cognitive changes relating to ageing individuals in the workforce and the related health outcomes. Although many of these changes occur for both men and women, there are some notable exceptions, such as the menopause, which occurs specifically in older women (50 years and older), a susceptibility of women to chronic conditions such as COPD and a higher prevalence in women of osteoarthritis and osteoporosis.

Horizontal and vertical segregation in terms of women’s participation in the workforce are important factors to consider in a gender-sensitive approach. It appears that horizontal and vertical segregation function as mediators of occupational exposure to hazards and risks along the life course. This review has highlighted some of the differences in terms of exposure to occupational hazards and related risks and health problems that result from horizontal and/or vertical segregation. Within horizontal segregation, the issue of task segregation (i.e. the fact that, even with a similar job title, men and women tend to do different work tasks) is a major issue for older working women, in particular those in low-skilled jobs. Another important issue when it comes to the OSH of older working women is their role as family carers and the availability of measures that enable them to combine work and care responsibilities. This is an issue that demonstrates how gender stereotypes can also be prejudicial to men: older men are more likely than their younger counterparts to have care responsibilities, while most flexible care arrangements are geared towards the childcare responsibilities of younger women.

Given these gender differences, in the future, it will be important to create sustainable working patterns for older workers, with a specific focus on older female workers, through measures that address workloads, work tasks, flexible working hours, the work–life balance, support in the workplace for specific gender-related health issues, and workforce development. Strong policy frameworks, investment and resources are crucial for supporting actions, at strategic and practical levels, on the complex intersection between age and gender. This requires consistent, coordinated actions to address age, gender and OSH actions related to risk management, the adaptation of work and the balance of work and care responsibilities across the life course. Older female workers are a valuable asset to organisations and, as part of this gender focus, it is important to counter stereotyped views of their abilities and avoid the double discrimination that older women may face in the workplace.

8.1 Gaps in knowledge and support

In general, however, data were rarely available to look at the combined impacts of gender and age. Major gaps have been identified in the literature in relation to the adaptation of physical and organisational work factors to older female workers. Although very few studies have looked specifically at the issues of age and gender combined, a few examples do exist of actions and programmes specifically targeting older women in the workforce, but much more research is needed examining both the exposure of older women to occupational hazards and related risks and the effectiveness of targeted actions in relation to other actions or interventions.

One of the difficulties faced in this review of gender-specific issues in relation to the OSH of an ageing workforce is the absence of research on the interlinkages between age and gender, and of sound evidence on what to base policy initiatives. Although data are available on basic demographic parameters, such as age, sex and gender, in relation to workforce participation, there are very few datasets available that examine them in combination, that is, the impact of the participation of women 50 years and over in different economic sectors, with different working arrangements, on their OSH and

well-being. This should be looked at from a life-course perspective that is, looking at what needs to be done from the start of women's working life to avoid the development of health problems with age. As has been mentioned, there is a significant lack of information on older female workers from ethnic minorities.

In general, gathering more evidence on the links between work, age and gender will require risk assessments and intervention evaluations that disaggregate data to assess differences in exposure and risk by age and gender. In addition, the design of research and investigations on interventions in relation to gender is crucial. These issues have been covered in previous EU-OSHA reports, which also highlight that it is important to recognise where and how women are exposed and the true extent of exposure (EU-OSHA, 2003a, 2013a). The WHO raised similar concerns about lack of information on gender differences in incidence of health problems in general because of data not always presented disaggregated by sex, and where it is, no gender analysis if the data taking place (WHO, 2003).

Kennedy and Koehoorn (2003) considered whether or not taking sex and/or gender into account is important in exposure research. The paper presents the following findings:

- for men and women with the same job title there exists apparent gender differences in exposure because of differences in job tasks or schedules;
- true sex differences occur in actual levels of personal exposure, for example through ill-fitting PPE, being closer to the source of exposure and differences in responses to exposure;
- a gender bias exists in exposure measures because of biased study methods or designs; for example, there is a lack of consideration of gender differences in the validity or accuracy of assessment tools or in considering the impact of the healthy worker effect.

The paper by Kennedy and Koehoorn concludes that failure to consider sex/gender differences at all steps along the pathway of epidemiological studies, from potential hazards to the measurement or estimation of personal exposure may result in biased results. This can be mitigated to an extent by ensuring that work tasks, rather than job titles, are assessed; by considering the possibility of gender-stratified analyses rather than gender adjustments; and by ensuring that the healthy worker effect is examined for both genders in terms of magnitude and direction.

Thus, only a few studies have looked at whether or not sex has an impact on exposure to certain occupational hazards and related risks. This can arise in relation to body size and shape, for example where women, because they are generally shorter, may be closer to an exposure source. Kennedy and Koehoorn (2003) give the example of liquor store workers, with women more exposed to measurable dust than men. It is unclear whether this was due to their proximity to the sources or to methods of working, but a measurable effect was found. In contrast, differences in body shape and size mean that women generally have a smaller surface area of skin potentially exposed to possible chemical hazards. However, Polychronakis *et al.* (2008, cited in EU-OSHA, 2013a) identified that organ blood-flow is relatively higher in females than in males, which would suggest that the rate at which chemicals can circulate once absorbed is faster in women. There may also be gender differences in true personal exposure owing to the way that the work is carried out, although these differences can be difficult to explain. It is suggested by the authors that gender differences in true personal exposure are lost during analyses, when adjustments for gender are made.

No studies have looked at these direct impacts in relation to older working women, but it is likely that a longer duration of exposure to these occupational hazards constitutes an increased risk for these workers. More research is needed on the age–gender intersection, OSH and sustainable work. In parallel, OSH-related interventions and measures that target age- and gender-specific health problems should be considered, such as MSDs, breast cancer and the menopause. In general, gathering more evidence on the links between work, age and gender will require risk assessments and intervention evaluations that disaggregate data to assess differences in exposure and risk by age and gender.

Based on the analysis of the literature, a number of general gaps in research and data have been identified:

- Further work is needed to improve the collection of data on hazards to which women are exposed, rather than making assumptions about work tasks and job roles, or correcting for sex and gender, in research studies.

- Because of horizontal segregation in certain sectors, such as cleaning and healthcare, women can be exposed to multiple hazards; further research is needed to examine this in relation to age and extending the working life.
- Further research is needed to understand why women report poorer mental health outcomes than men exposed to the same psychosocial risks.
- Further research is needed to strengthen our understanding of the impact of women's dual roles of paid and domestic work on their health, especially in the context of extending working lives.
- Studies need to include older female workers from different ethnic groups.

More specific research gaps have also been identified:

- Our understanding of the possible impact of the menopause on a woman's working life is still limited and this is an area for which further research is needed, in order to identify support strategies for the workplace.
- Further research is needed on the links between night work and breast cancer in women to increase our understanding of the potential causal mechanisms and to improve risk prevention strategies.
- Further research is needed on working in painful and tiring conditions.

In addition to the need for more research on the intersection between age and gender in relation to OSH and sustainable work, more practical support for the workplace is needed. OSH-related interventions and measures that target age- and gender-specific health problems should be considered, such as MSDs, breast cancer and the menopause.

8.2 Overall conclusions and possible policy implications

The key findings of the review are summarised below:

- *Sex- and gender-related differences in working conditions persist throughout the working life:* sex- and gender-related differences between men and women influence the health issues they may face, what jobs they do, their conditions of work and the occupational risks they face throughout their working lives. Therefore, a gender-specific approach is needed for sustainable work strategies, and policy plans should be assessed for any possible gender-specific impacts.
- *The cumulative physical and emotional impacts of women's work should not be underestimated:* sustainable work strategies need to focus on the cumulative impact of the exposures women face throughout their working lives (a life-course approach) in particular sectors and jobs, including in relation to repetitive and monotonous work, prolonged standing and sitting, stress and emotionally demanding work, and paced and shift work.
- *In the workplace, support for risk assessments of the cumulative exposure to hazards that incorporate the complexities of age and gender is needed:* the assessment of cumulative exposures should take into account differences related to both gender and age; for example, older men and older women or older and younger women should be considered within one occupation/sector.
- *Segregation into low-level jobs without career promotion can lead to long-term exposure to hazards:* attention needs to be paid to women's career development, to avoid them being trapped in low-level jobs resulting in long-term exposure to the same hazards.
- *The barriers to equal access to rehabilitation and vocational training need to be tackled:* women of all ages need equal access to appropriate/adapted rehabilitation programmes, and vocational retraining should be adapted/relevant to the sectors and jobs they are usually employed in. A lack of recognition of the work-relatedness of some health problems, as well as childcare and other care obligations, can be barriers to access to these services.
- *Simple non-stigmatising workplace measures can support women going through the menopause:* understanding and support for female workers during the menopause are needed;

such support could be as simple as providing access to drinking water. More research and practical, non-stigmatising, advice for the workplace in this taboo area is needed.

- *WHP strategies need different approaches for male and female audiences.*
- *Flexible work measures need to be relevant to carers of older relatives and to both men and women:* the workplace approach to family carers needs to be adjusted away from the current model that focuses on women who care for children, so that it is relevant to both male and female carers of older relatives.
- *Labour inspectorates need diversity strategies, and examples of such strategies exist:* labour inspectorates need to adopt diversity strategies in order to routinely incorporate age and gender issues into their work, avoid discrimination in their practices and be able to support workplaces effectively.
- *More research on the age–gender intersection is needed:* more research is needed on the intersection between gender and age in relation to OSH and sustainable work, combined with more practical support for the workplace.
- *Older female workers should be viewed as a valuable asset and the double discrimination that older female workers may face should be addressed through awareness raising:* simple measures can often be taken in the workplace to allow women with declining health or abilities to continue working. Measures to reduce work demands will often benefit all workers.

References

- Andrews, J., Barker, R., Bush, S. (2005), *A toolkit for managing an ageing TAFE workforce*, TAFE, Victoria, Australia. Retrieved 25 January 2016 from: <http://www.vta.vic.edu.au/docman-sortable-list/298-toolkit-booklet/file>
- Arbetsmiljöverket (2014), 'Arbetsmiljön 2013', *Arbetsmiljöstatistik Rapport 2014:3*. Retrieved 25 January 2016 from: <https://www.av.se/globalassets/filer/statistik/arbetsmiljostatistik-arbetsmiljon-2013-rapport-2014-03.pdf>
- Arvidsson, I., Arvidsson, M., Axmon, A., Hansson, G.A., Johansson, C.R., Skervfing, S. (2006), 'Musculoskeletal disorders among female and male air traffic controllers performing identical and demanding computer work', *Ergonomics*, Vol. 49, No 11, pp. 1052-1067.
- Aryal, S., Diaz-Gusman, E., Mannino, D.M. (2014), 'Influence of sex on chronic obstructive pulmonary disease risk and treatment outcomes', *International Journal of Chronic Obstructive Pulmonary Disease*, Vol. 14, No 9, pp. 1145-1154.
- Association CINERGIE (2008), *Travailler avec ... Un cancer du sein*, Association CINERGIE, Paris. Retrieved 23 May 2016 from: <http://handitrav.fr/travailler/travaillerCancerSein.pdf> (in French).
- Blok, M., De Looze, M. (2011), 'What is the evidence for less shift work tolerance in older workers?', *Ergonomics*, Vol. 54, No 3, pp. 221-232.
- Burdorf, A. (2015), 'Understanding the role of work in socioeconomic health inequalities', *Scandinavian Journal of Work, Environment & Health*, Vol. 41, No 4, pp. 325-327.
- Campos-Serna, J., Ronda-Pérez, E., Artazcoz, L., Moen, B.E., Benavides, F.G. (2013a), 'Gender inequalities in occupational health related to the unequal distribution of working and employment conditions: a systematic review', *International Journal for Equity in Health*, Vol. 12, No 57, p. 57.
- Campos-Serna, J., Ronda-Perez, E., Moen, B.E., Artazcoz, L., Benavides, F.G. (2013b), 'Welfare state regimes and gender inequalities in the exposure to work-related psychosocial hazards', *International Journal of Occupational and Environmental Health*, Vol. 19, No 3, pp. 179-195.
- Cantor Cutiva, L.C., Burdorf, A. (2015), 'Medical costs and productivity costs related to voice symptoms in Colombian teachers', *Journal of Voice*, Vol 29, No 6, pp. 776
- CarersUK (2014), *Facts about carers*, Policy Briefing, Carers UK, London. Retrieved 25 January 2016 from: http://www.carersuk.org/for-professionals/policy/policy-library?task=download&file=policy_file&id=4762
- Crawford, J.O., Graveling, R.A., Cowie, H.A., Dixon, K., MacCalman, L. (2009), *The health, safety and health promotion needs of older workers. An evidence-based review and guidance*, IOSH, Wigston, Leicestershire. Retrieved 25 January 2016 from: http://www.iosh.co.uk/~media/Documents/Books%20and%20resources/Published%20research/IOM_Ageing_RR.ashx
- Darr, W., Johns, G. (2008), 'Work strain, health, and absenteeism: a meta-analysis', *Journal of Occupational Health Psychology*, Vol. 13, No 4, pp. 293-318.
- De Zwart, B., Frings-Dresen, M., Kilbom, Å. (2000), 'Gender differences in upper extremity musculoskeletal complaints in the working population', *International Archives of Occupational and Environmental Health*, Vol. 74, No 1, pp. 21-30.

- Doyal, L., Payne, S. (2006), *Older women, work and health*, Help the Aged/TAEN, London. Retrieved 25 January 2016 from: http://taen.org.uk/uploads/resources/Older_women,_Work_and_Health.pdf
- EC — European Commission (2014), *EU Strategic Framework on Health and Safety at Work 2014-2020*, COM/2014/0332 final. Retrieved 25 January 2016 from: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1405358974296&uri=CELEX:52014DC0332>
- EC — European Commission (2011), *Occupational health and safety risks in the healthcare sector: guide to prevention and good practice*, Publications Office of the European Union, Luxembourg. Retrieved 25 January 2016 from: <http://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=6108&type=2&furtherPubs=yes>
- EC — European Commission (2010), *Analysis note: Men and gender equality, tackling gender segregated family roles and social care jobs*, European Network of Experts on Employment and Gender Equality issues (EGGE). Retrieved 25 January 2016 from: <http://ec.europa.eu/social/BlobServlet?docId=5532&langId=en>
- EP — European Parliament (2011), *Occupational health and safety risks for the most vulnerable workers*, European Parliament, Brussels. Retrieved 25 January 2016 from: [http://www.europarl.europa.eu/RegData/etudes/etudes/join/2011/464436/IPOL-EMPL_ET\(2011\)464436_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/join/2011/464436/IPOL-EMPL_ET(2011)464436_EN.pdf)
- EP — European Parliament (2008), *New forms of physical and psychosocial health risks at work*, European Parliament, Brussels. Retrieved 25 January 2016 from: <http://www.europarl.europa.eu/document/activities/cont/201107/20110718ATT24294/20110718ATT24294EN.pdf>
- ETUCE — European Trade Union Committee for Education (2010), *Practical guidelines for anti-cyber harassment measures in education*, ETUCE, Brussels. Retrieved 25 January 2016 from: https://www.csee-etuice.org/images/attachments/Cyber_harassment_guide_en.pdf
- EU-OSHA — European Agency for Safety and Health at Work (2016a), *The ageing workforce: implications for occupational safety and health - A research review*, EU-OSHA, Bilbao. Available at: <https://osha.europa.eu/en/tools-and-publications/publications/safer-and-healthier-work-any-age-ageing-workforce-implications/view>
- EU-OSHA — European Agency for Safety and Health at Work (2016b), *Analysis report on EU and Member States policies, strategies and programmes on population and workforce ageing*, EU-OSHA, Bilbao. Available at: <https://osha.europa.eu/en/tools-and-publications/publications/safer-and-healthier-work-any-age-analysis-report-eu-and-member/view>
- EU-OSHA — European Agency for Safety and Health at Work (2016c), *Denmark — Never too old for the kindergarten: reducing the strain to retain employees*, EU-OSHA, Bilbao. Available at: <https://osha.europa.eu/sites/default/files/publications/documents/Denmark%20-%20Reducing%20the%20strain%20to%20retain%20employees.pdf>
- EU-OSHA — European Agency for Safety and Health at Work (2015), *Summary of EU-OSHA workshop: gender and age: impact on working life*, ETUI international conference 'Women's Health and Work', 4.3.2015, EU-OSHA, Bilbao. Retrieved 16 May 2016 from <https://osha.europa.eu/sites/default/files/seminars/documents/ETUI%20conference%20summary.pdf>
- EU-OSHA — European Agency for Safety and Health at Work (2014), *Mainstreaming gender into occupational safety and health practice*, Publications Office of the European Union, Luxembourg. Retrieved 25 January 2016 from: <https://osha.europa.eu/fr/tools-and->

[publications/publications/reports/mainstreaming-gender-into-occupational-safety-and-health-practice](#)

EU-OSHA — European Agency for Safety and Health at Work (2013a), *New risks and trends in the safety and health of women at work*, Publications Office of the European Union, Luxembourg. Retrieved 25 January 2016 from: <https://osha.europa.eu/en/publications/reports/new-risks-and-trends-in-the-safety-and-health-of-women-at-work/view>

EU-OSHA — European Agency for Safety and Health at Work (2013b), *Occupational safety and health and education: a whole school approach*, Publications Office of the European Union, Luxembourg. Retrieved 25 January 2016 from: <https://osha.europa.eu/sites/default/files/publications/documents/OSH-and-education-whole-school-approach.pdf>

EU-OSHA — European Agency for Safety and Health at Work (2012), *Motivation for employees to participate in workplace health promotion*, Publications Office of the European Union, Luxembourg. Retrieved 25 January 2016 from: https://osha.europa.eu/fr/tools-and-publications/publications/literature_reviews/motivation-employees-whp

EU-OSHA — European Agency for Safety and Health at Work (2009), *Workforce diversity and risk assessment: ensuring everyone is covered*, EU-OSHA, Bilbao. Retrieved 22 January 2016 from: <https://osha.europa.eu/fr/tools-and-publications/publications/reports/TE7809894ENC>

EU-OSHA — European Agency for Safety and Health at Work (2007), *OSH in figures: Young workers facts and figures*, Publications Office of the European Union, Luxembourg. Retrieved 25 January 2016 from: <https://osha.europa.eu/en/tools-and-publications/publications/reports/7606507>

EU-OSHA — European Agency for Safety and Health at Work (2005a), *Noise in figures*, Publications Office of the European Union, Luxembourg. Retrieved 16 May from: https://osha.europa.eu/sites/default/files/publications/documents/en/publications/reports/6905723/TE6905723ENC_-_Noise_in_figures.pdf

EU-OSHA — European Agency for Safety and Health at Work (2005b), *Reducing the risks from occupational noise*, Publications Office of the European Union, Luxembourg. Retrieved 16 May from: <https://osha.europa.eu/en/tools-and-publications/publications/reports/6805535>

EU-OSHA — European Agency for Safety and Health at Work (2003a), *Gender issues in safety and health at work: a review*, Publications Office of the European Union, Luxembourg. Retrieved 25 January 2016 from: https://osha.europa.eu/en/node/7014/file_view

EU-OSHA — European Agency for Safety and Health at Work (2003b), *Including gender issues in risk assessment*, Fact Sheet 43, EU-OSHA, Brussels. Retrieved 25 January 2016 from: <https://osha.europa.eu/en/publications/factsheets/43/view>

Eurofound — European Foundation for the Improvement of Living and Working Conditions (2014), *Work preferences after 50*, Publications Office of the European Union, Luxembourg. Retrieved 25 January 2016 from: http://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1403en.pdf

Eurofound — European Foundation for the Improvement of Living and Working Conditions (2015), *First findings: Sixth European Working Conditions Survey*. Publications Office of the European Union, Luxembourg Retrieved 3 May 2016 from: https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1568en.pdf

Eurofound — European Foundation for the Improvement of Living and Working Conditions (2013), *Women, men and working conditions in Europe. A report based on the 5th European Working Conditions Survey*, Publications Office of the European Union, Luxembourg. Retrieved 25 January 2016 from:

<http://www.eurofound.europa.eu/publications/report/2013/working-conditions-social-policies/women-men-and-working-conditions-in-europe>

Eurofound — European Foundation for the Improvement of Living and Working Conditions (2012), *Sustainable work and the ageing workforce. A report based on the fifth European working conditions survey*, Eurofound, Luxembourg. Retrieved 25 January 2016 from:

<http://www.eurofound.europa.eu/publications/htmlfiles/ef1266.htm>

Eurofound — European Foundation for the Improvement of Living and Working Conditions (2009), 'Drawing on experience: older women workers in Europe', *Foundation Findings*, Eurofound, Luxembourg. Retrieved 25 January 2016 from: <http://www.eurofound.europa.eu/pubdocs/2008are/85/en/2/EF0885EN.pdf>

Eurofound — European Foundation for the Improvement of Living and Working Conditions (2008), *Use of technology and working conditions in the European Union*, Eurofound, Luxembourg. Retrieved 25 January 2016 from:

https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef0863en.pdf

Eurofound — European Foundation for the Improvement of Living and Working Conditions (2005), 'Food Service Centrum, Finland: health and well-being, training and development, redeployment', *EurWORK European Observatory of Working Life*, 12 June. Retrieved 25 January 2016 from:

<http://www.eurofound.europa.eu/observatories/eurwork/case-studies/ageing-workforce/food-service-centrum-finland-health-and-well-being-training-and-development-redeployment>

Eurofound — European Foundation for the Improvement of Living and Working Conditions (2002),

<http://www.uni-mannheim.de/edz/pdf/ef/fp/ef0244en.pdf>

Eurostat (2015a), 'Employment rate of the total population, men and women, age group 20-64', *Employment [lfsi_emp_a]*. Retrieved 25 January 2016 from:

<http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tesem010&language=en>

Eurostat (2015b), 'Europe 2020 employment indicators – Employment rate of people aged 20 to 64 in the EU up to 69.2% in 2014 - New peaks for women and those aged 55-64', *News release*, 81/2015, 7 May. Retrieved 25 January 2016 from:

<http://ec.europa.eu/eurostat/documents/2995521/6823708/3-07052015-AP-EN.pdf/7e507ea0-43c7-452f-8e6a-b479c89d2bd6>

Eurostat (2015c), 'Persons reporting a work-related health problem by sex, age and type of problem' [hsw_pb5], *Accidents at work and other work-related health problems (source LFS)*. Retrieved 25 January 2016 from:

http://ec.europa.eu/eurostat/statistics-explained/index.php/EU_labour_force_survey_-_ad_hoc_modules

Fredriksson, S., Hammar, O., Toren, K., Tenenbaum, A., Wayne, K.P. (2015), 'The effect of occupational noise exposure on tinnitus and sound-induced auditory fatigue among obstetrics personnel: a cross-sectional study', *BMJ Open*, Vol. 20, p. e005793.

Granville, G., Evandrou, M. (2008), *Older men work and health: reviewing the evidence*, Help the Aged/TAEN, London. Retrieved 25 January 2016 from:

http://taen.org.uk/uploads/resources/ID6871_Older_men_report.pdf

- Granville, G. Evandrou, M. (2010), 'Older men, work and health', *Occupational Medicine*, Vol. 60, No 3, pp. 178-183.
- Griffiths, A., Knight, A., Mahudin, D.N.M. (2009), *Ageing, work-related stress and health. Reviewing the evidence*, TAEN, London. Retrieved 25 January 2016 from: http://taen.org.uk/uploads/resources/24455_TAEN_Work_Related_Stress_32pg.pdf
- Griffiths, A., MacLennan, S., Wong, Y.Y.V. (2010), *Women's experience of working through the menopause*, British Occupational Health Research Foundation, London. Retrieved 25 January 2016 from: http://www.bohrf.org.uk/downloads/Womens_Experience_of_Working_through_the_Menopause-Dec_2010.pdf
- Heilskov-Hansen, T., Svendsen, S.W., Thomsen, J.F., Mikkelsen, S., Hanson, G-E. (2014), 'Sex differences in task distribution and task exposures among Danish house painters: an observational study combining questionnaire data with biomechanical measurements', *Plos One*, Vol. 9, No 11, p. e110899.
- Hooftman, W.E., Van Poppel, M.N., Van Der Beek, A.J., Bongers, P.M., Van Mechelen, W. (2004), 'Gender differences in the relations between work-related physical and psychosocial risk factors and musculoskeletal complaints', *Scandinavian Journal of Work, Environment & Health*, Vol. 30, No 4, pp. 261-278.
- Hunt, A. (2006), *Employing staff within the education sector who have eldercare responsibilities*, Flexible Employment Options Project, University of Staffordshire, Staffordshire. Retrieved 25 January 2016 from: https://www.staffs.ac.uk/assets/Employing%20staff%20who%20have%20eldercare%20responsibilities%202006_tcm44-77333.pdf
- IARC- The International Agency for Research on Cancer, 2010, 'Painting, Firefighting, and Shiftwork', *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans* Vol. 98, IARC, Lyon. Retrieved 23 May 2016 from: <http://monographs.iarc.fr/ENG/Monographs/vol98/index.php>
- Kennedy, S.M., Koehoorn, M. (2003), 'Exposure assessment in epidemiology: Does gender matter?' *American Journal of Industrial Medicine*, Vol. 44, No 6, pp. 576-583.
- Lapierre, L.M., Spector, P.E., Leck, J.D. (2005), 'Sexual versus nonsexual workplace aggression and victims' overall job satisfaction: a meta-analysis', *Journal of Occupational Health Psychology*, Vol. 10, No 2, pp. 155-169.
- Lee, N. (2015), 'NHS Working Longer Group initial findings and recommendations: What do they say about older women at work?', ETUI international conference 'Women's Health and Work', 4.3.2015, EU-OSHA, Bilbao. Retrieved 16 May 2016 from: <https://osha.europa.eu/sites/default/files/seminars/documents/3-20150304%20Nicola%20Lee%20RCN%20UK.pdf>
- Lindstrom, L., Suojalehto, H., Henriks-Eckerman, M-L., Suuronen, K. (2013), 'Occupational asthma and rhinitis caused by cyanoacrylate-based eyelash extension glues', *Occupational Medicine*, Vol. 63, No 4, pp. 294-297.
- Manty, M., Kouvonen, A., Lallukka, T., Lahti, J., Lahelma, E., Rahkonen, O. (2015), 'Changes in working conditions and physical health functioning among midlife and ageing employees', *Scandinavian Journal of Work Environment and Health*, Vol. 41, No 6, pp. 511-5188
- Marmot, M. (2013), *Health inequalities in the EU. Final report of a consortium*, European Commission Directorate-General for Health and Consumers. Retrieved 25 January 2016 from: http://ec.europa.eu/health/social_determinants/docs/healthinequalitiesineu_2013_en.pdf

- Melgert, B.N., Ray, A., Hylkema, M.N., Timens, W., Postma, D.S. (2007), 'Are there reasons why adult asthma is more common in females?', *Current Allergy and Asthma Reports*, Vol. 7, No 2, pp. 143-150.
- Men's Health Forum (2008), *National Men's Health Week 2008. Improving male health by taking action in the workplace*, Men's Health Forum, London. Retrieved 25 January 2016 from: <http://www.mhfi.org/menatwork.pdf>
- Meyland, J., Heilskov-Hansen, T., Alkjaer, T., Koblauch, H., Mikkelsen, S., Svendsen, S.W., Thomsen, J.F., Hansson, G-A., Simonsen, E.B. (2014), 'Sex differences in muscular load among house painters performing identical work tasks', *European Journal of Applied Physiology*, Vol. 114, No 9, pp. 1901-1911.
- Montano, D. (2014), 'Chemical and biological work-related risks across occupations in Europe: a review', *Journal of Occupational Medicine and Toxicology*, Vol. 9, p. 28.
- Nobrega S, Champagne N, Abreu M, Goldstein-Gelb M, Montano M, Lopez I, Arevalo J, Bruce S, Punnett L. (2016), 'Obesity/Overweight and the Role of Working Conditions: A Qualitative, Participatory Investigation', *Health Promotion Practice*, Vol. 17 No. 1 pp. 127-136
- Nordander, C., Ohlsson, K., Akesson, I., Arvidsson, I., Blagoh, I., Hansson, G.A., Stromberg, U., Rittner, R., Skerfving, S. (2013), 'Exposure–response relationships in work-related musculoskeletal disorders in elbows and hands – a synthesis of group-level data on exposure and response obtained using uniform methods of data collection', *Applied Ergonomics*, Vol. 44, No 2, pp. 241-253.
- NUT – National Union of Teachers (undated), *Voice care - NUT health and safety briefing*, NUT, London. Retrieved 16 May 2016 from: https://www.teachers.org.uk%2Ffiles%2Fvoice-care_0.doc&usg=AFQjCNGHtLwWvTEY8X4R-O9n55C3275DOA
- Payne, S., Doyal, L. (2010), 'Older women, work and health', *Occupational Medicine*, Vol. 60, No 3, pp. 172-177.
- PCS — Public and Commercial Services Union (2016), 'Eldercare'. Retrieved 15 January 2016 from: http://www.pcs.org.uk/en/equality/guidance-and-resources/womens_equality_toolkit/eldercare.cfm
- Plantenga, J., Remery, C. (2010), *Flexible working time arrangements and gender equality. A comparative review of 30 European Countries*, Publications Office of the European Union, Luxembourg. Retrieved 25 January 2016 from: <http://ec.europa.eu/social/BlobServlet?docId=6182&langId=en>
- Purvanova, R.K., Muros, J.P. (2010), 'Gender differences in burnout: A meta-analysis', *Journal of Vocational Behavior*, Vol. 77, No 2, pp. 168-185.
- Roy, N., Merrill, R.M., Thibeault, S., Parsa, R.A., Gray, S.D., Smith, E.M. (2004), 'Prevalence of voice disorders in teachers and the general population', *Journal of Speech Language and Hearing Research*, Vol. 47 No. 2 pp. 281-293
- Santiago, P. (2001), 'Teacher shortage', *OECD Observer*, 225. Retrieved 25 January 2016 from: http://www.oecdobserver.org/news/archivestory.php/aid/431/Teacher_shortage.html
- Scottish Commission on Older Women (2015), *Older women and work: looking to the future*, Scottish Commission on Older Women, Glasgow. Retrieved 16 May 2016 from: <http://www.stuc.org.uk/files/Womens%20page/Older%20women%20report/SCOW%20Report%20FINAL%20Embargoed%20200815.pdf>

- Schulte, P.A., Pandalai, S., Wulsin, W., Chun, H. (2012), 'Interaction of occupational and personal risk factors in workforce health and safety', *American Journal of Public Health*, Vol. 102, No 3, pp. 434–448.
- Sjodin, F., Kjellberg, A., Knutsson, A., Landstrom, U., Lindberg, L. (2012), 'Noise exposure and auditory effects on preschool personnel', *Noise and Health*, Vol. 14, No 57, pp. 72-82.
- Stansfeld, S., Candy, B. (2006), 'Psychosocial work environment and mental health—a meta-analytic review', *Scandinavian Journal of Work, Environment & Health*, Vol. 32, No 6, pp. 443-462.
- Szczepura, A., Gumber, A., Clay, D., Davies, R., Elias, P., Johnson, M., Walker, I., Owen, D. (2004), *Review of the occupational health and safety of Britain's ethnic minorities*, Health and Safety Executive, HSE Books, Sudbury. Retrieved 16 May 2016 from: <http://www.hse.gov.uk/research/rrpdf/rr221.pdf>
- STUC, Close the Gap, One Workplace Equal Rights (2014), *Older women in the workplace: health and safety issues*, STUC, Glasgow. Retrieved 16 May 2016 from: <http://www.stuc.org.uk/files/Womens%20page/Health%20and%20Safety/Older%20Women/Health%20and%20Safety.pdf>
- Theorell, T., Hammarstrom, A., Aronsson, G., Bendz, L.T., Grape, T., Hogstedt, C., Marteinsdottir, I., Skoog, I., Hall, C. (2015), 'A systematic review including meta-analysis of work environment and depressive symptoms', *BMC Public Health*, Vol. 15, p. 738.
- Toivanen, S. (2012), 'Social determinants of stroke as related to stress at work among working women: a literature review', *Stroke Research and Treatment*, Vol. 2012, Article ID 873678, 10 pages, 2012. doi:10.1155/2012/873678.
- Toren, K., Blanc, P.D. (2009), 'Asthma caused by occupational exposures is common – a systematic analysis of estimates of the population-attributable fraction', *BMC Pulmonary Medicine*, Vol. 9, No.7, doi: 10.1186/1471-2466-9-7.
- TUC — Trades Union Congress (2014), *Age immaterial: women over 50 in the workplace*, TUC, London. Retrieved 25 January 2016 from: http://www.tuc.org.uk/sites/default/files/Age_Immaterial_Women_Over_50_Report_2014_LR.pdf
- TUC — Trades Union Congress (2011), *Supporting women through the menopause: guidance for union representatives on dealing with issues around the menopause*, TUC, London. Retrieved 25 January 2016 from: http://www.tuc.org.uk/sites/default/files/extras/supporting_women_through_the_menopause.pdf
- Uherecky, A. (2015), 'Gender, Age and Care duties: how to make care duties compatible with work for all', EU-OSHA Workshop on 'Gender and age – impact on working life', ETUI international conference 'Women's Health and Work', 4.3.2015, EU-OSHA, Bilbao. Retrieved 23 May 2016 from: <https://osha.europa.eu/sites/default/files/seminars/documents/5-20150304%20Agnes%20Uherecky%20-%20Coface.pdf>
- Vendramin, P., Valenduc, G. (2014), *A gender perspective on older workers' employment and working conditions*, Working Paper 2014.03, ETUI, Brussels. Retrieved 25 January 2016 from: <http://www.etui.org/Publications2/Working-Papers/A-gender-perspective-on-older-workers-employment-and-working-conditions>
- Weyman, A., Meadows, P., Buckingham, A. (2013), *Extending working life. Audit of research relating to impacts on NHS employees*, NHS Employers, London. Retrieved 9 May 2016 from <http://www.nhsemployers.org/~media/Employers/Documents/Pay%20and%20reward/WLR%20Prelim%20Report%20-%20Annex%206%20-%20Audit%20of%20existing%20research%20full%20report.pdf>

WorkSafe Alberta (2006), *Safety and health. A guide to managing an aging workforce*, WorkSafe Alberta, Alberta, Canada. Retrieved 25 January 2016 from: <https://alis.alberta.ca/pdf/cshop/safehealthy.pdf>

WHO — World Health Organization (2011), *Building healthy and equitable workplaces for women and men: a resource for employers and workers' representatives*, Protecting workers' health series 11, WHO, Geneva. Retrieved 25 January 2016 from: http://apps.who.int/iris/bitstream/10665/77350/1/9789241501736_eng.pdf

WHO — World Health Organization (2003), *Gender, health and ageing*, WHO, Geneva. Retrieved 25 January 2016 from: <http://apps.who.int/iris/bitstream/10665/68893/1/a85586.pdf>

Woolf, A.D., Pflieger, B. (2003), 'Burden of major musculoskeletal conditions', *Bulletin of the World Health Organization*, Vol. 81, No 9, pp. 646-656.

Yeomans, L. (2011), *An update of the literature on age and employment*, HSE, Sudbury, Suffolk. Retrieved 22 January 2016 from: <http://www.hse.gov.uk/research/rrpdf/rr832.pdf>

Appendix A: Summary of findings on the ageing workforce and the implications for occupational safety

The report 'The ageing workforce: implications for occupational safety and health – a research review' (EU-OSHA, 2016a) examined a number of issues related to the ageing workforce, OSH and sustainable work. It was carried out through desk-based research that reviewed existing information relevant to the topic. A summary of the report follows.

Background — why be concerned about ageing and sustainable work?

The proportion of older people in the general population is increasing across the EU. Even more importantly, this ageing of the general population is mirrored by the ageing of the working population, reflecting, in parallel with demographic trends, a number of socio-economic developments. For instance, there has been a push at the European level to increase the employment rate of those aged 55-64 years. Furthermore, many Member States have increased the official pension age to more than 65 for both men and women, and many Member States are planning to increase the retirement age even further. These changes are motivated by concerns regarding meeting state pension costs. An older working population, an increase in the number of years worked and continuing to work at an older age have implications for OSH and sustainable work.

However, economic measures, such as increasing the official pension age, will be successful only if workers are able to work and retain their physical and mental health into retirement. This requires, among others, measures to improve occupational health.

In particular, increasing the pension age has two possible implications for occupational risk prevention and the sustainability of work. Firstly, many occupational diseases and the effects of demanding work develop over time from cumulative exposure; therefore, extending the number of years worked may extend the exposure to hazards and increase the risks of developing occupational diseases or having one's physical ability affected by demanding work. Secondly, the work ability of those aged over 65 years and their continued ability to work in physically or mentally arduous working conditions in particular must be considered. For both of these implications of working for longer, the importance of reducing the exposure to hazards and making work easy for all workers is clear. In 2010, of those aged 50-54 years, 33.7 % did not think that they would be able to do the same job at 60 years of age. However, this overall average masks important differences between sub-groups of the working population: both men and women in low-skilled jobs, which are likely to be more physical in nature, have considerably greater concerns than men and women in professional and managerial jobs⁶.

The ageing of the working population, combined with increases in official pension ages to more than 65 years, means that more employees are likely to develop chronic health problems while still at work, as the prevalence of chronic health problems increases with age. Some of these chronic health problems will have a work-related component. However, regardless of whether work contributes to a chronic health problem or not, policies to promote working for longer and to reduce the incidence of early exit from the workforce need to focus on helping those with chronic diseases function actively at work⁷.

In order for workers to stay in work as they age, attention must be paid to creating good-quality working conditions, with an appropriate work-life balance, employment security and lifelong learning opportunities throughout the working life⁸. This is what is meant by 'sustainable work'.

⁶ Eurofound – European Foundation for the Improvement of Living and Working Conditions (2012), *Sustainable work and the ageing workforce. A report based on the fifth European working conditions survey*, Luxembourg: Eurofound. Retrieved 22 January 2016 from: <http://www.eurofound.europa.eu/publications/report/2012/working-conditions-social-policies/sustainable-work-and-the-ageing-workforce>

⁷ Eurofound – European Foundation for the Improvement of Living and Working Conditions (2014), *Employment opportunities for people with chronic diseases: Executive summary*, Dublin, Ireland: Eurofound. Retrieved 27 April 2016 from: http://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1459en1.pdf

⁸ Eurofound – European Foundation for the Improvement of Living and Working Conditions (2012a), *Employment trends and policies for older workers in the recession*, Dublin.: No EF/12/35/EN. Retrieved 22 January 2016 from: <http://www.eurofound.europa.eu/publications/report/2012/labour-market-social-policies/employment-trends-and-policies-for-older-workers-in-the-recession>

Focus of the review

Creating sustainable working conditions requires a wider understanding and appreciation of the influence of any age-related changes in work capabilities or susceptibilities and the cumulative impact of exposure to risks throughout the working life. This review has collated evidence on the current situation in relation to the challenges of an ageing workforce for OSH. The review examined the following three questions:

- 'What changes occur in ageing individuals within the workforce, and what are the likely impacts of work along the life course on health and ability?'
- 'What are the implications of these changes and the impacts of work along the life course in relation to OSH and sustainable work?'
- 'What OSH measures can be considered to mitigate any potentially adverse safety and health effects and to promote sustainable work along the life course?'

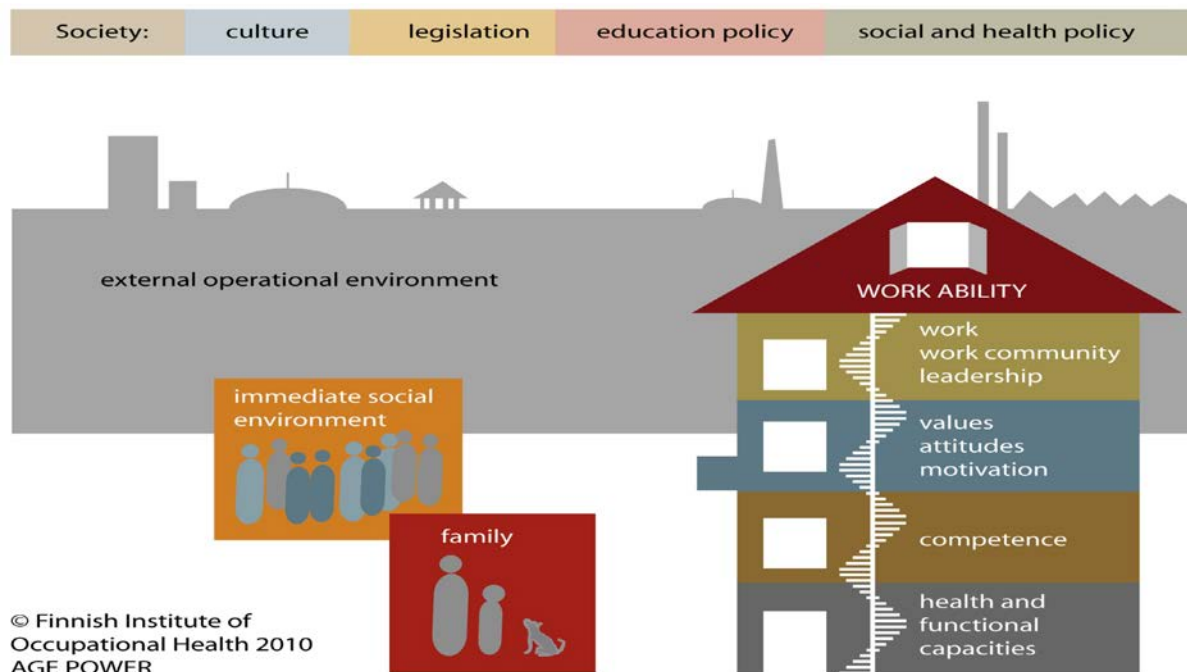
The review recognises that chronological age is not the most appropriate index of a person's abilities or needs and, instead, considers 'work ability', which looks at an individual's resources in relation to the demands of their work.

The review considers OSH factors that influence work ability and sustainable work within and outside the workplace. The report also considers measures to promote sustainable work across the life course. A 'life-course approach' to OSH focuses on improving prevention of risks for all workers, thereby reducing the damage to workers' health throughout life and limiting early exit from the workforce, improving the sustainability of work with high physical demands, and, in addition, making specific accommodations for individual workers if needed. This is key to promoting a longer working life and healthy retirement.

Therefore, when addressing these questions, the report also considers the implications of the cumulative exposure to hazards over the life course, the possible implications of increased cumulative exposure due to longer working lives, and OSH challenges with regard to sustainability over the life course.

There are many different determinants of health and work ability, which are influenced by a variety of interacting factors within and outside the workplace. For example, working conditions are influenced by the culture within a workplace, national OSH policy and services, national health policy and services, and the interaction between these factors. These interactions are represented by the Work Ability House (FIOH), shown in following figure. This report also considers OSH, work ability and sustainable work in this broader context of influences.

Model of work ability⁹



Changes associated with ageing, the impact of work, and the implications for occupational safety and health and sustainable work

A number of key findings were made in response to the question ‘**What changes occur in ageing individuals within the workforce, and what are the likely impacts of work along the life course on health and ability?**’:

- There are a number of *changes to physiological systems with age*, including reductions in aerobic power, muscle strength, stature, dexterity and mobility. The age at which these changes start to take place and the extent of such changes vary widely across individuals.
- *Older workers can often compensate for losses* to work-related functional capacity with strategies and skills gained through experience.
- *Physical strength and endurance is also very specific to individuals*, such that some older workers may be stronger than their younger colleagues.
- *While some cognitive abilities decline with age*, such as memory and reaction time, according to laboratory-based studies, there is evidence that work performance is unlikely to be affected, *as older individuals can generally compensate for any decline* with experience, better judgement and job-specific knowledge. *Strengthening of other mental characteristics*, such as ability to reason and motivation to learn, can also help older workers to compensate for any changes and maintain work performance.
- The *key elements of cognitive performance* important for workplace safety and health, such as intelligence, knowledge and use of language, *do not generally show any marked decrease until after the age of 70 years*.
- Statistical data show that *older workers are more likely than younger workers to suffer from chronic health problems*, such as cardiovascular disorders and musculoskeletal diseases. This does not necessarily affect their work performance and *many chronic diseases are controllable*.

⁹ FIOH – Finnish Institute of Occupational Health, *Multidimensional work ability model*, FIOH. Helsinki. Available at: http://www.ttl.fi/en/health/wai/multidimensional_work_ability_model/pages/default.aspx

- *Chronological age is not the most important determinant of health*, and ageing is not inevitably accompanied by illness and disease. Health is influenced by numerous other external factors, including lifestyle, exercise and nutrition.
- *The extent of exposure to hazards throughout the working life is one external factor that can influence the health of older workers*. For example, health can be affected by long-term exposure to chemical substances or physical work. There can be a long latency period before the effects of exposure are seen, as is the case with exposure to asbestos.
- *In contrast to some stereotypical views of the abilities of older workers, they are an asset to organisations*. Older workers are often more reliable than younger workers and often show a greater level of commitment. Furthermore, turnover and (short-term) absenteeism rates are often lower among older workers than younger workers, and they have a wider diversity of expertise, knowledge and skills.

The key findings that were made in relation to the question **‘What are the implications of these changes and the impacts of work along the life course in relation to OSH and sustainable work?’** are summarised below:

- *Cumulative exposure over the course of working life to a wide variety of physical and chemical agents has implications for occupational health and, therefore, the sustainability of work*.
- *Physiological changes can lead to the deterioration of physical capabilities*. This does not necessarily affect work performance, but can result in a reduced tolerance of certain aspects of physical work. There is evidence that *long-term exposure to demanding work increases the impact of deterioration*.
- While most jobs do not require workers to work at full physical capacity, some older workers with physically demanding jobs may be working at (or close to) the limit of their capacity and may, therefore, be more at risk of musculoskeletal injuries or chronic fatigue than their younger counterparts. However, experience may protect against this to some extent. In other words, *the propensity for injury is related more to the difference between the demands of the work and the worker’s ability to work than to age*.
- In general, *the prevalence of musculoskeletal disorders (MSDs) increases with age*, probably as part of the normal ageing process; however, declining health does not necessarily mean a decline in job-related performance. *Other factors, such as work demands, may have a greater influence on the risk of developing work-related ill health than age*. The increased prevalence of MSDs with age is most pronounced in workers involved in physically demanding jobs, irrespective of age.
- *A worker’s physical capacity or ability to work should be used to determine if they are capable of performing a specific job and the associated risk of MSDs, rather than their age*. Employers may need to provide additional support, including adjustments to the work.
- *Some age-related changes could result in increased risk under certain circumstances*, for example exposure to extreme temperatures or driving at night.
- *Rates of accidents at work associated with more than three days of absence are lower among older workers than among younger workers*. However, older workers are more at risk of a severe or fatal accident. Although less likely to have an accident, older workers take longer to recover from any injury sustained. *Occupation, not age, is the dominant factor that contributes to risk of injury*.
- Generally, the evidence suggests that *work-related stress, anxiety and depression increase with age and then decrease after the age of 55 years*. The causes of work-related stress in older workers are different from those in younger workers. For instance, older workers are more likely to experience stress because of the responsibility they have for other people’s work and the workload, rather than the physical work environment.
- There is evidence that *continuing to work in good-quality working conditions is associated with better physical health and psychological well-being than being out of work*. Good social support at work can contribute to a reduced likelihood of early retirement — workers need to be managed in an age-appropriate manner.

- There is evidence that *some older workers, but not all, have difficulties with shift work* and may need additional support or the option of non-shift work. Age is associated with changes in sleep patterns and a reduced tolerance of routine changes such as those usually associated with shift work. There is some evidence for a link between prolonged exposure to night work and breast cancer.
- The *experience of older workers* may enable them to increase their efficiency in the workplace (by learning to adopt different ways of working).
- Many age-related changes, such as hearing or vision changes, that could affect safety at work can generally be *corrected with simple aids or work adjustments*. This also applies to circumstances in which chronic disease affects performance at work.
- *Measures that make work less demanding for older workers would often benefit all workers*. For example, measures to prevent the development of MSDs as a result of manual handling, repetitive work, and static and awkward postures would benefit workers of all ages.

Chronological age is not the most important determinant of health and performance

The determinants of health status and performance, and the age-relatedness of both, are complex. There are a number of changes that occur across the life course in relation to physiology, psychology and human processing. However, it is apparent that ageing is a very individual process. Chronological age is not the most important determinant of health, and ageing is not inevitably associated with illness and disease. Furthermore, age is not the best indicator of performance or ability. Older workers are vastly different from each other because of the interaction of both external and internal factors with the ageing process. Important external factors include lifestyle, exercise and nutrition. No stereotype of older workers is likely to be true for all, even for the majority of older workers, particularly the belief that chronological age is the most important determinant of health or that older workers take more time off work¹⁰.

One study¹¹ concluded that chronological age is unlikely to be the best predictor of work preferences or ability, and that focusing on older workers may lead to good practice relevant to employees of all ages being overlooked. The authors stated that older workers essentially exhibit the same set of vulnerabilities as workers of other ages, even if considered a relatively high-risk or vulnerable group.

As mentioned above, one external factor that can influence the health and physical capacity of older workers is the extent of exposure to hazards throughout their working life. For example, health can be affected by long-term exposure to chemical substances or physical work, and there can be a long latency period before the effects of such exposure are seen, for example in the case of exposure to asbestos. Dworschak *et al.* (2006)¹² stated that 'If workers are required to perform work under adverse conditions on a permanent basis, they will almost inevitably encounter health and performance problems as they grow older.' Work should maintain physical and mental health, not contribute to its deterioration. However, according to the European Working Conditions Survey (EWCS), workers aged 35-44 and 45-55 years are more likely to report that their health is at risk from work than those aged over 55 years, which has implications for the future health of these workers. Those aged 55 years or over in craft and elementary occupations are more likely to report that they do not think that they will be able to work until they are 60 years old than those in managerial or professional jobs. Therefore, to

¹⁰ Benjamin, K. & Wilson, S. (2005), *Facts and misconceptions about age, health status and employability*, Health and Safety Laboratory, HSL/2005/20, Buxton, UK. Available at: http://www.hse.gov.uk/research/hsl_pdf/2005/hsl0520.pdf

¹¹ Weyman, A., Meadows, P. & Buckingham, A. (2013), *Extending working life. Audit of research relating to impacts on NHS employees*, London, UK: NHS Employers. Retrieved 22 January 2016 from: <http://www.nhsemployers.org/~media/Employers/Documents/Pay%20and%20reward/WLR%20-%20Extending%20Working%20Life%20-%20An%20audit%20of%20research%20relating%20to%20impacts%20on%20NHS%20Employees%20May%202013.pdf>

¹² Dworschak *et al.* (2006, cited in Weyman *et al.*, 2013). See footnote 10.

ensure that work is sustainable, it is important that it helps to maintain physical and mental health and does not contribute to its deterioration^{13 14}.

Demands of work: work ability — an individual's resources in relation to work demands

As mentioned above, age-related changes happen to individuals at different ages and to differing degrees, and may also be compensated for at work, so may not affect work performance. It should also be recognised that age-related changes are not the only factors that affect the ability to work. Whether any such change affects work performance or not also depends on the nature of the work itself, or, in other words, the demands of the work. The concept of 'work ability' looks at an individual's resources in relation to the demands of a particular job.

It is difficult to predict the effects that age-related changes may have on the work ability of those aged over 65 years, who will now more often continue to work because of increases in official pension ages. The effects of continuing to work longer may be both positive, in terms of keeping people active, and negative, in terms of exposure to occupational hazards.

Health problems may not or need not necessarily affect work performance

An individual's health may change with age, but age is not necessarily the best determinant of health status. In addition, having an illness does not necessarily mean that an employee's work will be affected. In certain cases, adjustments to work can enable an employee with a health problem to continue working. Evidence also suggests that, in general, good work has a positive effect on both physical and mental health and well-being, while not working has been associated with poor physical and mental health. The biggest barrier to working with a health problem may be employers' attitudes, rather than the health condition itself.

Work should be made easier and healthier for all, with specific measures for individuals if needed

According to the concept of 'sustainable work', workplaces should promote the health of workers of all ages and support those who have health conditions. This suggests that the first priority should be to improve risk prevention measures and make work easier for the benefit of all workers across the work-life course, especially in the case of mentally or physical demanding work, but also with regard to work that is associated with the risk of developing MSDs, such as working in awkward postures. It would appear that the workers who are most likely to have problems later in life if their ability to work declines, because their work is particularly demanding, are also most likely to have their health compromised by their work.

Although physical capabilities may decline with age, this need not necessarily affect work performance. Many changes, such as age-related vision changes, can be corrected by either personal equipment or simple workplace adaptations. In many cases, adjustments can be made to specific tasks. However, if such adjustments are not possible, the transfer of workers to less demanding work should be considered in order to retain experienced workers. Evidence suggests that the consideration of work ability — an individual's resources in relation to the demands of the work — is the most appropriate way of determining whether or not any changes in a worker's health or capabilities puts them at an increased risk from their work.

Older workers should be viewed as an asset

Finally, older workers have been identified as a valuable asset to organisations, because they are often more reliable than younger workers and often show a greater level of commitment. Furthermore, turnover and (short-term) absenteeism rates are often lower among older workers than younger workers, and they have a wider diversity of expertise, knowledge and skills¹⁵. It is important to be objective about

¹³ Eurofound – European Foundation for the Improvement of Living and Working Conditions (2012b), *Sustainable work and the ageing workforce. A report based on the fifth European working conditions survey*, Luxembourg: Eurofound. Retrieved 22 January 2016 from: <http://www.eurofound.europa.eu/publications/report/2012/working-conditions-social-policies/sustainable-work-and-the-ageing-workforce>

¹⁴ Eurofound – European Foundation for the Improvement of Living and Working Conditions (2015), 'First findings: Sixth European Working Conditions Survey', Retrieved 3 May 2016 from: https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1568en.pdf

¹⁵ Harrison and Higgins (2006) cited in Okunribido, O. & Wynn, T. (2010), *Ageing and work-related musculoskeletal disorders: A review of the recent literature*, UK, HSE: Research Report 779. Available at: <http://www.hse.gov.uk/research/rrpdf/rr799.pdf>

the performance of older workers and counteract the stereotypical views of the abilities and attitudes of older workers that some employers may have.

Occupational safety and health measures and systems that support sustainable work and mitigate any potentially adverse effects on safety and health

The findings related to the question ‘**What OSH measures can be considered to mitigate any potentially adverse safety and health effects and to promote sustainable work along the life course?**’ are discussed in the following sections.

Models of sustainable work

In terms of OSH, the concepts of ‘sustainable work’ and the ‘life-course approach’ can be used to inform an integrated approach to improving working conditions for all, along with considering the individual changes that can occur with ageing and the implications of these changes for workplace safety and health. Various models have been put forward to help us understand the multifaceted nature of sustainable work. These models reflect the various influences from both within and outside the workplace and, therefore, highlight the importance of an integrated policy approach that includes an OSH component.

The four models briefly summarised in the review were selected because of their relationship to OSH, but also because they differ in their perspectives on other factors. These models are:

- the work ability concept¹⁶;
- a model to monitor sustainable employability¹⁷;
- the conceptual framework on age and employment¹⁸;
- the schema for understanding the domains encompassed by sustainable work¹⁹.

These four models of sustainable work present the various complex and interacting elements that can influence the sustainability of work and the work ability of individuals, and therefore the continuation of or early exit from work of those individuals. By improving understanding in this way, these models can help to inform improvements in policy and interventions aimed at retaining older workers in the workforce. The work ability concept (FIOH, 2010) has already been described above.

Occupational safety and health measures and systems to support sustainable work

The models described above depict influencing factors from within and outside the workplace. The report examined two important influences: the safety and health of working conditions, and the OSH systems, legislation and policy needed to ensure that safe and healthy working conditions are maintained, including the interaction between OSH and other policy areas such as health, social policy, employment and education in the context of sustainable work.

There is evidence that OSH performance needs to improve if the EU is to prolong the working life of its workforce, especially in some demanding jobs. According to the European Working Conditions Survey, significant proportions of the workforce report exposure to challenging working conditions such as painful and tiring positions, working at high speed or adverse social behaviour²⁰). Long-term exposure to such working conditions could lead to early exit from employment.

¹⁶ FIOH – Finnish Institute of Occupational Health, *Multidimensional work ability model*, FIOH. Helsinki. Available at: http://www.ttl.fi/en/health/wai/multidimensional_work_ability_model/pages/default.aspx

¹⁷ TNO (2012), *Model developed to monitor sustainable employability*. Retrieved 25 January 2016 from: <http://publications.tno.nl/publication/100446/zzqzb5/kraan-2012-model.pdf>

¹⁸ Hasselhorn, H.M., Peter, R., Rauch, A., Schroder, H., Swart, E., Bender, S., du Prel, J-B, Ebener, M., March, S., Trappmann, M., Steinwede, J. & Muller, B.H. (2014), ‘Cohort profiles: The lidA cohort study – a German cohort study on work, age, health and work participation’, *International Journal of Epidemiology*, Vol. 43, No 6, pp. 1736-1749

¹⁹ Eurofound – European Foundation for the Improvement of Living and Working Conditions (2015b), *Sustainable work over the life course: Concept paper*, Publications Office of the European Union, Luxembourg. Retrieved 23 January 2016 from: <https://www.eurofound.europa.eu/fr/publications/report/2015/working-conditions/sustainable-work-over-the-life-course-concept-paper>

²⁰ Eurofound – European Foundation for the Improvement of Living and Working Conditions (2015), ‘First findings: Sixth European Working Conditions Survey’, Retrieved 3 May 2016 from: https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1568en.pdf

Improved risk prevention for all workers

Key finding: *In relation to OSH, sustainable work consists of two main elements, both of which are covered by the European legal framework on OSH: (1) ensuring work does not damage physical or mental health across the life course, by controlling risks to all workers (generic measures); and (2) taking additional steps if and when necessary to protect any particularly vulnerable groups or individuals.*

Therefore, the first OSH priority, in terms of sustainable work, is to ensure that working conditions do not negatively affect workers' health or their work ability, or, put another way, to ensure that work positively contributes to the maintenance of workers' physical and mental health across the work-life course. To achieve this, continued efforts are needed to improve risk prevention and make work easier and safer for the benefit of all workers. Various measures that would make work easier for all workers have been identified in this report.

Specific measures for older workers if and when necessary

In addition to good OSH management aimed at reducing risks to all workers, additional specific measures are also needed for older workers if and when necessary, depending on the type of work and the individual, so that their work can be organised in a way that allows them to continue to work in a safe and healthy manner. This needs to be done on an objective basis, in order to avoid discrimination and actions being based on stereotypes of older workers. This implies that a diversity-sensitive risk assessment approach is needed. It is proposed that the assessment of work ability of individual workers could also be used as part of an OSH management approach based on risk assessment. Work ability assessment may be especially applicable to demanding working conditions. The report has identified various, often simple, accommodations that can be made to allow those with changed abilities or health conditions to continue working.

Key finding: *'Work ability' refers to an individual's resources (for example, physical capacity, attitudes, experience) in relation to work demands (for example, work content, work environment, work culture). The work ability concept has been incorporated into a self-assessment tool, the Work Ability Index, which can assist with the early identification of risks to individual workers in order to counteract them.*

Occupational safety and health risk prevention measures and workplace accommodations

Various measures have been identified in this report that would make work easier for all workers, including changing the way tasks are carried out to avoid or reduce physically demanding work, exposure to repetitive work or dangerous substances, etc.; using equipment to make work easier; and improving career progression to avoid prolonged exposure to risks (in relation to, for example, highly repetitive work, which is often carried out in some female-dominated types of work).

In particular, measures to prevent the development of MSDs, caused by manual handling, repetitive work, or static and awkward postures, would benefit all workers and contribute to the sustainability of work. Taking frequent breaks and the use of properly adjusted ergonomic workstations is suggested for computer-based work.

The report has also identified various, often simple, accommodations that can be made, including the use of personal devices or equipment, or changes to working hours, tasks or roles, to enable individuals with reduced work ability or changes in health to remain in work.

Key finding: *OSH measures to make work easier for all and workplace accommodations to allow workers with declines in health or performance to remain in work are often very simple.*

General mitigating measures

In summary, the report has identified the following **key measures that can mitigate** adverse effects on safety and health:

- *A comprehensive approach to age management in the workplace, to promote sustainable work and counter the effects of ageing, includes OSH, health promotion and human resources measures.*
- *Risk assessment can support sustainable working by being used to identify risk prevention measures to improve working conditions for the whole workforce or identify measures for*

specific groups or individuals. Work ability evaluation can be used as part of risk assessment. OSH aspects of age management can be accommodated within the normal workplace risk assessment and management process.

- *Health surveillance monitoring over time and access to occupational health services* are issues that need to be addressed, particularly for temporary workers and small businesses.
- *Ergonomics has an important role to play* in reducing the demands of work for all workers and making specific adjustments for groups of workers or individuals.
- *Workplace health promotion interventions should be age appropriate, gender appropriate and inclusive of all age groups.*
- *Older workers can often benefit from appropriate flexible working arrangements*, allowing them to accommodate other activities such as responsibilities as carers or to facilitate working with health problems. Social policy also influences whether or not workers can combine caring responsibilities and work.
- *Other measures* include maintaining up-to-date skills and knowledge, with training methods adapted to different age groups; and viewing older workers as an asset and developing their roles, for example through training and mentoring of younger, less experienced workers.
- The *prevention of injury and ill health in younger workers* is an essential part of a sustainable work approach. The promotion of 'healthy schools' and risk education in schools is also part of a lifelong approach.
- *Rehabilitation* should be focused on staying in work, and early interventions are crucial. Rehabilitation programmes should be interdisciplinary. Simple workplace accommodations can often allow workers with chronic diseases to remain in work. More needs to be done to support individuals living with chronic MSDs, who are either in work, or planning to return to work in future.
- *Specific gender-related issues*, in relation to sustainable work, need to be taken into account, as in any other OSH area. Such issues include reducing the high demands of certain jobs in which women predominate, for example health care and cleaning; workplace measures to support women going through the menopause; the double workload of family carers; and equal access to rehabilitation services.
- *A sector- or job-specific approach* allows interventions to address the specific work challenges identified and takes account of the specific context. Many of the measures identified to reduce workloads in specific sectors would benefit all workers in the sector.

The figure below was produced by the Federal Institute for Occupational Safety and Health (BAuA) in Germany to depict various measures in the workplace that contribute to work ability and sustainable work.

How to improve work ability and promote sustainable work in the workplace²¹



Support of OSH systems to promote sustainable work

Key finding: As suggested by the models, an effective OSH system is needed to support the approach to sustainable work of combining improved protection for all workers with measures for individuals at greater risk as and when necessary.

Elements of an effective OSH system and the tools it requires include: legal measures; enforcement; services available to enterprises and organisations, such as occupational health services; incentives; awareness raising and campaigns; knowledge and solutions; networking for exchange of good practice; and cooperation between employers and workers, for example through tripartite advisory committees²². All of these areas are relevant to achieving sustainable work.

As mentioned above, the European OSH legal framework is based on risk assessment and combines the collective measures of protecting all workers as the priority with work adapted to individual workers and measures to protect vulnerable groups. This framework is supportive of achieving sustainable work if effectively implemented. The promotion of well-being in addition to risk prevention requirements is likely to increase the impact of legislation with regard to supporting sustainable work. The modern labour inspectorate combines enforcement activities with the provision of support, advice and information to workplaces. To carry out these roles, a labour inspectorate needs to be equipped with the appropriate tools and expertise to apply its activities to a diverse workforce.

The importance of access to occupational health services, including health surveillance throughout the working life, has been highlighted as an issue in this report. This is a problem particularly for small businesses and temporary workers, such as construction workers or cleaners, many of whom may be migrants and perform the most demanding work. The provision of basic occupational health services linked to primary health care has been suggested as one way to greatly increase the coverage of small businesses and workers not covered by employers' occupational health systems or work insurance systems. Small businesses in particular need access to OSH support in general, for example for risk assessment, and especially with regard to assessments of individual workers and for determining risk prevention measures and suitable workplace adjustments for individuals. A sector-based approach may be most effective for small businesses and could be more easily targeted to their specific needs.

Work-focused rehabilitation services are also highlighted in this report as being of key importance for workers and also small businesses. This implies the need for an integrated approach between health and social policy and employment and OSH policy, as covered by the models.

²¹ Sedlatschek, C, INQA project, BAuA, (undated).

²² Takala J, Urrutia M, Hämäläinen P, Saarela KL. (2009), 'The global and European work environment – numbers, trends, and strategies', *Scandinavian Journal of Work, Environment and Health Suppl*, 7, pp 15–23

Awareness raising campaigns should be implemented to disseminate the benefits of older workers to a workplace and raise awareness of those elements of the workplace that are not suited to their needs²³. However, this is likely to have a greater impact if combined with support and incentives for small and medium-sized enterprises (SMEs) to improve OSH, and to take measures to accommodate older workers or carry out workplace health promotion activities.

Continued research into OSH in general, and in relation to the ageing workforce in particular, is needed to improve knowledge and solutions. Existing OSH knowledge and best practice needs to be shared, including best practice on how to support small businesses in the context of an ageing workforce. OSH authorities and organisations need to take a strategic approach to achieving sustainable work. The most effective way to do this is likely to be by incorporating or mainstreaming age and other areas of diversity throughout their strategy and practices. The diversity strategy of the Austrian Labour Inspectorate is a good example of how this can be done.

OSH systems can also promote a life-course approach that starts before working age, through cooperation with education policy, to embed risk education in school curriculums and promote health in schools, including through raising awareness of the ergonomics of furniture and other elements that could contribute to the development of MSDs.

Integrated policy approach

Key finding: As depicted in the conceptual models relating to sustainable work, *improving the retention of older workers is not just a function of maintaining their health and capacity and providing quality working conditions, but it is also essential to take other inter-related factors into account*, including motivation, learning opportunities and broader socio-political and institutional factors, such as income distribution, and pension and tax regimes.

There are many social and economic factors which interact to influence strongly health and wellbeing²⁴ and also skills and motivation to work. As mentioned above with regard to rehabilitation, the models for sustainable work depict how various policy areas outside the workplace interact in the context of the sustainability of work, emphasising the importance of an integrated policy and services approach that includes OSH.

Given the evidence of persisting risks, especially in some sectors, considerable improvements to OSH are needed in many instances to prolong working lives. In cases in which work demands exceed an individual's work ability, because of the working conditions or declines in workers' health, even after accommodations have been made, there will need to be provisions for them to either change to another field of work entirely or exit from the workforce. Therefore, complementary policies and services are needed to support workers who, unavoidably, have to exit employment early. This, again, underlines the importance of an integrated policy approach.

Gaps in the knowledge

Finally, the review identified a number of evidence gaps. An improved understanding is needed of how to make work sustainable for all ages and promote work ability and the needs of workers throughout the life course. More evidence is needed on the effectiveness of potential interventions on workers of any age. Furthermore, more knowledge is needed in relation to extending the working life beyond 65 years of age, for example in relation to work capacity and a potential increase in the length of exposure to work hazards.

Overall conclusions and possible policy implications

Economic measures, such as increasing the official pension age, will be successful only if workers remain able to work and retain their physical and mental health into retirement. Work should allow the maintenance of physical and mental health, not contribute to its deterioration.

²³ Okunribido, O. & Wynn, T. (2010), *Ageing and work-related musculoskeletal disorders: A review of the recent literature*, UK, HSE: Research Report 779. Available at: <http://www.hse.gov.uk/research/rrpdf/rr799.pdf>

²⁴ Marmot, M. (2013), *Health inequalities in the EU. Final report of a consortium*, Consortium lead: Sir Michael Marmot, European Union. Available at: http://ec.europa.eu/health/social_determinants/docs/healthinequalitiesineu_2013_en.pdf

The overall aim of OSH in relation to sustainable work is to limit early exit from the workforce and ensure that working allows healthy workers to maintain their physical and mental health throughout their work-life course, and remain healthy into retirement.

While many changes in health and ability can be linked to age, ageing is not necessarily associated with ill health or declining performance. There is a huge variation in health and ability among workers of the same age. In addition, older workers can often compensate for losses to work-related functional capacity with strategies and skills gained through experience. The focus of OSH in relation to age management should be on work ability in relation to work demands, not chronological age.

Cumulative exposure to demanding work across the work-life course can have a significant impact on health and functional ability, so is a particular concern with regard to sustainable work.

There is evidence that continuing to work under good-quality working conditions is associated with better physical health and psychological well-being than being out of work.

Improved OSH management to reduce risks and make work easier for all workers could have a significant impact on the sustainability of work. A life-cycle approach to OSH and sustainable work is needed for the health of workers to be maintained.

Specific measures for older workers should be taken if and when necessary — depending on the type of work and the individual — and should avoid discrimination and not be based on stereotypes of older workers.

Measures to make work less demanding would often benefit all workers, for example measures to prevent MSDs caused by manual handling, repetitive work, and static and awkward postures.

The tool of risk assessment can support sustainable working by identifying risk prevention measures to improve working conditions for the whole workforce or identifying measures for specific groups or individuals. OSH aspects of age management can be accommodated within the normal workplace risk assessment and management process. Individual work ability assessments can be used as part of risk assessment.

Often simple workplace accommodations can allow workers with health or performance declines to remain in work. In the workplace, human resources and OSH departments should cooperate on age management and related measures.

Older workers often benefit from flexible working arrangements, allowing them to accommodate other activities such as responsibilities as carers.

Effective, robust OSH systems are needed that are equipped to support SMEs and atypical workers and that have diversity issues mainstreamed into their strategy and actions. Access to basic occupational health services is an issue for small businesses, and health surveillance across the work-life course is needed for those workers not currently covered. OSH systems should promote well-being at work, as well as improved risk prevention measures, to achieve sustainable work.

If effectively implemented, the European OSH legal framework, based on risk assessment, combining collective measures to protect all workers as the priority with work adapted to the individual worker and measures to protect vulnerable groups, is supportive of achieving sustainable work.

A sector-based approach may be most effective for small businesses and can be more easily targeted to their specific needs.

Many factors influence the sustainability of work, from both within and outside the workplace. The integration of policies and services is needed, including between OSH, employment, education, and public health and social security, both to promote sustainable work, in order to minimise early exit from employment, and to make provisions for those who, unavoidably, need to change occupations or exit the labour market.

A comprehensive approach to age management would incorporate the fields of OSH, health promotion and human resources.

As with all areas of OSH policy, gender-related issues should be taken into account in relation to sustainable work.

Further research is needed, including in relation to demanding work and working sustainably after the age of 65 years. Sharing experiences of strategy development and the implementation of interventions should be promoted.

Older workers are valuable assets to organisations. Increased efforts are needed to counter stereotypical views and discrimination, and support organisations in prolonging the working lives of their employees.

Appendix B: Search protocol and selection methodology

In addition to the previous studies by EU-OSHA on gender and OSH and by Eurofound on gender and work sustainability, this review was informed by a literature research.

The methodology used for the literature search can be summarised as follows

A number of different approaches were taken to identify relevant research and resources for this review, in line with the search protocol. Firstly, an assessment of the academic literature was carried out. Secondly, searches were performed on relevant EU and research institutes' websites. Finally, a search identified other grey literature using Scirus and OpenGrey.

A particular focus was given to identifying systematic reviews, meta-analyses, literature reviews, guidance and grey literature.

An initial screening was carried out independently by two researchers. Full publications were obtained of the selected documents for those documents that were deemed to fit these inclusion and exclusion criteria. Two researchers independently analysed the full texts and a joint decision was made on those to include in the review.

Information from the literature search was supplemented with references to projects and recommendations arising from various non-governmental organisations and other organisations active in the field at both European and national levels, particularly with regard to possible strategies or measures to promote sustainable work.

Search protocol

A search protocol was developed consisting of the following elements:

- What gender-differentiated data are there in relation to changes in patterns of retirement across the EU?
- What are the main hazards for older female workers, by sector?
- What is the impact of health promotion for older female workers?
- What is the impact of early intervention for OSH and health promotion for younger female workers?

The following describes the search protocol that was used.

Topics to be addressed by the reviews

The search material will provide the information basis for the topics required in the technical specifications document, so that the following is included:

- An overview of demographic change, changing retirement patterns and the societal and business costs of ignoring OSH.
- An overview of OSH issues and older workers, including the realities and myths about age and work, older workers' capability to change and the impact of individual differences
- Information on ensuring a holistic approach to OSH for everyone (including the promotion of sustainable work across the life-course) , taking into account diversity, access to occupational health and support for enterprises, in particular small and medium-sized enterprises and micro enterprises.
- An overview of OSH and younger workers and the importance of the maintenance of OSH at a younger age to ensure lifelong employability.
- Information on WHP and older workers — what works and what does not.
- Information on hazards for older workers in relation to sectors and other risk factors.
- An overview of the interaction between OSH policy and older workers, considering other policy areas including employment, health, research and education
- A summary of key OSH statistics in relation to age including injury, health, work disability and, if available, return to work.

Building research questions

1. What gender dimensions have an impact on OSH for older workers?

Search strategy for the review

Population

- Adult
- Employed
- Employee
- Worker
- Ageing worker
- Older worker
- At work
- Economically active
- Younger worker
- Greying workforce
- Active ageing models
- Life course
- Gender

Intervention

A broad definition of the term ‘intervention’ was used, ranging from large-scale intervention studies to smaller scale workplace design changes, management training courses or safety and health considerations, with the following search terms used:

- Measurement of impact of occupational safety initiative
- Measurement of impact of occupational health initiative
- Measurement of impact of health promotion initiative
- Ergonomics
- Health promotion
- Occupational safety
- Occupational health and safety
- Occupational health
- Occupational medicine
- Occupational hygiene
- Worker protection
- Risk control
- Risk reduction
- Training for employees
- Training for managers
- Age management
- Rehabilitation
- Return to work
- Work disability
- Education

Outcomes

- Reduction/increase in ill health
- Reduction/increase in sickness absence reporting
- Reduction/increase in accidents
- Reduction/increase in capability
- Extended working life
- Improvement/decline in retention of workers
- Improvement/decline in morale

- Improvement/decline in work ability
- Improvement/decline in management style
- Improvement/decline in mental well-being
- Improvement/decline in employability
- Reduction in premature departure from work

Publication types

- Systematic reviews
- Reviews
- Guidance
- Guidelines
- Reports
- Articles

Inclusion criteria

- Employed
- Employed but not working
- Voluntary work
- Published post-2000

Exclusion criteria

- Economically inactive
- Published pre-2000

Search databases

For academic research, the following databases were used to identify published reviews:

- Embase
- Medline
- PsycINFO
- SciSearch
- Sociological Abstracts
- Social Sciences Citation Index
- Social Policy & Practice
- Social SciSearch

Grey literature searches were also carried out using databases such as Scirus and OpenGrey. Further websites that were searched include:

- EU-OSHA
- ENWHP (European Network for Workplace Health Promotion)
- DG SANCO
- DG EMPL (European Commission's Directorate General for Employment, Social Affairs and Inclusion)
- DG SANCO (European Commission's Directorate General for Health and Consumer Protection)
- ETUC/ETUI (European Trade Union Confederation/European Trade Union Institute)
- BusinessEurope
- UEAPME (European Association of Craft, Small and Medium-sized Enterprises)

- CEEP (European Centre of Employers and Enterprises providing Public Services)
- ILO (International Labour Organization)
- WHO (World Health Organization)
- NIOSH
- Mental Health Europe
- European Social Network
- EuroHealthNet
- TAEN (The Age and Employment Network)

Each study was assessed on external validity and its applicability to the target population and to the settings defined in the scope. The following phrases were used to evaluate the evidence in relation to each research question:

- likely to be applicable across a broad range of populations and settings
- likely to be applicable across a broad range of populations and settings, assuming it is appropriately adapted
- applicable only to populations or settings included in the studies — the success of broader application is uncertain
- applicable only to settings or populations included in the studies.

Identification of Member States' OSH websites and searches for relevant material

This included a request sent to EU-OSHA's focal points for relevant reports and tools available within each nation state. Experts involved in the project for each country were also asked to supply relevant reports, documents and tools for this component of the work.

Screening of titles, abstracts and full texts

Details of all relevant publications identified in the search, including title and abstract (where available), were stored in a RefWorks database. Initial screening of the titles and abstracts was carried out independently by two researchers using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The inclusion criteria were:

- research on the employed, whether working or not;
- research on those in voluntary work;
- documents published in English, after 2000.

Exclusion criteria reflected the reverse of the inclusion criteria:

- research on the economically inactive;
- documents not published in English;
- documents published before 2000.

For those documents that fit the inclusion criteria, the full publications were obtained. Emphasis was placed on systematic reviews, meta-analyses, literature reviews, guidance and grey literature, with data extraction carried out on the included publications. Data were extracted for each of the included publications to summarise and evaluate the evidence presented. The following screening procedure was used:

- Initial screening of title and abstracts (without looking at full text)
- By two independent reviewers
- Score all abstracts
 - Score 1 = potentially eligible study
 - Score 0 = irrelevant for research question(s)
 - Score 2 = interesting paper for introduction or discussion but not answering research question (s)

- Reason for excluding paper should not be documented
- No consensus needed between reviewers
- Screening of full-text articles
- Order all papers that received a score of 1
- Development of scoring sheet with inclusion and exclusion criteria and add scoring YES/NO
- All full texts have to be scored by two independent researchers
- Consensus needed between reviewers

Limitations of the research reviewed

When evaluating research in the field of ageing and gender, research study design is an important consideration, and there is little longitudinal research to draw upon (i.e. research where the same sample or group of people has been followed up over a period of time). Comparing this with cross-sectional research, where different groups of people are evaluated at one point in time, or even where repeated cross-sectional groups have been evaluated at different times, can cause bias in results when identifying differences or similarities between groups. This is essential when examining age-related change, as comparison groups may have important differences (e.g. fit individuals over the age of 60 years versus unfit 30-year-olds).

Other types of research in this area have a number of additional inconsistencies. Different reporting and recording systems are used internationally, making the collation and comparison of data from different countries difficult. In addition, the categories used to break down age groups often differ between studies, which has an impact on accurate comparisons. In some studies, 'ageing workers' may wrongly be regarded as a homogeneous group (e.g. all those 55 years and older). Finally, the widespread previous assumption of retirement at a certain age (usually 65 years) results in a lack of data available on workers over 65 years old, which should be noted as a limitation for the evidence base.

Appendix C: Features of good practice: summary of findings (Weyman *et al.*, 2013)

Components of good practice Six domains: recruitment & retention; occupational health; education, training, development & promotion; flexible working, systems of work and ergonomics design; changing the attitudes of people towards older workers and evidence based measures of organisational performance to support this...A focus on older workers risks masking elements of good practice relevant to employees of all ages. While older workers might be considered a higher risk or more vulnerable group they essentially exhibit the same set of vulnerabilities as workers of other ages.

Identified features of employer good practice and selected key points made in relation to these features by the authors:

- work ability perspective – extend beyond individuals, to a more holistic perspective on systems of work and the configuration of work, orientated around sustaining older employment.
- defining older workers – chronological age unlikely to offer the best predictor of work preferences or ability and risks masking elements of good practice relevant to employees of all ages. Older workers might be considered a higher risk but essentially exhibit the same set of vulnerabilities as workers of other ages.
- organisational learning – an organisational epidemiological perspective focused on profiling which groups are at risk, from what, and in what way(s) offers the potential for a strategic approach to intervention.
- occupational health – a proactive approach to prevention of harm and promotion of well-being focused on (1) systems of work and (2) individuals.
- ergonomics – changes to work design and bespoke solutions for individuals.
- part-time and flexible work - employers need to do more than simply offering flexible options, adopting a proactive, managed approach.
- training and personal development – a managed process needed. Managers, particularly line managers need training in the principles of good practice for managing an older workforce.
- line management role – a challenging and key role in the management of older worker issues. Support needed.
- countering age discrimination – focus on enhancing capacity to work and actions to challenge (employees' beliefs of) age discrimination by managers and employers.
- organisational culture and climate - impact on the experiences and behaviour of older employees in relation to work and retirement.

Occupational health and well-being	Source
Monitor demographic patterns of sickness absence and presenteeism to identify vulnerable groups by job role and gather epidemiological data on known risk factors	Ilmarinen (1999), Capita (2012), Weyman (2012)
Sustainable lifestyle health promotion	EHEA (1993), NPAW (2000), Black (2008), Ilmarinen (2012), Smeaton <i>et al.</i> (2012)
Management standards for stress at work	Cox <i>et al.</i> (2009), HSE (2013)
Apply management standard principles to non-stress issues (e.g. MSDs)	Biron <i>et al.</i> (2012), Weyman <i>et al.</i> (2012), Karanika-Murray and Weyman (2013)

Occupational health and well-being	Source
Managed approach to accessing treatment and rehabilitation in work — extending this to individual case managers	Black (2008), Borman (2009), Black and Frost (2011)
Regular individual health monitoring (e.g. for 40+ age group)	Black (2008), Borman (2009), Black and Frost (2013)
Limit exposure to heavy physical and high-stress work	Griffiths (2000), Watson <i>et al.</i> (2003)
Regular individual work ability assessment — using risk assessment and management principles (avoiding limiting the work ability assessment to only health elements)	Ilmarinen (1999, 2012), Capita (2012)
Ergonomics	
Physical work environment — consider lighting levels, noise levels and thermal environment	EHEA (1993), Walker and Taylor (1999), NPAW (2002), Australian Public Safety Commission (2003), Siegenthaler <i>et al.</i> (2008)
Job design — promote employee control and autonomy over their work; reduce physical loads; set appropriate work rate standards, production targets and workloads	
Equipment design — considering dexterity and ease of use issues; inclusive design; rehabilitative adaptations	
Shift working	
For workers aged 45-50+, extend recovery periods; minimise exposure to long shifts (e.g. 12 hours), night work and rotating shifts	Costa and Sartori (2007), Costa and Di Milie (2008)
Flexible work	
<p>Where possible increase the availability of:</p> <ul style="list-style-type: none"> hours of work part-time work flexi-time annualised hours compressed hours job-sharing home working unpaid leave special leave (e.g. for caring responsibilities) phased retirement 	<p>Widely cited. See, for example:</p> <p>NPAW (2000), Watson <i>et al.</i> (2003), Davey (2007), Lewin Group (2009), Capita (2011), Philipson and Itzin (2012), Smeaton <i>et al.</i> (2012), DWP (2013)</p>
<p>Involve employees' representatives in devising options (all ages)</p> <p>Mixed-age teams</p>	<p>NPAW (2000), Siegenthaler and Brenner (2008), Tikkanen (2012)</p>
<p>Survey on employees' views on attractive options (including demographic differences)</p>	<p>Siegenthaler and Brenner (2008)</p>
Training and development	

Occupational health and well-being	Source
Equalise opportunities by age — lifelong learning	Walker (1999), Dworschak <i>et al.</i> (2006), Cedefop (2012)
Take a managed, bespoke, individualised approach to increase participation rates	NPAW (2000), Davey (2007), Renkema and van der Kamp (2012), Tikkanen (2012)
Migrate older workers to mentoring roles for younger employees	Saba <i>et al.</i> (1998), Lewin Group (2009)
Opportunities for promotion (including part-time staff)	Saba <i>et al.</i> (1998)
Carer change re-training options	Dworschak <i>et al.</i> (2006), Larsen (undated)
Refresher courses for returning workers	Watson <i>et al.</i> (2003)
Train managers (in particular line managers/supervisors) in managing older worker issues	Walker and Taylor (1998), NPAW (2000), Murray and Syed (2005), Philipson and Smith (2005), Armstrong-Stassen (2008), Smeaton <i>et al.</i> (2012), DWP (2013)
Recruitment and retention	
Formal individualised (whole) career planning — linked with staff review procedures	Saba <i>et al.</i> (1998), Walker and Taylor (1998), Buck and Dworschak (2003), Clas and Heymans (2006), Dworschak <i>et al.</i> (2006), Siegenthaler and Brenner (2008), Larsen (2012), Philipson and Itzin (2012), Smeaton <i>et al.</i> (2012), Tikkanen (2012), DWP (2013), Larsen (undated)
Collate reasons for quitting — exit interview data	Shacklock <i>et al.</i> (2005), Capita (2012)
Embed extending working life (EWL) in broader equal opportunities/diversity policies	Walker and Taylor (1998), Smeaton <i>et al.</i> (2012), Tikkanen (2012)
Remove age barriers in recruitment procedures	Walker (1999)
Focus on contextual (psychosocial and socio-technical) elements — not just (individual) capacity to work	Clas and Heymans (2006), Ilmarinen (2012), Tikkanen (2012)
Remove redundancy options that target older workers	Capita (2011)
Well-defined opportunities for horizontal moves and voluntary down-shifting — by profession/job role	Dworschak <i>et al.</i> (2006), Smeaton <i>et al.</i> (2012)

Organisational culture and learning

Visible senior management commitment to EWL policies	Walker and Taylor (1998), Siegenthaler and Brenner (2008)
Barometer measure(s) of employee EWL aspirations, intentions	Shacklock <i>et al.</i> (2005)
Barometer audit measure(s) of adherence to good practice	NPAW (2000), Philipson and Itzin (2012)

The European Agency for Safety and Health at Work (EU-OSHA) contributes to making Europe a safer, healthier and more productive place to work. The Agency researches, develops and distributes reliable, balanced and impartial safety and health information and organises pan-European awareness-raising campaigns. Set up by the European Union in 1994 and based in Bilbao, Spain, the Agency brings together representatives from the European Commission, Member State governments, employers' and workers' organisations, as well as leading experts in each of the EU Member States and beyond.

European Agency for Safety and Health at Work

Santiago de Compostela, 12 – 5th Floor
48003 Bilbao, Spain
Tel. +34 944-358-400
Fax +34 944-358-401
E-mail: information@osha.europa.eu
<http://osha.europa.eu>

