European Agency for Safety and Health at Work

EN

Occupational safety and health in Europe: state and trends 2023

European Agency
for Safety and Health
at Work

Safety and health at work is everyone's concern. It's good for you. It's good for business.

Luxembourg: Publications Office of the European Union, 2023

Print ISBN 978-92-9479-934-0 doi: 10.2802/26873

PDF ISBN 978-92-9479-935-7 doi: 10.2802/56459

The photographs used in this publication illustrate a range of work activities. They do not necessarily show good practices or compliance with legislative requirements.

For one-click access to websites and references please consult the online version of this publication
https://osha.europa.eu/en/publications/occupational-safety-and-health-europe-state-and-trends-2023

Contents

List of figures

List of tables

Foreword by Nicolas Schmit, European Commissioner for Jobs and Social Rights

Occupational safety and health (OSH) has been at the heart of the European project since the very beginning. OSH concerns all European citizens whether they work in a factory, in an office, sell goods in a shop or take care of patients in a hospital. Health and safety at work is an essential part of any organisation's operations.

This is why EU policy and legislation on OSH, based on both scientific and technical evidence and data, is a vital policy area for EU society and all of its citizens.

"Occupational safety and health in Europe – state and trends 2023" is a very important contribution from the European Agency for Safety and Health at Work (EU-OSHA). The Agency's analysis is also particularly timely, as the EU takes stock of progress made under the 2021-2027 EU Strategic framework on health and safety at work.

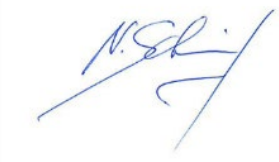
This publication originates from a European Commission initiative, supported by its tripartite Advisory Committee on Health and Safety at Work, to create a comprehensive EU OSH Information System. Work in this area started in 2015 and the project was later transferred to EU-OSHA which together with the Commission put the information system online under the title of "EU OSH Barometer".

This particularly useful tool, notably for the stakeholders in this policy area, provides, on a permanent basis, graphical information for significant OSH indicators at EU and national level, drawing on statistics, surveys and public data. This first analytical report combines the quantitative data of the EU OSH information system with explanatory and analytical descriptions of trends that reach back between 10 and 25 years. The intention is to repeat this exercise on a regular basis, so that it can provide knowledge and insights for safer and healthier work, in an ever-changing world of work, to wider audiences.

Changes at the workplace, caused by the COVID crisis, the green, digital and demographic transitions, as well as by scientific and technological progress, led the Commission to adopt, in June 2021, a new 2021-2027 EU Strategic framework on health and safety at work.

The Framework is part of the Commission's commitment to building a strong social European Union that protects. This is the foundation of all the initiatives that we are proposing. Every action we take in social policy comes under the umbrella of the European Pillar of Social Rights Action Plan that we presented in March 2021. The protection of workers' health and safety, enshrined in the EU Treaties and in the Charter of Fundamental Rights, is one of the key elements of an EU economy that works for people. In particular, the right to a healthy and safe workplace is reflected in principle 10 of the European Pillar of Social Rights, and is fundamental for reaching the United Nations' sustainable development goals. Our determined action to improve occupational safety and health and to consolidate a culture of prevention represents a substantial contribution to the objectives of the abovementioned Pillar.

The work of EU-OSHA is essential in this respect and this publication is a good example of the strong commitment shown by EU governments – and also employer and trade union organisations - to continuously improve OSH in Europe.



Nicolas Schmit

Acknowledgements

EU-OSHA wishes to thank the European Commission, Directorate-General for Employment, Social Affairs and Inclusion for their contributions and support, in particular Matthias Fritz.

Thanks to Jukka Takala, Subas Neupane and Päivi Hämäläinen for the provision of their estimates of the global burden of disease. EU-OSHA also thanks Frank Pega and Natalie Momen from the World Health Organization (WHO) for the kind provision of an extract of EU27 data from its Occupational Burden of Disease database. Joana Soares and Réka Zayzon have meticulously checked data and calculations of this report.

Lead author: Lothar Lieck (EU-OSHA)

Co-authors and contributors: Ioannis Anyfantis, Xabier Irastorza, Lorenzo Munar, Birgit Müller, Malgorzata Milczarek, William Cockburn, Andrew Smith (EU-OSHA).

Find more up-to-date information and data on occupational safety and health in Europe in the **OSH Barometer data visualisation tool**: https://visualisation.osha.europa.eu/osh-barometer

The tool informs on a large range of OSH indicators, such as work-related accidents, diseases and wellbeing as well as working conditions and prevention. It also presents the national OSH authorities and strategies, economic and sector information, and enforcement capacity.

You can visualise and compare country data, generate graphics and download a report of all data per country. The OSH Barometer is updated regularly with new indicators, data, publications and features.

1 Executive summary

How can the 'state of OSH' in the EU be assessed?

This report describes the **state of OSH in the EU**, and accordingly the **trends and the developments**, that is, the changes in state over time. The report refers to different periods in time, mostly to the situation between 2005 — after the substantive enlargement of the EU in 2004 — and 2019; if the use of earlier or more recent start or endpoints was reasonable and data were available, a different time frame was applied.

Two criteria were crucial for the selection of these indicators: availability of reliable data and the relevance of the indicators. An ideal and complete set of indicators would cover even more indicators than presented in this report, but major limits were set by the availability of reliable data.

The main data sources **comprise a large variety of quantitative datasets**, for example, Eurostat statistics and EU-wide surveys (e.g. EU-OSHA's European Survey of Enterprises on New and Emerging Risks (ESENER), Eurofound's European Working Conditions Survey (EWCS), Eurostat's Labour Force Survey (LFS) and its ad hoc modules, and the Flash Eurobarometer, detailed background reports on risks, groups of workers, OSH systems and infrastructures (e.g. by EU-OSHA, Eurofound, the Fundamental Rights Agency, etc.), and evaluations and assessments of the level of implementation of OSH directives (e.g. by the Directorate-General for Employment, Social Affairs and Inclusion (DG EMPL) or the Senior Labour Inspectors Committee (SLIC) surveys facilitated by the National Labour Inspectorates). Regarding the description of developments beyond the EU, data were taken from the International Labour Organisation (ILO), the World Health Organisation (WHO), the International Social Security Association (ISSA), the United Nations (UN), the Organisation for Economic Co-operation and Development (OECD), the International Commission on Occupational Health (ICOH) and the International Association of Labour Inspection (IALI).

Please note that Eurostat employment data and ICOH data were retrieved in 2023. Current figures might slightly deviate due to updates and corrections.

Working conditions – Risk factors at work

Shifts in work tasks and workforce between sectors, technological progress and the development of higher skill levels have led to less work in manual occupations and more work in administrative (clerical, professional, managerial, etc.) occupations as well as in client-oriented and communicative occupations.

Consequently, these developments caused a **shift of risks to psychosocial and emotional challenges**. This can be documented by the growing percentage of workers who report difficult clients (60%), long or irregular working hours (22%), and poor communication in the organisation (18%) (all data from ESENER 2019 or EWCS 2015) The OSH risks for these occupations — gradually but also significantly — shifted from safety risks to health risks. The psychosocial risks for mental health and the emotional challenges increased; they clearly correlate with more work in emotionally demanding and/or client-oriented sectors, be it in tourism, entertainment or education, public transport, social work, or health and care.

The trend towards more psychosocial and emotional challenges at work **does not mean that 'classical' exposures** or **ergonomically burdensome work has disappeared**. There is a large number of workers in all sectors — between 40% and 75% in ESENER and the EWCS — who report **ergonomic risks**. These are, for example, repetitive hand and arm movements in industry and service occupations, where a particularly high percentage is reported by low-skilled manual workers; moving heavy loads in craft occupations, or patients in health and care occupations, where a particularly high percentage is reported by high-skilled manual workers; and tiring and painful positions, where again the highest level is reported by high-skilled manual workers.

Still a quite constant share of workers reports **exposure to physical risks like noise, vibrations, high or low temperatures and to chemical and biological agents**; depending on occupation and sector, between 15% and 30% of workers are exposed to such risks (EWCS). No or very minor decreases in these risks can be seen during the past 15 years.

In several occupations, **classical safety risks often add to the above-mentioned exposures**, that is, slips, trips and falls, risks related to moving parts of machinery, moving vehicles, exposure to hot, cold, or hazardous materials, loud noise, chemical or biological substances, and in general physically exhaustive work.

A certain **ergonomic risk** of many administrative and supervisory jobs is **physical inactivity** (61%), in practice meaning sitting most of the working time in front of digital equipment, sitting to make phone calls or sitting in meetings. Not only administrative tasks but also many occupations in transport and industry require prolonged sitting (transport, cashiers, parts assembly, etc.).

In the 10-year period before 2005, EU-wide surveys found a significant increase in work intensity. Major differences in work intensity and working time patterns can be seen between occupations, forms of work, sectors and enterprise size, for example. The length of the daily or weekly working time and its allocation with the 24 hours of a day or at night are important factors for health and wellbeing. The Eurostat data show a slight decrease **in the average weekly working time for full-time employees** (15-64 years) from 40.2 to 39.9 hours between 2006 and 2019.

Eurostat reports for all types of **'employment at atypical working time'** a minor decrease between 2011 and 2019, from 38.8% to 37.2% (EU27 average), for all employed workforce and all types of such atypical time. The data also document slight increases or decreases of the different types of work during atypical times > on Saturdays the percentage decreased from 28% to 25%, working in the evenings decreased from 19% to 15%, working on Sundays remained stable at around 13.5%, work at night fell from 7% to 5%, and shift work increased slightly from 17% to 18%. Some **groups of self-employed** show a higher rate of atypical working times: for **high-managerial self-employed**, this rate is 43.2% and for **low-managerial self-employed** 64.5%.

Significant differences also exist between eastern/southern and central/northern/western European countries. More physical and ergonomic risks (except inactivity) are reported from eastern and southern EU Member States but more emotional demands (e.g. difficult clients, poor communication and long working hours) in northern and central European countries. One of the major reasons might be the reallocation of industrial production to eastern countries after the EU extension to 24 and later to 27 Member States.

Conditions of employment and workforce development

During the past decades and at faster pace after 1990, a **greater variety of non-standard contractual relations** has emerged. Typical characteristics of non-standard work are part-time work, temporary (or fixed-term) work, seasonal work, casual work, home-based work, telework, self-employment or family work. Currently, high public awareness is directed to those types of non-standard work that are connected either to **new forms of contracts** (voucher, platform, zero-hours, portfolio, etc.) or increasing **types of work not bound to the premises of the employer** (mobile, at home, at client's place), mostly made possible by the increased use of modern information and communication technologies (ICT). These forms of work often have as a — additional — major characteristic a **less clear employer–worker relationship**.

However, in 2019 the conventional employment contract still accounted for around 86% of the workforce (EU27), 9% are 'own-account' workers, that is, self-employed without employees. The remaining 4% were self-employed with employees (employers) and less than 1% were contributing family workers. Of all employed workers, 17.2% worked part-time and 13.3% had temporary contracts.

Non-standard types of work that are characterised by the circumstance that **the work is not taking place at the premises of the employer** are mobile and home-based work, domestic work, care work and long-term domestic care work, and online platform work. In 2019, approximately 77% worked at the employer's premises, 5% at home, 9% at the clients' places and 8% at non-fixed workplaces. With the onset of the COVID-19 pandemic in 2020, the share of work at home more than doubled; in the EU27 it increased from 5.4% in 2019 to 13.4% in 2021.

Compared to work at the premises of the employer, such non-standard workplaces often miss basic OSH facilities (Minimum requirements at workplaces directive), availability and suitability of help tools (Work equipment directive and Personal protective equipment directive), or provision of adequate digital and mobile tools (Display screen equipment directive).

The **workforce structure** also significantly changed during the past 15 years, requiring new or adapted prevention solutions, organisationally and technically.

Statistics show a growing share of **employment rates of female workers**; between 2005 and 2021, the employment (activity) rate of women expanded from 56% to 67.7%. In 2005, approximately 80 million women and 101 million men were employed in the EU. In 2005, this made the share of the female workforce 44.1%, and in 2021 this rate went up to 46.1%, that is, 90.2 million women and 105.6 million men, together totalling 195.8 million.

The share of older workers — between 55 and 64 years old — increased significantly, from 11.1% (2005) to 18.4% (2019). This corresponds to a growth from 20.1 million to 35.9 million employed persons, or of 79%.

The **migrant workforce** in the EU27 also increased in the past two decades. The majority of migrants are intra-EU, that is, all workers who are born in a Member State other than the one where they currently work and reside; this number is estimated at 10.4 million (2019), based on LFS data. Cross-border workers account for another 1.5 million and posted workers for 2.4 million. In 2020, 8.6 million extra-EU citizens (born outside the EU) were employed in the EU labour market, out of 196 million persons aged from 20 to 64 years, corresponding to 4.4% of the total. The sum of all different categories of mobile extra- and intra-EU workers is roughly 23 million, or about 12% of the EU workforce.

When comparing 2005 with 2020, for most occupations **higher skills** are required. In this period, the share of occupations requiring the three lowest education levels fell from 24.5% to 15.5%; the share of occupations that require a tertiary education grew from 24.9% to 36.4%.

Accidents at work

Accidents at work are the most common indicator regarding the quality of prevention in an enterprise, a sector or a country. Between 1998 and 2019 (EU level), **the incidence** rate of **non-fatal work accidents** fell about 58%, from 4,089 to 1,713. Most of this decrease took place in the first half of this decade. Between 1998 and 2008, the incidence rate fell by 54%, and between 2009 and 2019 by 9%.

Between 1998 and 2019, the **incidence rate for fatal accidents** dropped about 57% from 5.03 to 2.17, almost the same decrease as for non-fatal accidents.

Four major sectors, **agriculture, manufacturing, construction and transport**, employed just under 40% of the workforce (in 1998 as well as in 2019). However, in 1998, more than 60% of the accidents at work took place in these sectors, thus the reduction of accidents in these sectors was crucial for the overall reduction. In addition, economic developments — sector decline and shift of workforce between sectors — reduced the number of workers exposed to common safety risks in these sectors.

There have always been concerns in national or sectoral case studies about **underreporting of work accidents** for different reasons: accidents suffered by self-employed who are not obliged to notify or are insured via private or non-occupational public health insurances, work-related traffic accidents that are reported as traffic accidents only, declaration of less severe accidents as private to avoid administrative burden, administrative burden in general. This leads to several approaches to estimate the true number of accidents at work. Currently, these estimates result in figures of around 5.45 million work accidents at EU27 level in 2019 for all economic sectors and all types of employment. That means that the reported 3.14 million accidents represent approximately 57.5% of all work accidents resulting in more than three days of absence, while 42.5% are not reported.

The pure distinction between fatal and non-fatal work accidents does not reveal that a very large part of the human and financial burden is caused **by severe but not fatal accidents**. In 2019, 232,892 work accidents resulted in an absence of more than three months or caused a permanent disability, compared to 3,008 fatal accidents (NACE Rev. 2 activity A, C-N). That is, in addition to every worker who dies, another 77 suffer injuries resulting in at least three months off work or in permanent disability.

Work-related deaths and diseases

Work-related health outcomes represent a much higher burden for society than work accidents. More workers are affected, and the overall costs are much higher. When limiting the scope of analysis to the officially **recognised occupational diseases**, the trend of health outcomes (deaths, illnesses) caused by ‘exposures’ at work decreases similarly to the accident trend.

Eurostat's new experimental European Occupational Diseases Statistics (EODS) indicates a **decrease in some of the major recognised diseases** due to technical preventive measures and to a shift of the workforce to sectors with less 'classical' exposures and related recognised occupational diseases.

EU-OSHA has been engaged in several research efforts to estimate the burden of work-related diseases, including their economic impact (this work is being continued by ICOH). The impact of the two major health consequences ('Outcomes') was calculated, that is, **work-related deaths** and **work-related diseases**, measured in DALYs (lost life years due to disability, or in other words: **one DALY is one lost year of healthy life**).

This report presents two estimates, one from WHO/ILO and one from ICOH. In 2021, the WHO and ILO jointly published estimates of the burden of work-related diseases for the period 2000-2016. The WHO/ILO calculate for the EU27 114,000 **work-related deaths in 2016**. When setting the **absolute number of work-related deaths** (114,000) in relation to the EU27 population above 16 years (371 million), this gives a result of approximately **31 deaths per 100,000 population of working age above age 16**.

For 2019, ICOH estimates **179,000 deaths** in total; moreover, they refer to the much smaller **labour force** population (201 million) and calculate **88 work-related deaths per 100,000 labour force**.

These estimates also provide figures on the relation between **major risks** and the **health outcome in DALYs**. The DALYs that are attributable to work vary between 6.8 million life years (ICOH) and 4.4 million life years (WHO/ILO) for the EU27.

The main reason for these different estimates is the general approach: The WHO/ILO used a different methodological approach and restricted their analysis to selected risk–outcome pairs, for example, long working hours as risk and stroke as outcome, whereas ICOH aspires to cover all work-related diseases.

It can be concluded that despite methodological differences, the estimates **do not vary that much if the same reference population** is used in the calculation. Future research will contribute to a better attribution of the impact of work on these diseases. Additionally, the impact of work on the prevalence of mental diseases will be incorporated in future estimates.

Wellbeing and health

Existing concepts of **wellbeing** cover more aspects of work than working conditions or safety and health at work. Eurofound mentions as the most relevant components: *income, working time arrangements, possibilities for skills development and career advancement, and the degree of individual control over work.*

ILO defines wellbeing at work under the term **'Workplace Wellbeing'**: *'Workplace Wellbeing relates to all aspects of working life, from the quality and safety of the physical environment, to how workers feel about their work, their working environment, the climate at work and work organization. The aim of measures for workplace well-being is to complement OSH measures to make sure workers are safe, healthy, satisfied and engaged at work.'*

A common methodology to collect data on **health status and wellbeing** is **self-reporting and self-assessment** of risks at work, health risks and health problems, absence, job satisfaction and working life perspectives from a health point of view. This allows insight into the subjective assessment of health risks at work and wellbeing.

Indicators on wellbeing and satisfaction at work show similar patterns to health and work accidents. Sectors with high physical demands and high customer and client orientation and occupations with a lower skill level report lower wellbeing and satisfaction levels; they report a good health status but fewer expectations to be able to work in this occupation until the age of 60 years. Concerning the levels of **self-reported 'Health at risk'**, the LFS Ad hoc module on 'Accidents at work and other work-related health problems' suggests that the situation has improved. According to the LFS, in 2007 14.6% of employed persons reported a work-related health problem; this figure decreased in 2013 to 8.8% and went slightly up again — during the pandemic — to 10.3% in 2020 (EU27 level).

Safer and healthier technologies and organisation

To support the **practical implementation of preventive safety and health measures**, numerous actors (e.g. organisations of OSH professionals and practitioners, and standardisation institutes such as the European Committee for Standardisation and the International Organisation for Standardisation) issued safety and health guidance or standards, or developed new and advanced OSH management systems, the engineering sciences worked on better technical preventive technologies, on measuring and monitoring technologies, the medical sciences introduced better medical diagnosis and treatment of work-related diseases, and the social sciences contributed with better knowledge on the legal and economic determinants of OSH, or analysed the characteristics of awareness raising, knowledge development and healthy work organisation.

It is obvious that **better technical and organisational prevention at work** contributed to more safety and the evident strong reduction in accidents. **Prominent fields and examples** of such improvements are: technically safer design of moving vehicles (e.g. for fork lifts or heavy trucks and machines, light and noise warning signals for moving vehicles); safer design of machines like automatic shutdowns or disconnections, two-hand operating of machines (e.g. for pressing and punching), safer cranes including better technologies for communication between co-workers, coverage of moving parts, safer company cars (e.g. safety belts and airbags), safer tools (e.g. for drilling or cutting); improved personal protective equipment like air-supplied breathing apparatus, steel mesh gloves for meat workers, trousers for forest workers that resist a chainsaw; minimum safety requirements for buildings (e.g. forms and size of stairs and handrails, fire exits and fire alarms, safer ladders and scaffolds), emergency equipment like eye wash and emergency showers; better monitoring of acute hazards (e.g. in sewage water systems), exhaust and ventilation technologies to avoid fumes, dusts, chemicals or contact with hazardous biological agents; strong safety obligations for work in confined spaces, or for work at height and work in trenches; introduction of explosion zones and of non-sparking tools, a comprehensive system of warning signals, warning signals for slippery floors and unsafe grounds, better warning systems and equipment in particularly dangerous work environments like road maintenance, combined with better organisational measures; quality systems that promote continuous repair and maintenance of tools; regular instructions by safety representatives and safety coordinators, and guarantee of minimum safety standards of machines and products by European standards like CE (‘European Conformity’).

Major technological developments

The widespread **introduction of new or advanced technologies** — automation, digitalisation/ICT, green technologies, new material technologies and so on — results in substantial changes in work organisation and work processes, and replacement of (traditional) materials (screws by glues, metal and wood by plastics, nanomaterials). For OSH regulators and practitioners, it is a constant challenge to assess these changes regarding their impact on risks for health and safety and to develop adequate risk prevention and mitigation measures.

Foresight studies (e.g. by EU-OSHA) have shown that such technological change can help improve working conditions, for example, by taking over heavy, dangerous or routine work (automation, robotisation, exoskeletons), or by better communication and remote control via ICT tools. At the same time, they can also pose new risks, creating rigid work processes without much decision latitude, along with technical options for extreme surveillance and control (e.g. by constant geolocation), or pose new safety risks like working at height (renewable energies) or by exposure to materials with widely unknown health effects (e.g. nano).

EU-OSHA has **published several foresight studies** to emphasise possible safety and health concerns. Examples are the reports and fact sheets about new safety risks in green jobs (green buildings, solar energy, wind energy) published more than 10 years ago. Since 2015, EU-OSHA has been publishing reviews and discussion papers on emerging risks and foresight topics. This work covers topics like robotics, performance-enhancing drugs, 3D printing, monitoring technologies, developments in the e-retail sector, artificial intelligence, platform work, Long COVID, exoskeletons and so on. In 2018, the Agency published a foresight report on new and emerging OSH risks associated with digitalisation.

A well-known example of such changes in work processes causing new OSH challenges is the **growing number of workers outside the premises of the employer**, that is, at non-stationary or mobile workplaces or at home. This refers to the increasing amount of mobile work in transport, traffic and

distribution and the increased number of workers doing their job in private homes (home care, domestic work, etc.), plus the rapid spread of remote office work in 2020 due to the COVID-19 pandemic. One major difficulty for risk prevention is to determine how far safety and health at these workplaces might deviate from the OSH requirements of a conventional workplace in an office building or an industrial plant, regarding topics like ergonomic and safe equipment, space, ventilation, daylight, electrical and fire safety, emergency procedures and so on.

Globalisation

Over the last decades, production and services have become less and less solely based on national (pre-)products or service suppliers and instead on international supply chains. Digitalisation facilitates the **globalisation of services** that do not require personal presence. **International supply chains** require logistics connections between countries and continents, harmonised technical standards, and, as far as possible, common legal rules, standards and agreements, be they for services or materials and products. The development of such supply chains divides the necessary work related to a product or a service in parts, which might also mean **that OSH risks might not be shared in a fair or equal way**.

In industry, a relevant part of outsourcing to less-developed countries **took place in sectors with high OSH risks**: mining, metallurgic processes, treatment of hazardous waste, basic chemicals and textiles. At the same time, EU enterprises 'import' risks by producing goods for export (e.g. vehicles, machines, food, specialty chemicals). A full assessment of the division of OSH risks would require a case-by-case description.

When looking at the work of global institutions during the past two to three decades, many important **agreements, conventions, government actions and global business** programmes have been negotiated, agreed and issued. The objectives and necessary measures at a global level have been made much more concrete by these efforts. OSH and working conditions are on the agenda of these organisations, and general and concrete targets and indicators have been set. The **task is the implementation of these principles and programmes** in every region and country of the world in a way that it reaches all workplaces.

Consequences of the COVID-19 pandemic

The outbreak of the **COVID-19 pandemic** in 2020 required exceptional measures and quick reactions on many unanticipated challenges for OSH. The infrastructures — staff, material, measures — were to a large extent not available or prepared to cope with an acute pandemic of that size. EU-OSHA reacted with several guidance documents for employers and workers, that is, the 'COVID-19: Guidance for the workplace' and the guidance 'COVID-19: Back to the workplace - Adapting workplaces and protecting workers'.

In the **EU OSH Strategic Framework 2021 to 2027**, the impact of a pandemic or similar threat was addressed by one overall objective, namely 'Increasing preparedness – responding rapidly to threats'. The strategy aims at employing the preventive experience gathered during the pandemic to prepare for potential future similar threats. Enterprises, sector organisations and health institutions have **developed proven workplace and sector-specific risk assessments and prevention measures**; there is experience with test procedures and timelines for quarantine and return-to-work and use of personal protective equipment. A major indirect impact on working conditions is the strongly increased share of remote work from home.

In this policy area, important decisions have been made that are relevant for potential future pandemics of a similar kind, for example, the **definition of essential work** that needs to be continued despite a high infection risk, and safety and hygiene measures for work in education, care or public transport.

Legal and regulatory frameworks

OSH is a shared EU and national responsibility. Over the last 35 years, the EU developed a comprehensive legal framework that covers and regulates OSH risks. It changed the focus from prescription of obligatory prevention measures for certain predominantly safety risks towards a general preventive and participative approach. That is, all OSH risks have to be assessed, consultation between employers and workers is required, and OSH training, expertise and preventive capacities are required for every enterprise. All EU OSH directives have to be transposed into national law. In parallel, national,

regional and local legislation and policies concretise the minimum conditions set by EU law and adapt to the risks in the specific context.

New directives or revisions and updates of directives were introduced for several reasons, that is, coverage of new technologies like artificial optical radiation (use of laser, etc.); after 2017, the Carcinogens and mutagens directive was amended several times towards the current status (Carcinogens, mutagens or reprotoxic substances directive). The revision of the Display screen equipment and workplaces directive — mainly to adapt it to the significant technological developments since their introduction — is one of the actions under the EU OSH Strategic Framework 2021 to 2027. In light of the changes of working conditions towards **physical inactivity and repetitive work and the higher psychosocial and emotional demands**, there have been calls from many stakeholders and experts for a stronger legal framework.

Although the **EU OSH legislation guarantees a strong legislative frame**, evaluations of the practical implementation at workplaces observe certain **difficulties in implementation** (see DG EMPL evaluations of the OSH Acquis or EU-OSHA reports in the frame of its research on supporting compliance). Studies and evaluations found that full compliance might be challenging for micro and small companies (EU-OSHA has published several reports on safety and health in micro and small enterprises (MSEs)). It also seems not to be standard practice to apply the hierarchy of preventive measures, that is, technical and organisational solutions of risk reduction first, and individual solutions as a last resort. As mentioned, it is also a challenge to swiftly cope with technological changes and developments.

Moreover, there are difficulties to apply the same level of protection to types of work with weakened or non-existing employer–worker relations, for example, temporary and subcontracted work, involuntary self-employed, seasonal work, platform work, domestic work and all types of irregular work. These forms of work often have as one major characteristic a **less clear employer–worker relationship**, while the main structural element of the EU OSH legislation is the dual role of employers and workers in OSH.

OSH infrastructures

There exists a **diverse and rich OSH infrastructure** in most EU Member States, that is, labour inspection and other supervising authorities, governmental OSH institutes, prevention and research centres, knowledge centres, OSH training and education centres, and occupational health clinics. The social partners and professional organisations often contribute to this infrastructure, either in an advisory way or even as an integral part of such institutions. These institutions are responsible for supervision and control of compliance, they train OSH practitioners, produce guidance material, engage in improvement actions and projects, and contribute to more awareness and better knowledge. In many cases they help in adapting general legislation to sector- or workplace-specific regulations.

EU Member States apply very diverse regulations regarding the **number and required qualification of OSH staff in enterprises, and for external protective and preventive services** (PPS). In diverse ways, the Member States prescribe topics like necessary qualifications and certificates, depending on sector and work tasks, time granted for preventive work and training, and obligatory or voluntary use of external PPS by enterprises, while some of these PPS offer technical support and others also medical monitoring and advice. In some countries such support is granted for free in certain sectors or for certain types of enterprises. The role and power of all actors in these systems varies substantially, defining such roles specifically for employers, workers' representatives and safety representatives.

During the last two decades, nearly all EU Member States have developed strategic approaches, mostly called **'National OSH Strategies'** or 'National OSH Plans'. In most cases, these strategies have helped to identify and mitigate recognised structural weaknesses of the national OSH system, for example, low levels of implementation of existing legislation, insufficient reporting and monitoring tools, or specific sector or risk-related actions, and finally also regulatory improvements. The EU OSH strategies and OSH strategic frameworks have often been used as orientation for objectives and actions of national strategies; the first started in 2002 ('Communication from the Commission - Adapting to change in work and society: a new Community strategy on health and safety at work 2002-2006'). The latest **EU Strategic Framework on Health and Safety at Work 2021-2027** puts the focus on changes; it is titled 'Occupational safety and health in a changing world of work' and focuses on three key objectives for the coming years: *(1) anticipating and managing change in the new world of work brought about by the*

green, digital and demographic transitions; (2) improving prevention of workplace accidents and illnesses; and (3) increasing preparedness for any potential future health crises.

Where did improvements take place?

Improvements took place in major areas: legislation, guidance, instruction, development and use of OSH supporting analogue and digital tools, training of OHS practitioners and professionals, application of OSH management systems, organisational progress in many areas like safety coordination, higher awareness about several topics and aspects like specific risks for certain groups, psychosocial risks and mental health, technical improvements, better technologies to reduce physical health risks like noise or dust, less exposure to and use of highly hazardous chemicals, better medical treatment, financial incentives, and safety and health obligations from insurers.

In public and policy, **the main indicator for safety outcomes** remains the **work accident figure**, that is, fatal and non-fatal accidents at work and traffic accidents in connection with work or during commuting. The overall statistical picture shows a strong decrease since the mid-1990s until 2010; this positive development continued after 2010 but with significantly lower reduction rates. The main cause of this decrease is better organisational and technical prevention, and it is also supported by economic developments like sectoral shifts — for example, decrease of workforce in high-risk sectors like mining and agriculture —, and technological changes.

When looking at recognised occupational diseases — not work-related diseases — as an indicator for **health outcomes** of working conditions, these underwent a similar decrease to that for work accidents. The outcomes for the main occupational disease groups descended, for example, hearing impairments from noise at work, pulmonary diseases (from exposure to dust and chemicals), very specific musculoskeletal diseases, and diseases related to exposure to hazardous biological or chemical agents. However, the latest estimates of the burden of diseases from the WHO/ILO and ICOH do not show a decline in work-related diseases. The figures might even considerably increase in future estimates if mental diseases and illnesses from biological agents are incorporated.

Coping with a **broader variety of the workforce** — higher age, higher skills and longer education, more women and more international workers — is a challenge for OSH practices in enterprises. It is a topic that is tackled in a large and increasing number of preventive information and guidance documents. **Preventive services, external or internal, in a private, state or mixed framework**, are functioning as an important pillar of OSH; they are crucial for the implementation of good and best practices in enterprises.

We can observe **more global efforts** for better OSH. Ethical considerations in supply chains are of increasing importance for enterprises in international trade and many markets. International organisations like the ILO, WHO, ISSA, UN, ICOH and IALI continue to develop not only objectives and observation tools but also more and more action programmes to practically improve the situation globally.

The **modernisation of the EU OSH legislation** from the middle of the 1980s onwards has created a critical frame for prevention of OSH risks. The EU, Member States, governments and social partners have agreed on this legislation and the Member States have transposed them into their national legislation. The **overall legislative framework** is generally complete and comprehensive. Moreover, the European Commission launched an initiative to agree on the **'European pillar of social rights'** comprising 20 guiding principles for the work of the EU institutions in the field of social policy. In 2017, the Pillar was agreed by the Member States; in particular **principle 10 refers to a healthy, safe and well-adapted work environment**.

Where do we find stagnation and ambiguous developments?

Stagnation can also be observed in important areas. Since 2005, the share of workers exposed to **traditional safety and health risks** — accidents, noise, vibrations, dust, chemical and biological agents, high or low temperatures, electrical shock and so on — remains at a stable level. Even some increase can be observed due to a higher share of workforce in sectors with such risks, like transport, logistics and distribution, renovation and maintenance, green technologies, and health and care. The national regulations for these risk areas are generally well developed and detailed; a mixture of overall goals and prescriptive details is the major approach. An increasing and difficult challenge will be to keep sufficient safety and health standards for new forms of work and for mobile work, work from home and work at

clients' places. Also **ergonomic risks** — repetitive hand-arm movements, tiring and painful positions, lifting and carrying, and prolonged sitting — can pose major health risks, and the statistics show no significant decrease.

There is a shift of **workforce to administrative, communicative, and emotionally demanding and client-oriented sectors**, like the sectors 'Education, human health and social work activities' and 'Trade, transport, food/accommodation and recreation activities' (more human–human interaction, less human–machine interaction). Consequently, this development caused an overall **shift of risks to psychosocial and emotional challenges** and — mostly but by far not always — less physical activity. Some health risks worsen in such types of work, like work with difficult clients or long working hours. Many approaches and pilot projects have been developed to mitigate these workloads, but the implementation seems to be limited to a minority of workplaces with high awareness of work-related health issues. Also, since 2005, statistics and surveys find a stagnation (practically no increase and no decrease) concerning the development of **working time**, **time pressure and high workload** for workers.

When looking at the **overall relationship between work and some major diseases** in the adult population (cardiovascular diseases, cancer, musculoskeletal disorders, pulmonary diseases, hearing loss), there is a clear connection to socioeconomic status that is a major cause of low life expectancy and high morbidity. In public health morbidity and mortality studies, a more precise analysis of impact of working conditions on health, as a very important factor of socioeconomic status, is very rare. This would require more detailed knowledge and analysis of the health impacts of occupations and work tasks and of the preventive measures at work, as well as an improvement in the detection capacities of preventive and monitoring health systems. Identification of the approximate **attributable fraction of work to diseases** is still the subject of intense scientific debate, with clearer results for some relations and less clear results for others.

The **level of implementation and enforcement** of compliance with legislation seems to stagnate. The capacities of the OSH infrastructure at national levels show a mixed picture in EU Member States. Across the EU, between 2010 and 2020, the labour inspectorates performed on average **two million labour inspections per year**, in approximately 22 million businesses. To enhance the level of implementation in terms of coverage and quality, many labour inspections tried to enhance the effectiveness of common drop-in company inspections by **smart enforcement and supervision concepts**.

There is no measurable progress in the types of **work with eroded employer–worker relations** (subcontracts, involuntary self-employed). The reliability of statistical monitoring fades where the employer–worker relationship is less clear (regarding aspects such as working conditions, work accidents and work-related diseases, and of compliance with legislation).

Many enterprises and particularly MSEs and the self-employed very often **cannot fully comply with more complex risk prevention tasks** (e.g. psychosocial, chemical, biological, optical, electromagnetic risks) due to lack of resources, expertise and awareness (ESENER data). In general, enforcement authorities can only supervise a small percentage of enterprises, particularly not a substantial portion of MSEs, of self-employed or of non-standard types of work; some Member States included in their strategic approaches the objective to reach these enterprises/self-employed. The reason for the continued levels of intensification of work from 2005 onwards might be that the related tasks were contracted out or put on the shoulders of non-standard workers, for example, self-employed, temporary and seasonal workers.

Some **EU OSH legislation** may be adapted and modernised to cope with the changes in technologies, employment conditions, longer working life, and a growing share of mobile and remote work. Many of these changes in the world of work have caused higher insecurity, less clear employer–worker relations, and a higher burden of psychosocial and ergonomic risks.

Which are the areas of concern?

Incomplete compliance with OSH regulation is more noticeable in certain sectors and types of work. Most of these types of work — mobile and home-based work, domestic work, care work and long-term domestic care work, seasonal work, platform work, non-voluntary self-employed — are growing in terms of workforce. But many of these work and employment formats are until now not covered in the same

way by OSH legislation or OSH practice. The principle of employer responsibility for working conditions of workers is undermined or at least blurred in such situations.

Future solutions could focus on several aspects — a **new definition of 'work' or of 'employment', stronger individual responsibility, or extended state interventions to guarantee OSH** also in such working and employment conditions. There are some examples of such solutions but to date most of them focus on better information, that is, stronger individual responsibility.

Undeclared and illegal employment is scarcely visible in the statistics. Due to the difficult conditions for research, the overall OSH situation in these types of work is widely unknown; in case study-based investigative studies, the working conditions — including safety and health — for this group are mostly regarded as worse compared to workers with a regular work contract. It seems to be necessary to consider different research and action initiatives for this type of work, also in collaboration with other state supervising authorities.

The health data clearly show an ever-growing **share of work tasks that go along with or even require physical inactivity**. Inactive work is often characterised by permanent sitting combined with high requirements for visual and mental focusing during work, for example, towards digital equipment or to traffic situations. Serious indirect health consequences of such inactivity can be seen in the strong increase in certain widespread diseases or disease-supporting factors, like obesity.

Even 15 years after the enlargement of the EU in 2004, **significant differences between Member States** can still be observed regarding several working conditions. The data demonstrate that the worst status concerning physical risks, wellbeing, and expectations to do the job until the age of 60 — is almost always present in eastern EU Member States, followed by southern Member States, all compared to the status in central, western and northern Member States**.** For psychosocial risks, it is just the other way around, these are more often reported in central, western and northern Member States.

International organisations complain about an unfair divide of OSH risks in globalised supply chains, be it in mining, metallurgy, textile production, disposal of hazardous waste or other sectors. The ILO decided in June 2022 to make OSH one of the Fundamental Principles and Rights at Work. In this context, 10 ILO conventions and instruments are considered now as fundamental, including two OSH conventions: the Occupational Safety and Health Convention, of 1981 (No. 155) and the Promotional Framework for Occupational Safety and Health Convention, of 2006 (No. 187). Ethical, fairness and justice considerations have led to more activities on decent, safe and healthy work in developing countries and a fair share of risks at work in global supply chains. These are important initiatives, but until now they only slightly changed the overall situation when looking at the global scale of the issue.

2 Setting the scene

The ethical and economic importance of safe and healthy working conditions was the root cause for the development of a strong legal framework and comprehensive policy actions targeting EU workplaces. The objective of all related measures is to reduce the avoidable burden for individuals and society, that is annually more than 3,000 fatal accidents at work, and more than 230,000 severe accidents at work, and an estimated 180,000 deaths from work-related illness.

During the last 50 years, we have witnessed **significant progress** in the field of OSH in EU Member States. Milestones along the way provide evidence that a preventive, proactive and often participative approach has become mainstream in policies and many businesses. The number of work accidents that Eurostat registers has decreased significantly in the period between 1994 and 2020. The EU stabilised and promoted this development, particularly in the 1990s, by adopting the overarching OSH Framework Directive and 24 specific OSH directives. OSH strategies and strategic frameworks at EU and Member State levels have contributed to streamlined approaches in priority areas. Higher safety and health standards, better preventive technologies and OSH management, improved training and education of OSH professionals, and scientific, technical and medical progress have contributed considerably to improving safety and health at work. Member States, the EU and international organisations have been providing comprehensive and manifold guidance and support for enterprises, covering virtually every kind of OSH-related issue and proposing practical preventive measures. Broad and extensive research at national institutes and universities and by EU institutions has considerably improved the level of evidence and knowledge on OSH.

Looking at the challenging and weaker aspects of the last 30 years, we still **observe deficits** concerning the level of compliance and enforcement of OSH legislation, particularly in some sectors, types of work (e.g. mobile or domestic work), types of enterprises (e.g., micro and small enterprises), and in less secure and irregular forms of work. During the COVID-19 pandemic in 2020 and 2021, quite a few media reported on insufficient safety and health measures in irregular, informal, insecure and illegal forms of work, for example, in several types of seasonal or subcontracted work. Permanent and seemingly accelerating changes in economic and social policies, technologies and forms of work, the demographic

composition of the workforce and the climate influence on working conditions challenge all stakeholders in the field of OSH to keep pace with all these developments. In addition, the EU and consequently also OSH in the EU is increasingly and significantly influenced by the globalisation of product and service chains and the internationalisation of its workforce.

This report is a common effort of EU-OSHA and major stakeholders. It is a product of EU-OSHA's activity 'EU OSH Info system' and aims at interpreting and analysing the quantitative and qualitative data on OSH in the EU that have been collected during the past six years in this activity. The purpose of this report is to **summarise status, trends and key aspects**, preferably based on statistics, data and related analytical research findings.

The idea of a permanent observation or monitoring of the situation of working conditions and OSH is not new. In the past three EU OSH strategies between 2002 and 2020, it was always an objective to improve the knowledge on working conditions and OSH and by doing that to facilitate **better evidence for stakeholders** and give them a solid base for their activities and prioritisation.

The idea of better monitoring was strengthened by DG EMPL in 2015 in a broad and systematic effort to develop a new **EU OSH Info system, based on indicators**. The development and design of such a system was done in collaboration between DG EMPL, EU-OSHA, newly established National Contact Points, and the Advisory Committee on Safety and Health. Many indicators were discussed and subsequently included or discarded, depending on their relevance but also depending on the availability of reliable data and the efforts needed to collect such data. For example, a good description of working conditions based on EU-wide surveys or statistical data is available, whilst a detailed description of national prevention systems would require considerable research efforts and is until now not part of this info system. In 2023, the info system provides more than 125 datasets for 16 major indicators.

All these data are presented online in a visualised mode, the OSH Barometer[1]. This data visualisation tool does **not create new data** but **combines major OSH-related and publicly available quantitative data** with qualitative descriptions and analysis. Many of the indicators and data collections that are used in this report are published in the OSH Barometer. All quantitative indicators are based on available data, that is, they are not based on new research but on existing sources. These sources are dispersed, the info system brings it all together and makes access and overview significantly easier.

Many of the **key findings of this report are based on previous work conducted by EU-OSHA**; many of these data and research results show obvious and (nearly) unambiguously accepted findings. Sometimes the existing data and findings are weak and ambiguous and allow quite diverging interpretations of the reasons and reality behind such data. For these areas and topics, even a combined analyses of quite different sources can only present hypotheses and no clear evidence; in these cases, the current knowledge is not more than a starting point to clarify open questions and to undertake research, data collection and data analysis efforts.

This report aims at **contributing to better evidence** as a base for more effective and comprehensive actions. A precise picture can better inform priority choices to be made by the legislators and state institutions, by enterprises, workers and their associations, and by OSH professionals. It can result in the ultimately desired effective protection of all groups of workers, in all sectors, all occupations, all work tasks and all forms of work.

This report paints a mostly **quantitative picture** of the current OSH status in the EU. It uses data from European surveys and statistics that were compiled in the frame of EU-OSHA's activity 'EU OSH Information System' and combines quantitative data with explanatory and analytical descriptions. The report covers trends that reach back between 10 and 25 years — depending on data availability and methodological issues. It also takes into account relevant context factors, be it economy, workforce and demography, industrial relations or technological developments.

The report covers as many indicators, trends and context developments as possible. Short overviews and summaries form the character and shape of this report, not detailed descriptions. This is slightly compensated by extensive referencing to literature, particularly the OSH Barometer data visualisation tool, reports by EU-OSHA and other EU agencies (e.g. Eurofound), and other EU institutions and international agencies.

The analytical distinctions were mostly made according to work and workplace-related criteria, like occupation, type of work, different contractual conditions and, in some cases, emphasising differences between EU Member States; it presents fewer data on characteristics of different worker groups, like age, sex and origin.

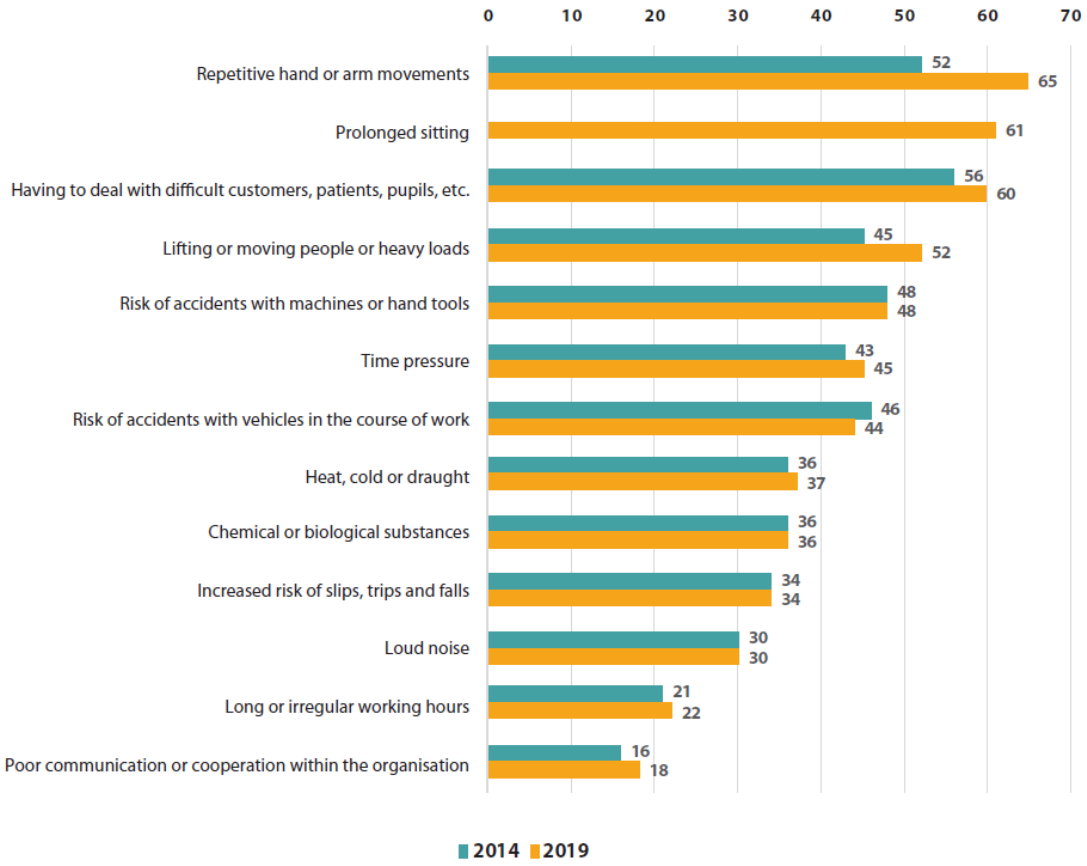
3 Status of working conditions

This chapter on health and safety-related working conditions provides an overview on status and development of working conditions; it is mainly based on the indicators that were **selected for the data visualisation in the OSH Barometer**. This is a quite limited selection of major data; in surveys and statistics many more indicators on working conditions are provided, particularly at national level.

Practically all working conditions influence **mental health**, that is, they involve **psychosocial risks**, and all also involve **'physical risks'**, including safety aspects of these risks. Mental health risks are illustrated in the OSH Barometer by datasets on time pressure, poor communication, dealing with difficult clients, discrimination and harassment, and similar. **Physical risks** include datasets on accidents at work, exposures to chemical and biological substances, exposure to noise, vibrations, high or low temperatures, and working tasks with ergonomic risks, like carrying, lifting heavy loads or work in tiring or painful positions; and also permanent physical inactivity, mainly sitting or long standing.[2]

The figure below shows the percentage of enterprises reporting OSH risks 'present in the establishment', compared between 2014 and 2019 (ESENER) and covering mental and physical risks.[3]

Figure 1: Risk factors present (% of establishments) – ESENER 2014 and 2019



Note: Prolonged sitting was a new item in the 2019 survey.

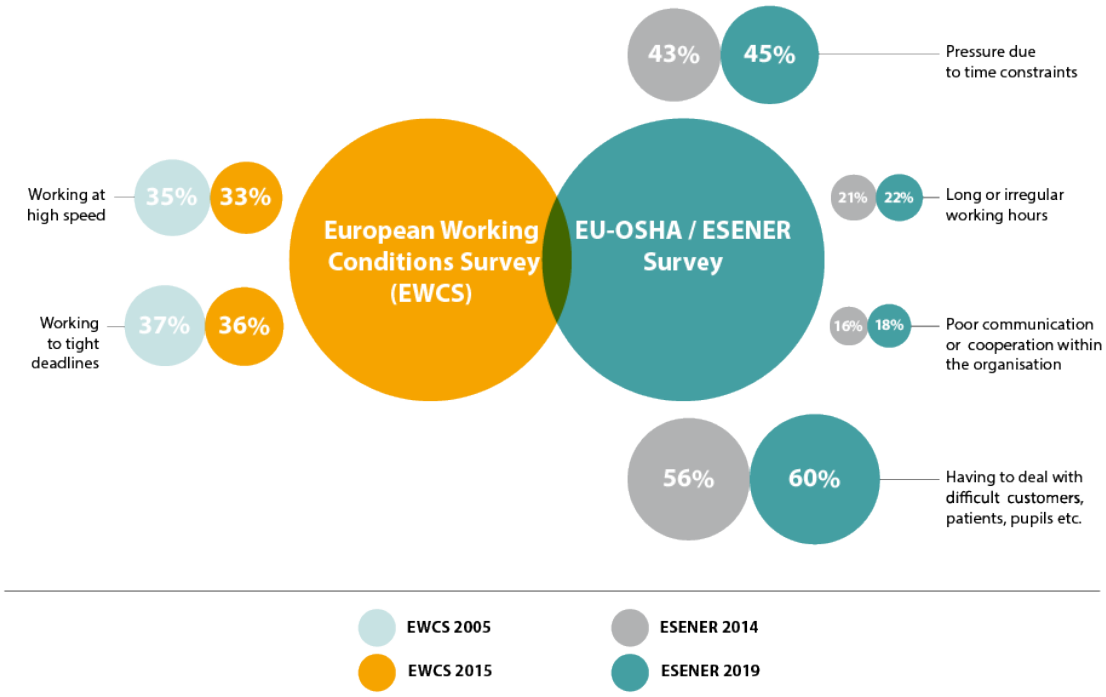
Between 2014 and 2019, some risk factors increased, like 'Repetitive hand and arm movements', 'Lifting or moving people of heavy loads', and 'Having to deal with difficult customer, patient and pupils; many others showed no changes, like 'Risk of accidents with machines or hand tools', 'Chemical or biological substances', and 'Loud noise', or minor decreases like 'Risk of accidents with vehicles'.

3.1 Psychosocial risks at work

During the last 30 years, the scientific, political and practical discussions on **psychosocial risks** and preventive measures against psychosocial risks have gained strong importance. After a period of doubts and resistance, today they are regarded as risks of the same severity as the classical physical safety and health risks.[4] (Chapter 1 covers the psychosocial risk aspect; for the prevalence of mental diseases and the burden of mental diseases see Chapter 2.2.[5])

Looking at the steady increase of certain psychosocial risk indicators at workplace level, either the **risks have increased** and/or the **number of people working in occupations** with higher psychosocial risks has increased.[6,7] This is valid, for example, for the indicator time pressure, for example, in delivery services, transport, and often also clerical work; the workforce has grown in sectors where emotional demands from dealing with difficult clients, customers, pupils or patients are common; there are also more workers employed (or self-employed) in interactional occupations, for example, in call centres, or in occupations with a high level of emotional tensions, for example, education, health and care.

Figure 2: Risk factors that can adversely affect mental wellbeing – EWCS[8] and ESENER[9]



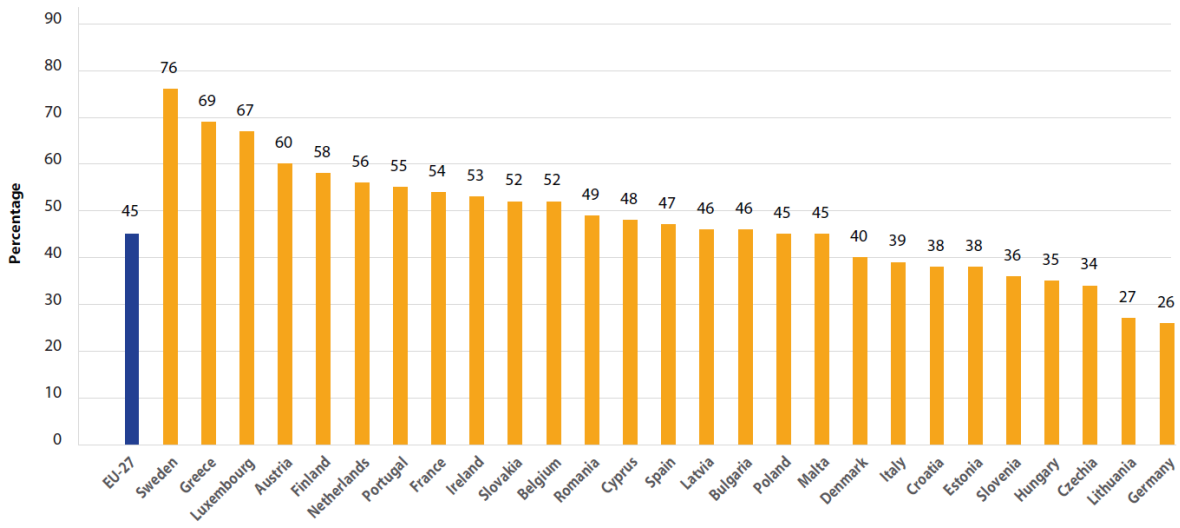
A major difference between the ESENER and the EWCS survey is the respondent. In ESENER those persons who are most familiar with OSH or responsible for OSH in an enterprise were asked whether a certain risk factor exists in the enterprise; in the EWCS survey workers themselves were asked whether they are exposed to a risk factor.

In 2007, 2013 and 2020, **Eurostat** asked employed persons in its ad hoc surveys to the Labour Force Survey (LFS) whether they had **'… exposure to risk factors that can adversely affect mental well-being'**.[10] In 2007 and 2013, the questions covered four items (time pressure and overload of work, violence or threat of violence, harassment and bullying, other factors). In the 2020 survey,[11] 'Mental well-being' was operationalised by an additional four response options, resulting in a total of eight options:[12]

1. *Severe time pressure or overload of work;*
2. *Violence or threat of violence;*
3. *Harassment or bullying;*
4. *Poor communication or cooperation within the organisation;*
5. *Having to deal with difficult customers, patients, pupils etc.;*
6. *Job insecurity;*
7. *Lack of autonomy, or lack of influence over the work pace or work processes; and*
8. *Another significant risk factor for mental well-being.*

Forty-five per cent of the employed persons reported being exposed to risk factors that can adversely affect mental wellbeing. The country data vary significantly. Sweden, Greece and Luxembourg report over two-thirds such exposures, and Germany, Lithuania and Czechia one-third or less.[13]

Figure 3: 'Exposure to risk factors adversely affecting mental wellbeing' – LFS Ad hoc survey 2020[14]



ESENER 2019 reveals that several **psychosocial risk factors** are reported to be present in a significant share of establishments in the EU27, namely having to deal with difficult customers, patients and pupils (59%) and time pressure (45%).

The aspects **'Difficult clients', 'Poor communication' and 'Long working hours'** are major psychosocial risks. The increase of workforce in communicative and client-oriented occupations — social work, education, tourism and entertainment, health and care — during the last 30 years adds to the conventional work with clients in service, sales and health occupations.

The next table shows the top seven EU Member states with the highest share of these risks for all sectors and for the sector 'Human health and social work activities' (HHSW).

Table 1: Psychosocial risks, Top countries 'All Sectors' and 'Human health and social work' – ESENER 2019

Having to deal with difficult customers, patients, pupils	Poor communication or cooperation within the organisation	Long or irregular working hours	Having to deal with difficult customers, patients, pupils	Poor communication or cooperation within the organisation	Long or irregular working hours
ALL SECTORS	ALL SECTORS	ALL SECTORS	HHSW	HHSW	HHSW
PT 75.6%	SE 41.8%	DK 44.9%	SI 96.7%	SE 51.8%	SE 56.8%
MT 75.0%	DK 37.4%	RO 39.7%	PT 94.1%	DK 45.5%	DK 47.8%
CY 71.4%	BE 29.9%	SE 33.1%	EE 91.5%	NL 37.4%	CY 47.0%
DK 68.3%	NL 28.7%	FI 32.8%	PL 91.4%	BE 37.1%	LV 45.7%
LU 67.8%	FI 27.7%	CY 29.6%	BG 89.8%	FR 33.6%	CZ 44.3%
BE 67.5%	LU 25.9%	MT 28.0%	SE 89.4%	ES 31.8%	RO 36.7%
FR 67.2%	FR 22.9%	DE 25.7%	DK 87.1%	LU 31.5%	FR 35.7%
EU 59.7%	**EU 17.9%**	**EU 21.5%**	**EU 83.5%**	**EU 27.7%**	**EU 31.1%**

Difficult customers, patients and pupils ('clients') seem to be the most widespread psychosocial burden, with workers in Portugal, Malta and Cyprus are most exposed. In the sector HHSW, eastern European countries are much more present, Slovenia at the top, followed by Portugal, Estonia, Poland and Bulgaria.

Concerning the complaints about **poor communication and cooperation** within the organisation, all three Nordic EU Member States are represented in the seven countries with the highest burden, together with several central European countries. This is valid for both selected groupings, 'All sectors' and 'HHSW'.

Regarding **long or irregular working hours**, we see a mix of countries from all regions. The order of countries in the sector HHSW — a mixture of countries from the East, South and North — is probably due to specific sectoral regulations of working times. Sweden is at the top in HHSW with 57%, followed by Denmark, Cyprus, Latvia and Czechia, all between 44% and 48%.

Many analyses of psychosocial risks include **other relevant factors like decision latitude** (or decision authority) and **skill discretion** (level of skill and creativity required on the job). In a long-term analysis of the responses to the EWCS between 1995 and 2015, the authors conclude:[15]

'Our findings suggest that work stress generally increased from 1995 to 2015, and that the increase was mostly driven by psychological demands. People working in lower-skilled occupations had generally higher levels of job strain and effort-reward imbalance, as well as they tend to have a steeper increase in job strain than people working in higher-skilled occupations. Most of the change occurred from 1995 to 2005.'

According to this study, the **differences between the skills groups** are significant, below illustrated for the development of **'Psychological demands'** and **'Job strain'**; for these two indicators high-skilled and low-skilled manual workers are at the top of the scale.

Figure 4: Psychosocial risk factors – Differences between skill groups (Job strain)

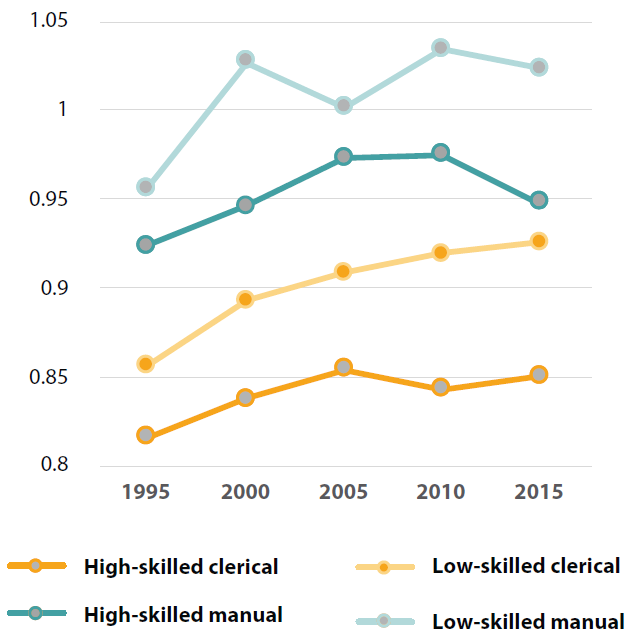
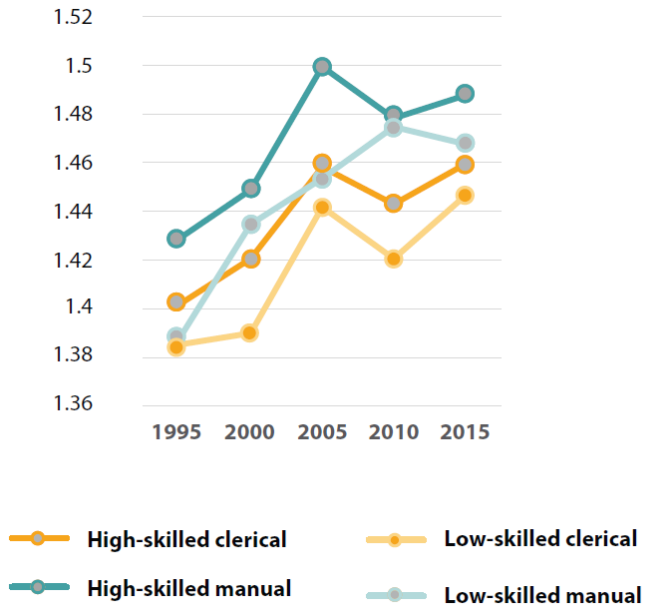


Figure 5: Psychosocial risk factors – Differences between skill groups (Psychological demand)



Regarding the other two analysed indicators, **decision authority and skill discretion**, the clerical workers show higher levels (a positive outcome) and both manual worker groups are at the lowest level.

Figure 6: Psychosocial risk factors – Differences between skill groups (Decision authority)

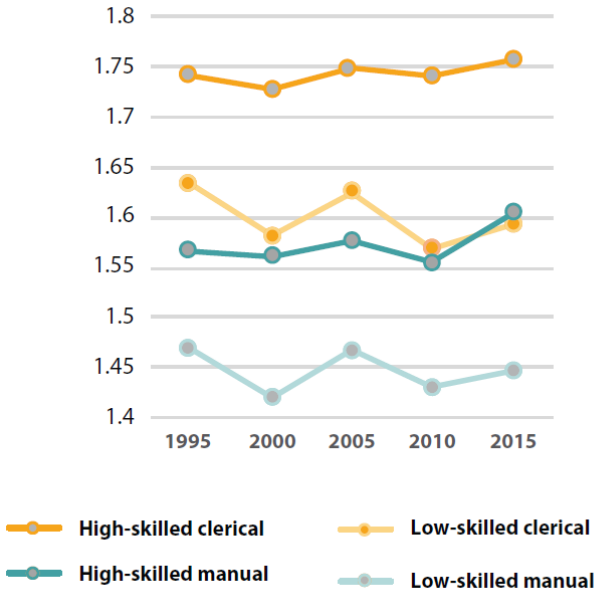
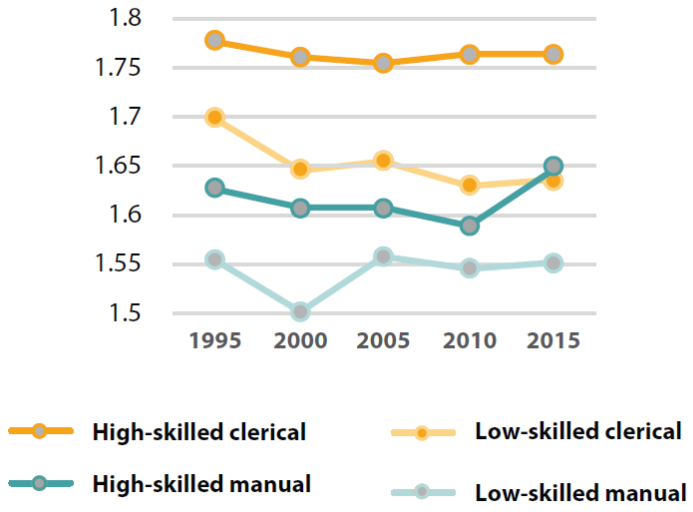


Figure 7: Psychosocial risk factors – Differences between skill groups (Skill discretion)



For 'Decision authority' and 'Skill discretion', the authors found a stable situation since 1995, even a small rise of skill discretion for manual workers after 2010. Regarding 'Psychological demands' and 'Job strain', the major increase for all groups took place between 1995 and 2005. This growth decelerated after 2005, this observation is also valid for other working conditions, like work intensity.

3.1.1 Working time in hours and at atypical times

Too many hours of working time and/or working hours at atypical or unsocial times can put **the mental** and **the physical health** of humans at risk. It is also regarded as a major **contributing factor to work accidents**, due to fatigue or exhaustion.[16]

The main indicator to describe working time is the **number of the weekly average working hours** of full-time employees. However, regarding its impact on health and safety, **other aspects of working time are of the same relevance**:

- How long is the average working day?
- At which times and days is this work done (typical, atypical times)?
- How often do long working hours take place?
- Is the work split between two jobs?
- How flexible are start and end?
- How intense is the work during this time (breaks, deadlines)?
- Which groups of workers have standard working times and which do not (e.g. depending on the sector or the type of contract, e.g. sub-contracted workers or self-employed)?

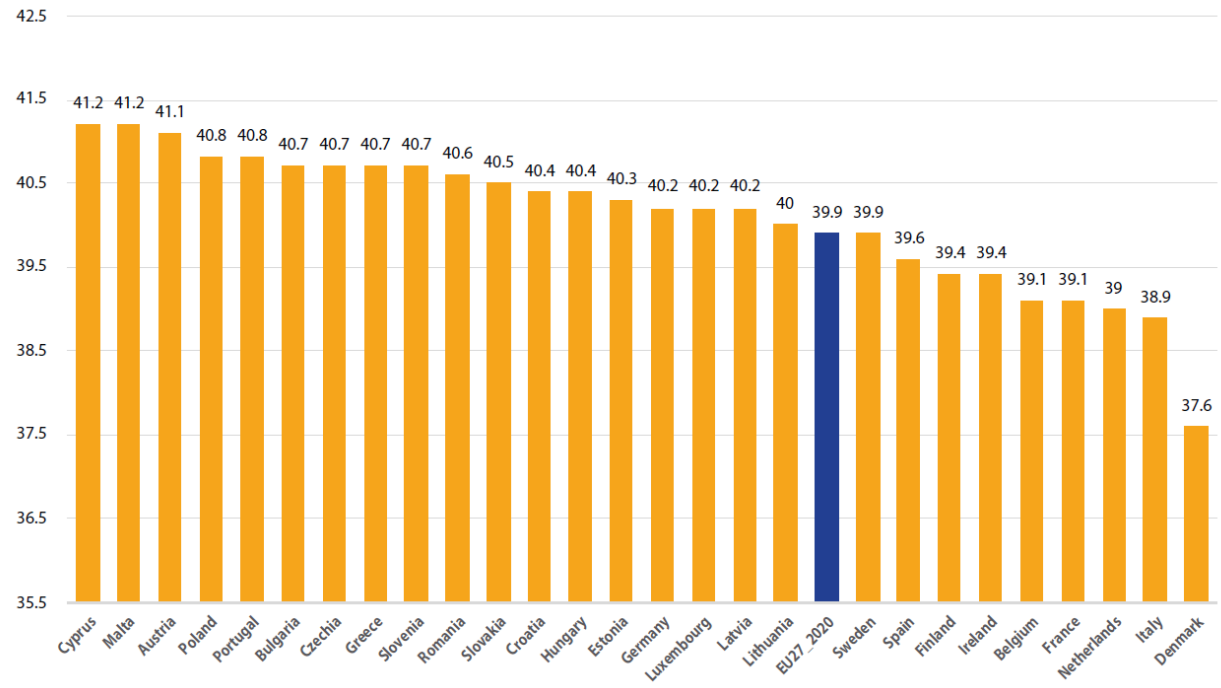
There is a **slight trend towards fewer working hours** for full-time **employees** (not 'Employed persons') in the EU27; between 2006 and 2019 the average weekly working time dropped from 40.2 to 39.9 hours, a decrease of approximately 15 minutes.[17]

Regarding the weekly hours, there are **no striking differences** between the EU27 Member States. In 2019, Cyprus, Austria and Malta with a high share of workers in the sector of tourism (accommodation) had the highest number of working hours per week (above 41 hours), and Denmark, the Netherlands and Italy the lowest number (39 or fewer) (full-time, employees, 15-64 years, all NACE codes).[18]

'Bakers are craftsmen, working mostly at night, unlike other craftsmen who, once their work during the day is done, can grasp sleep, and by this renew the worn-out forces. The bakers are the whole night rushing about, and then, for most of the day, they are forced to indulge in sleep, just like those animals hiding from the sun (Solifugae). Therefore, in the same city there are Antipodes, men who live a life that is contrary to that of others.'

Ramazzini, 1713: De Morbis Artificum Diatriba.

Figure 8: Hours worked per week of full-time employment, EU27 – Eurostat



The **commuting time** between home and workplace is quite stable; in 2005 at EU27 level, it stood at 42.4 minutes, and in 2015 Eurostat reports 40.2 minutes (time for both ways, to the workplace and back).[19]

Work at atypical working times is in general regarded as a working condition with negative health impact, called **work extensity**. The two major indicators of atypical working times are work at **'atypical working times'** and **'long working hours'**.

Eurostat reports for **'Employment at atypical working time'**[20] a minor decrease between 2011 and 2019, from 38.8% to 37.2% (EU27), for all employed workforce and all types of such atypical time.[21] Some **groups of self-employed** show a higher rate of atypical working times but also for most of the categories of self-employed the rates decreased during the period 2011 to 2019. **High managerial self-employed** had a slight increase from 42.1% to 43.2% in this period. For the **low managerial self-employed** Eurostat finds a decrease from 69.2% to 64.5%. The figures for **small entrepreneurs** dropped slightly from 56.6% to 54.1%, the same applies for employed persons in **personal care work** with a minor change (50.6% to 49.8%). **Agricultural self-employed** had the highest level of such working times; they showed a decrease from 68.4% to 63.4%.

The length of the daily or weekly working time, its allocation over the 24 hours of a day or at night are important factors for health and wellbeing. The statistical data (Eurostat) show a slight decrease **of the average weekly working time for full-time employees** (15-64 years) from 40.2 to 39.9 hours between 2006 and 2019.[22] The data also document slight increases and decreases of work at atypical times (response option for frequency: 'usual').[23] In 2006 and 2019, the following percentages of all employed persons worked at atypical times: on **Saturdays** the percentage decreased from 28% to 25%, **working on Sundays** remained stable at around 13.5%, **working in the evenings** decreased from 19% to 15%, **work at night** fell from 7% to 5% and **shift work** increased slightly from 17% to 18%.[24]

Figure 9: Average working time and work during unsocial hours – Eurostat LFS

Two country examples might illustrate these developments (all data for 2019): Slovakia, a country with a high share of process-based industries, reports that 15.0% of its workforce is working at night and 29% in shifts; for the EU27 this rate is 5.2% respectively and 18.3%.[25] Regarding work on Sundays three other countries are at the top of the EU27, the Netherlands, Ireland and Spain; they report between 18% and 21% (EU27 average = 13.5%); all three countries have an above-average share of sectors like transport, tourism and agriculture.[26]

For all these types of work it should be take into account that other groups of **workers under non-standard types of employment contracts** (self-employed, agency workers, students, pensioners, undeclared workers) might have taken over work at these atypical working times.

Concluding, it can be stated that there is a **slight trend towards a reduction of weekly working hours for regularly employed** workers, including a stable commuting time. Working hours at atypical times show a mixed picture. Looking at most types of employees, **atypical working time decreased, except work on Sundays**. For self-employed with employees, the working time at atypical hours is in general at a higher level. The number of employees in night work is decreasing. More employees in service and client-related occupations at night or in shifts but also here the atypical times are slightly decreasing.

Probably these changes **mirror the structural economic changes**, that is, the shift of workforce between sectors. Night work was common in many industries as part of a three 8-hours shifts, not only in industries with permanent production processes (steel, chemicals, etc.).[27] Moreover night work is and was common in essential services like health, transport, technical infrastructure and security. The

number of workers in industry decreased, but the number of workers in the above-mentioned service sectors increased.

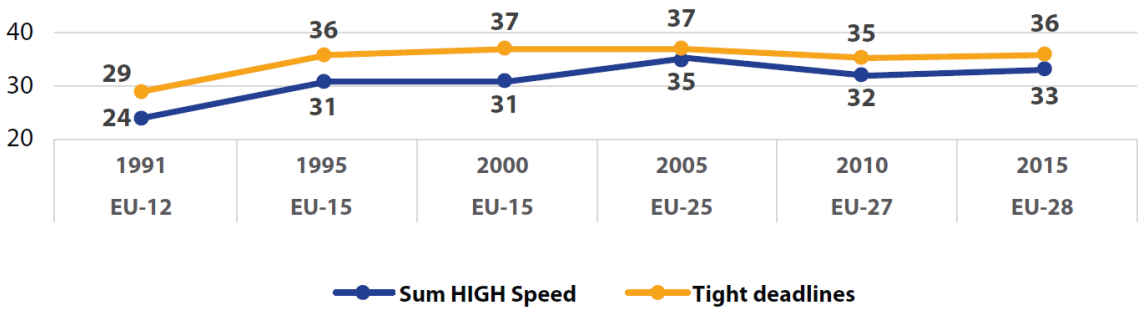
3.1.2 Work intensity

There are numerous references showing that during the period **between 1990 and 2005 work intensity has considerably increased**.[28]

For example, Eurofound has analysed the responses to the two EWCS questions on high speed at work and tight deadlines. The EWCS found a significant increase of work intensity between 1991 and 2005. In 1991, **'Working at a very high speed'** was for the majority of respondents not an issue. Fifty-two per cent of the workers responded to this statement 'Never' or 'Almost never'; in 1991, 24% worked at high speed and responded 'Around ¾ of the time', 'Almost all of the time' and 'All of the time'; until 2005 this response rate went up by 11% to 35%.

Working to tight deadlines was not an issue for 34% in 1990, and in 2005 only for 19%, a reduction of 15%. The percentage of the sum of responses 'Around ¾ of the time', 'Almost all of the time' or 'All of the time' to this question on tight deadlines increased between 1991 and 2005 from 29% to 37%. Regarding these two indicators, **work intensity has evidently increased** between 1991 and 2005.[29]

Figure 10: Development of work intensity indicators between 1991 and 2015 – Eurofound



After that first period between 1991 and 2005, **this development seems to stagnate between 2005 and 2015**.[30] The responses 'Almost all of the time' or 'All of the time' vary only slightly, between 33% and 37% depending on year and question ('Working at high speed' or 'Working to tight deadlines').

Differences can be seen regarding sector, company size and occupation. **Regarding work intensity**, ESENER enterprise data on time pressure for the EU27 indicate a slight increase of 2.3% between 2014 and 2019 from 43% to 45%.[31] Interestingly, according to ESENER, time pressure drastically **increases with the size of the enterprise**. In enterprises with 5 - 9 employees, 39% report time pressure, and in enterprises with above 250 employees 69%.[32] The same applies for long working hours, where enterprises with 5 - 9 employees report 19% 'long working hours', and in enterprises with above 250 employees this percentage increases to about 39% (EU27, 2019).[33]

Figure 11: Establishment size and 'Pressure due to time constraints' – ESENER 2014 and 2019[34]

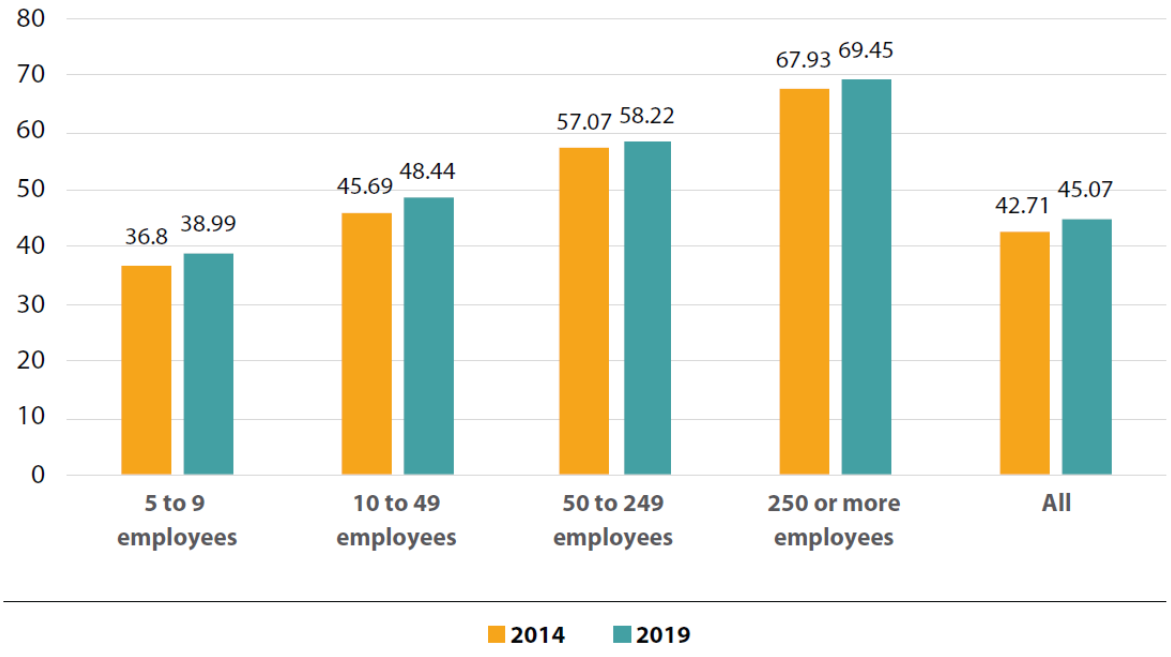
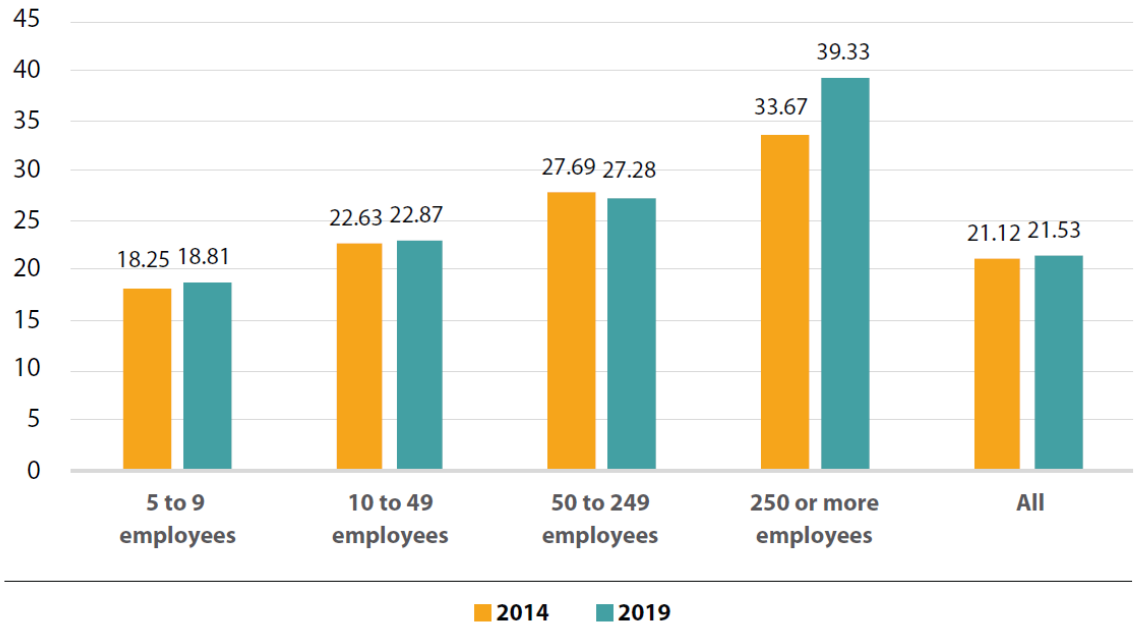


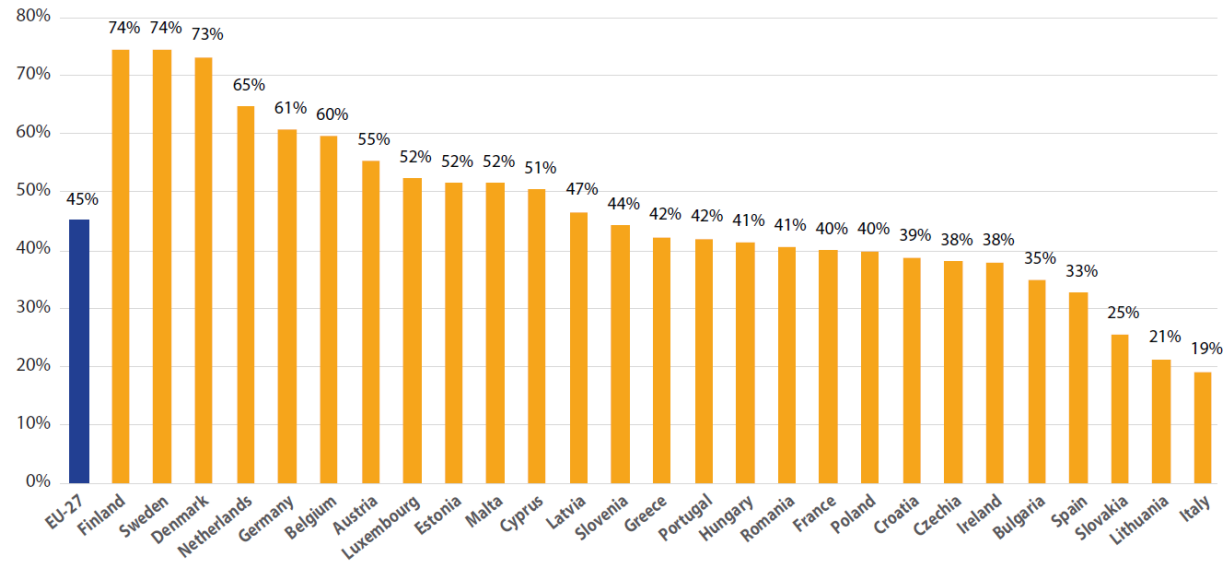
Figure 12: Establishment size and 'Long or irregular working hours' – ESENER 2014 and 2019[35]



Sectoral differences are also strong but not that large as between enterprise sizes they vary for **'Pressure due to time constraints'** between 32% in agriculture to 54% in education and HHSW activities.

Looking at countries, as indicated the figure below, the three Nordic EU Member States are at the top of the EU27 countries, all three with rates of more than 70%. The lowest levels of less than 30% are reported for Italy, Lithuania and Slovakia.[36]

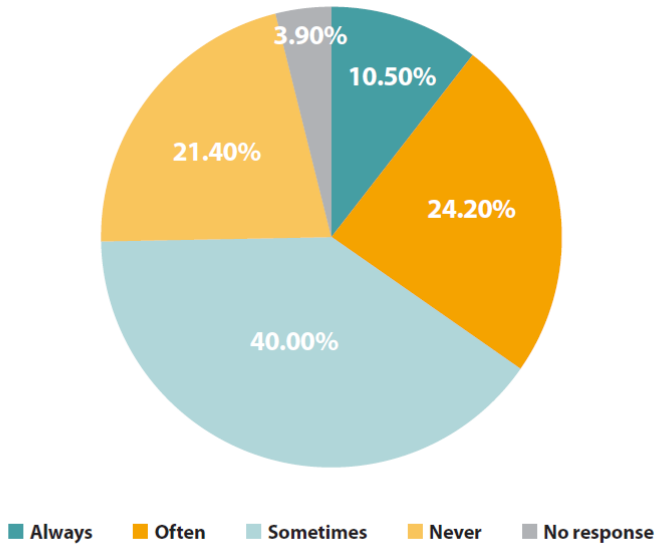
Figure 13: 'Pressure due to time constraints', Yes responses – ESENER 2019



It has to be noted that ESENER responses refer to the situation in an enterprise, and the LFS and EWCS refer to the individual situation of a worker/employed person.

Also in 2019, the Eurostat LFS Ad hoc module on working arrangement and working time shows quite similar data.[37] Approximately 35% of all employed persons in the EU27 are working 'Often' or 'Always' under time pressure.

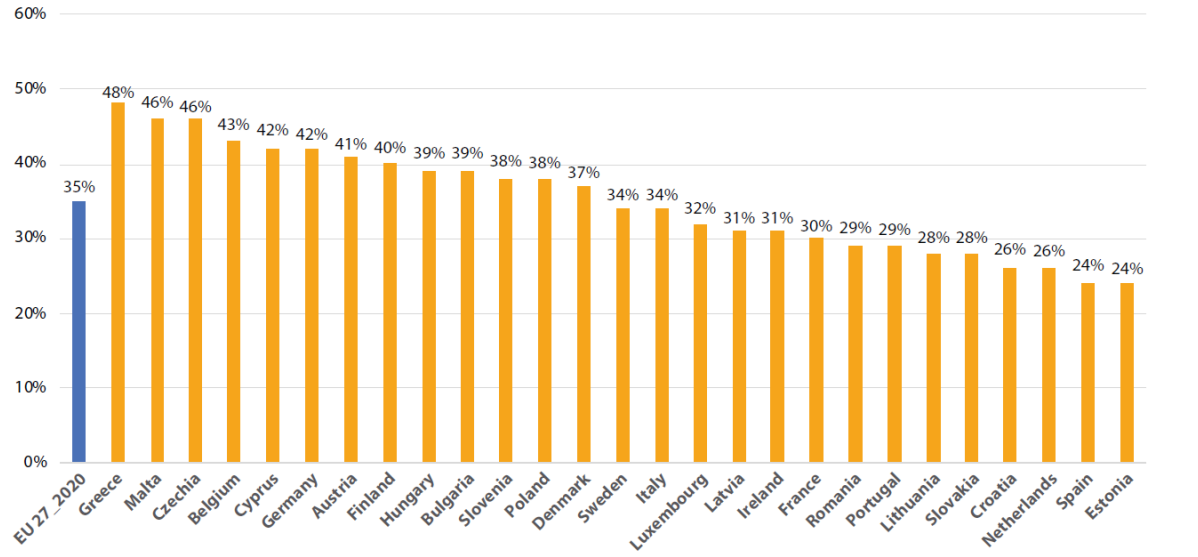
Figure 14: Employed persons and percentage of working time under pressure – Eurostat LFS Ad hoc 2019



The country-specific data from the LFS differ in many aspects from the ESENER data. Greece, Malta and Czechia are at the top, the Nordic countries in a middle position and at the lower end we find a mixture of countries from all geographical regions. This difference is probably due to the applied

methodology, the OSH practitioners who were asked in ESENER seem to have a different view on time pressure than the workers themselves who are respondents in the LFS.

Figure 15: Percentage of employed persons with working time under pressure (per country, sum of responses 'Always' and 'Often') – LFS Ad hoc 2019



One hypothesis to explain the increased time pressure is to draw a direct **connection between short weekly working time and more intense work**; or in other words, a short weekly working time leads to more **intensification of work or more long hours or atypical working times** ('trading flexibility for effort').[38]

The analysis of EU survey data shows **a mixed picture**: Firstly, ESENER data corroborate this hypothesis, the three countries with highest percentage of work under time constraints — that is, Finland, Sweden and Denmark — all have working hours under the EU average. Secondly, LFS data show a different picture; a country like Greece has the longest working hours and also reports the highest time pressure, the same 'combination' — but less extreme — applies to Austria, Cyprus and Malta. Trends of low or less than average working time and no time constraints are reported for Lithuania, and medium working time and low time constraints for Italy and Ireland.

An analysis of EWCS data concluded[39] that in general intensity increases with long working hours, in enterprises with 1-19 the work intensity index (on a scale between 0 and 12) is 4.4, in larger enterprises with above 40 employees it is 6.3. This is in line with ESENER data that corroborate the importance of the **size of the enterprise** for time pressure and long working hours.

Literature — from very diverse disciplines — on work intensification points to **reasons for intensification on developments as:**[40]

- Economic developments, particularly the dominance of neoliberalist policies and enhanced competition between workers, companies and states; reduction of state influence and privatisation.[41]
- Pressure due to substantial organisational changes, for example, introduction of short-term economic objectives in enterprise policies,[42] expansion into new markets or new countries, acquiring other enterprises or merging, being acquired, restructuring of management or of basic staff working conditions (contracts, working time, flexibility).[43]
- Decrease of trade union influence or worker participation regarding labour relations.
- Liberalisation of labour legislation, creation of 'new forms of work' and new contract types, beyond the permanent full-time employment.[44]
- New forms of management, application of management concepts like just-in-time production or lean management, higher flexibility of production and higher customer orientation, [45]

segmentation of enterprises into profit centres, quality management obligations, externalisation/subcontracting of service areas like cleaning, canteen, security and so on.
- Increased communication and interdependency, time coordination and synchronisation requirements between units, enterprises and in supply chains.
- Less direct supervision and more objective and results-based management.
- Last but not least the massive introduction of ICT and other work-intensifying technologies.

The main reasons for stagnation after 2005 might be that many of the above-mentioned concepts or policies were developed or had their peak during the 1980s, 1990s or the first decade of the 21st century. Some of them lost their dynamic (e.g. privatisation), or have become a kind of standard (management by objectives), or were widely implemented in the first decade of the 21st century (ICT facilities at most workplaces); also, some negative impacts on working time were mitigated by state interventions (i.e. the EU Working time directive[46]) or labour agreements.[47]

Of particular interest for OSH probably is that the changes in labour legislation, the production in international supply chains and technological improvements were sufficiently developed to shift quite a relevant part of work to other types of contracts, that is, to **subcontractors, self-employed or temporary agent workers** and other forms of non-standard work contracts. Reasons were economic savings but also better management of **intense work periods, peak times and risky work**.

These developments are probably the main reason that work intensity **stayed at a similar level for the employed workers** with a standard contract while the working conditions of other types of work degraded. EU-OSHA has **taken this conclusion** already in 2002 in its report[48] on 'New Forms of Contractual Relationships and the Implications for Occupational Safety and Health':

'1. the transfer of risks in the (practical) conditions of work to non-permanent employees and to subcontractors;
2. segmentation in the workforce based on differences in contractual conditions of employment (working hours, job insecurity, and qualifications).
In the first scenario, risks directly related to working conditions (bad ambient and ergonomic conditions)

are shifted towards non-permanent workers and subcontractors, who have less protection and/or knowledge to cope with these risks. This scenario is not easy to verify in quantitative data, although it is frequently stated in case study research.'

Also, Eurofound draws such conclusions on the **impact of subcontracting on working conditions**: *'First, employees in subcontracting perceive higher health and safety risks, notably through more work-related accidents and increased time pressure. Second, there are a number of psychological risk factors, such as perceived economic insecurity and worries about losing one's job, that are more likely among subcontracting workers.'*[49]

There is even an evident **relation between such forms of employment and higher rates of work accidents**. In a first systematic review the authors conclude:[50]
'This review supports an association between some of the dimensions of precarious employment and occupational injuries; most notably for multiple jobholders and employees of temp agencies or subcontractors at the same worksite. However, results for temporary employment are inconclusive.'

OSH Barometer – Mental risks:

https://visualisation.osha.europa.eu/osh-barometer/working-conditions-preventions/working-conditions

ESENER – Data visualisation:

https://visualisation.osha.europa.eu/esener/en/survey/datavisualisation/2019

3.2 Physical health risks at work

Risks at work that can result in physical harm can be divided into **safety** and **health risks**.

The main result of insufficient safety is a work accident. A **work accident** has as immediate consequences either a personal injury, a disease, or death of one or more workers. Eurostat distinguishes between non-fatal and fatal work accidents, and for the majority of sectors it provides also the duration of the absence due to the accident — an indicator for the severity of the injury. Non-fatal accidents at work can cause medium- or long-term health consequences, and in the worst case a permanent disability.

ILO Definition of accident: 'An occupational accident is an unexpected and unplanned occurrence, including acts of violence, arising out of or in connection with work, which results in one or more workers incurring a personal injury, disease or death.'[51]

Physical health risks can be caused by a **variety of circumstances and exposures** or by **inadequate ergonomics**. Natural **circumstances** at work can pose such health risks, that is, temperature, storms and floods, unsafe terrain, biological agents and so on; or the risks are due to manmade circumstances, that is, work in buildings, on roofs and towers, on traffic routes, under artificial ventilation. **Exposure** is a general term to describe the interaction between environment / emissions / contaminants and the human organism. In a workplace context, 'exposure' mainly covers emissions from machinery or from tools and materials, for example, noise, vibration, dust, electromagnetic fields and chemical substances.

Risks from **inadequate ergonomics** harm in particular the musculoskeletal system. Ergonomic risks of manual work are typically caused by repetitive hand and arm movements, tiring positions, for example, permanent kneeling or overhead work, lifting and moving of heavy loads, or of patients and so on. A certain ergonomic risk is **physical inactivity**, in practice sitting most of the working time. Not only administrative tasks but also many occupations in service or industry require permanent sitting, for example, drivers, cashiers, part assembly operators and so on (often called 'sedentary occupations').

In general, the EU-wide surveys (self-reported working conditions or health problems) show a high prevalence of ergonomic risks. Between 40% and 65% of the respondents in ESENER and the EWCS report **classical ergonomic risks**. A quite constant share of workers reports **physical exposures** like noise, vibrations, high or low temperatures and exposure to chemical and biological agents; depending

on occupation and sector, between 15% and 30% of workers are exposed to such risks. No or very minor decreases of these risks could be seen during the past 15 years.

In both the ESENER and the EWCS surveys[52] there is a similar share of 'Yes responses' when asked for the presence of such risks.[53] In ESENER a set of questions is related to the risks present in the enterprise. The figure below shows the responses from ESENER 2014 and ESENER 2019 regarding physical health risks.[54]

Figure 16: Exposure to physical risks – ESENER, EWCS and LFS

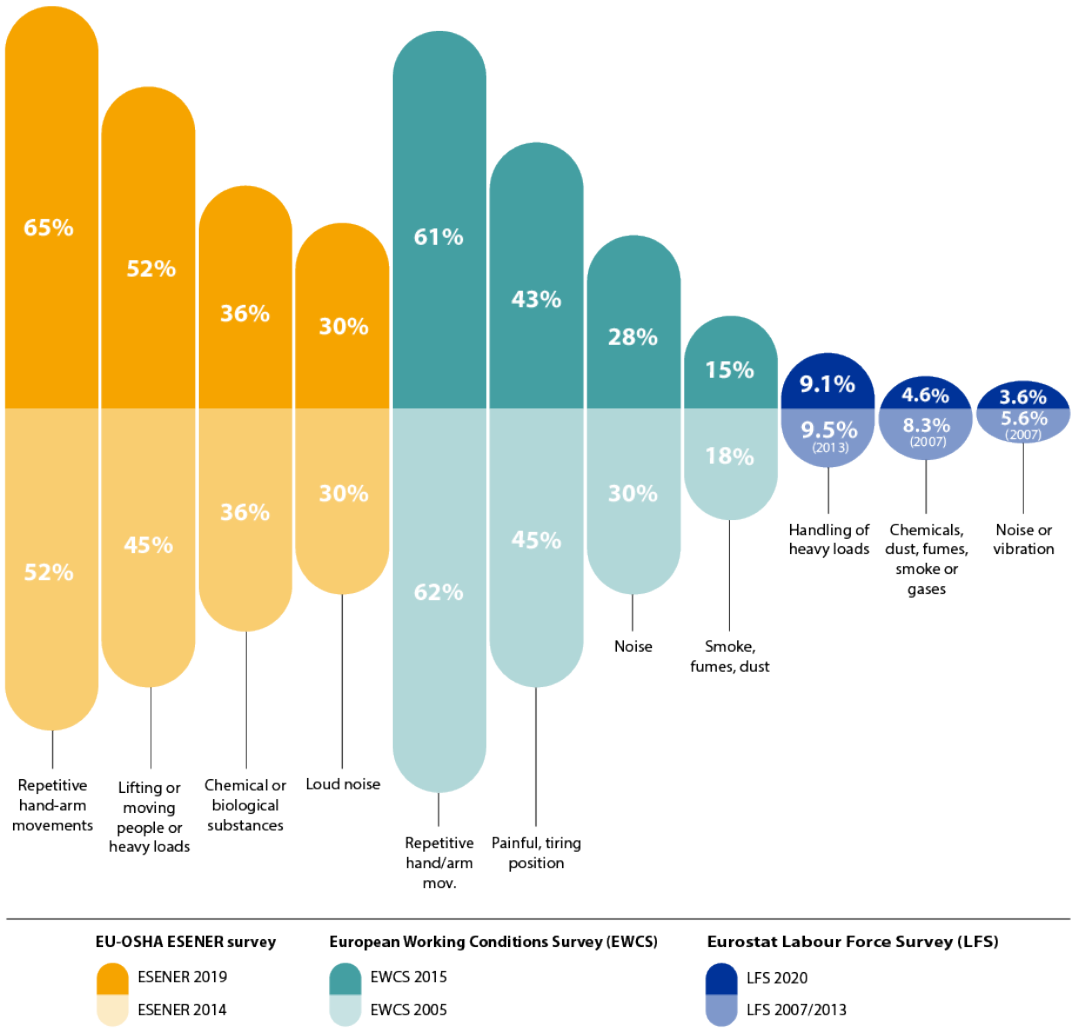


Table 2: Physical risks present in enterprises EU27 (in %) – ESENER 2014 and 2019

Risk	2014	2019
Repetitive hand or arm movements	52.2	65.3
Prolonged sitting (*not asked in 2014*)	-	60.8
Lifting or moving people or heavy loads	45.3	51.7
Risk of accidents with machines or hand tools	48.4	48.1
Risk of accidents with vehicles in the course of work	45.7	44.5
Heat, cold or draught	36.0	36.8
Chemical and biological substances	35.6	35.8
Increased risk of slips, trips and falls	34.1	33.8
Loud noise	30.3	30.0

In the short period of five years from 2014 to 2019, some **significant changes of ergonomic risks** could be observed. ESENER reports that more enterprises have to deal with lifting or moving people or heavy loads (increase from 47.4% to 51.7%) and repetitive hand or arm movements (up from 52% to 65%). Physical risk and safety risks stagnate.

The EWCS data also show in most areas **only a minor increase or decrease of physical health risks (between 2005, 2010 and 2015)**. Overall, the data are quite similar to the findings of ESENER.

In some cases, the differences between the survey questions led to different results, for example, in ESENER 2019 52% respond 'Yes' to the question 'Lifting or moving people or heavy loads'; in the EWCS 32% respond 'Yes' to the question 'Carrying or moving heavy loads' and 10% respond 'Yes' to the question 'Lifting or moving people', which makes in total 41%.[55]

Table 3: Physical risks (in %) – EWCS 2005, 2010 and 2015

Risk	2005	2010	2015*
Repetitive hand or arm movements	62	63	61
Painful, tiring positions	45	47	43
Carrying or moving heavy loads	35	34	32
Loud noise	30	29	28
Handling chemical products or substances	14	15	17
Smoke, fumes dust	19	18	15
Exposed to infectious material	9	11	13
Lifting or moving people	8	9	10

The 2015 data are the sum of responses: 'Almost always' and 'Between ¼ and ¾ of the working time', or the response 'At least ¼ of the working time'.

The LFS Ad hoc modules[56] show much lower values — between 3% and 10% — due to a different methodological approach, that is, the interviewees had to determine one risk factor that they regarded as the most important of 11 risk factors.[57]

Table 4: Physical risks (in %) – LFS Ad hoc Survey

Risk factor	LFS 2007/2013	LFS 2020
Handling of heavy loads	9.5% (2013)	9.1%
Noise or vibration	5.6% (2007)	3.6%
Chemicals, dust, fumes, smoke or gases	8.3% (2007)	4.6%

A main factor for comparatively **higher physical health risks in a country is the different share of sectors in the economy**. However, there is only a statistically significant correlation but not always an unambiguous relation between sectors and physical health risks.

Countries with a high share of the sectors industry, agriculture and construction show in general higher values regarding physical health risks from exposure to vibrations, noise and dangerous substances, for example, Romania (highest share of these three sectors), Poland (second highest share) and Hungary (seventh highest share). Still, two countries with a high share of employed persons in these sectors like Bulgaria and Czechia cannot be found in the list of the seven countries with the highest share of employees exposed to these physical health risks; Slovakia and Slovenia are only found regarding the exposure to loud noise. These data give an indication of the sectoral spread of physical health risk but cannot explain every country situation in detail.

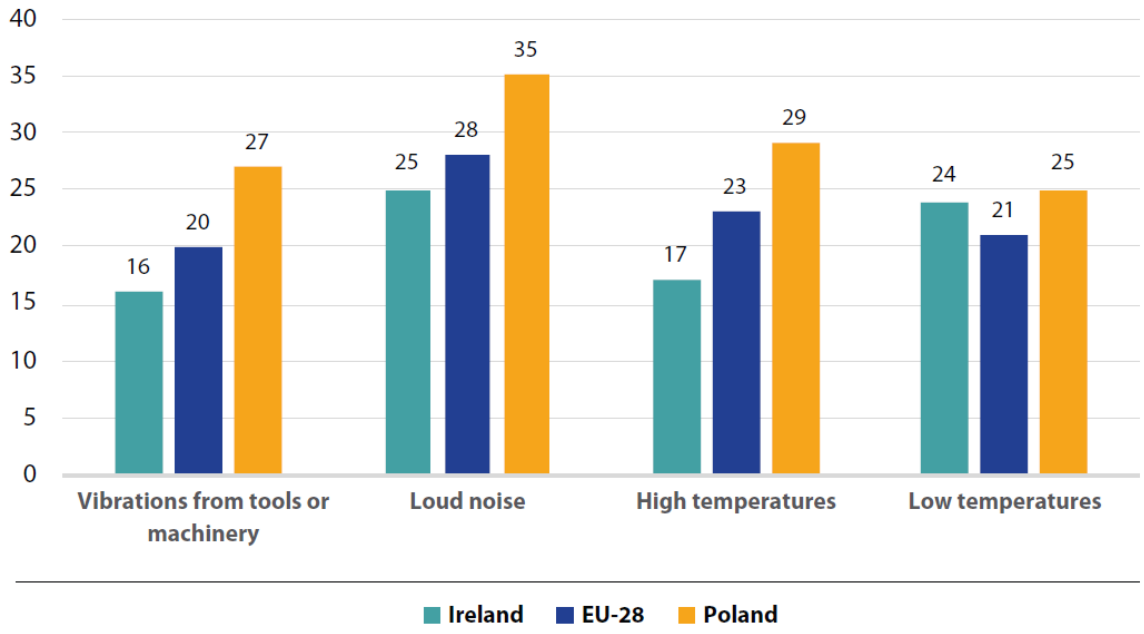
Table 5: Physical health risks, Sectors and exposures – EWCS 2015

Share of employed persons in the sectors agriculture, manufacturing and construction	Exposed to Loud Noise	Exposed to Vibrations	Exposed to Low Temperatures	Exposed to Handling Chemicals
	Country / % Top 7	Country / % Top 7	Country / % Top 7 (+ x)	Country / % Top 7
RO 49.4%	FI 37%	RO 30%	RO 34%	HU 22%
PL 41.6%	SI 36%	HU 27%	CY 29%	ES 21%
CZ 40.6%	PL 35%	LV 27%	EL 29%	PL 21%
SK 39.5%	FR 33%	PL 27%	EE 27%	RO 20%
SI 38.3%	SK 33%	EE 26%	FR 27%	FI 19%
BG 37.1%	LT 32%	LT 26%	FI 26%	FR 19%
HU 37.0%	RO 32%	EL 25%	HR/MT/DK/ES 25%	UK 19%

Country colours: Romania aquamarine, Poland orange, Hungary blue.

The figure below illustrates country differences, based on data from the EWCS 2015: the values of Ireland (green), the EU28 level (blue) with numbers, and the values of Poland (orange). Poland had a relatively high share of employment in industry of 24%, for which Ireland has a share of 12%. The impact on working conditions can be seen in the share of workers reporting exposures to vibrations (Poland 27%, Ireland 16%) and loud noise (Poland 35%, Ireland 25%).

Figure 17: Physical health risks compared (%) – EWCS 2015



In a similar way, **the levels of ergonomic risks** are related with the sectoral structure of a country, determining the type of occupations and work tasks. EU-OSHA provided a detailed analysis of the prevalence of musculoskeletal disorders (MSDs) and the related risk factors in several studies on musculoskeletal diseases, for example, 'Work-related musculoskeletal disorders: why are they still so prevalent?'[58]

An example of the **interrelation between sectors and risks is the connection** between the sector aggregate 'Trade, transport, food/accommodation and recreation activities' and three major indicators of ergonomic burden, that is, 'Painful, tiring positions', 'Repetitive hand or arm movements', and 'Carrying or moving heavy loads'.

Seven countries have a share of employees in this sector of more than 30% (Cyprus, Greece, Spain, Malta, Bulgaria, Croatia and Latvia), and many of them are present in two or three lists of countries with the highest number of responses regarding the indicators.

Table 6: Physical health risks, Ergonomics – EWCS 2015

Share of employed persons in the sector 'Trade, transport, food/ accommodation and recreation activities'	Repetitive hand/arm movements	Carrying or moving heavy loads	Painful and tiring positions
	Country / % Top 8	Country / % Top 9	Country / % Top 7
CY 35.8%	CY 80%	RO 44%	CY 69%
EL 34.3%	RO 77%	LV 38%	EL 66%
ES 32.7%	EL 74%	EL 38%	RO 62%
MT 31.5%	HR 73%	ES 37%	HR 56%
BG 31.2%	ES 69%	FI 37%	ES 54%
HR 30.6%	FI 69%	SI 37%	LT 52%
LV 30.2%	FR/SK 69%	LT/SE/FR 36%	BG 51%

Country colours: Cyprus aquamarine, Greece orange, Spain blue.

The exposure to **painful and tiring positions** and **hand/arm movements** are highest in southern and eastern EU Member States. They also seem to be closely correlated to the sector aggregate 'Trade, transport, food/accommodation and recreation activities'. **Moving and carrying heavy loads** is also connected to the sectors agriculture, manufacturing and construction — Romania, Latvia, Slovakia and Spain are part of the top seven. Looking at the countries for the share of workers who are lifting or moving people, Romania, Sweden and Ireland are the countries with the highest shares (15%, 14% and 13%).

Regarding **occupations, manual workers** — craft workers, plant and machine operators, and agricultural workers — **have the highest score** of posture-related risks and ambient ergonomic risks.

Table 7: Physical health risks, Ergonomics – EWCS 2015[59]

Occupational group	Posture-related risk score	Ambient risks
Managers	16	11
Professionals	16	10
Technicians	18	11
Clerks	16	8
Service and sales workers	24	14
Agricultural workers	31	30
Craft workers	37	31
Plant and machinery operators	34	27
Elementary occupations	30	20
EU-28 average	**24**	**16**

Looking at the data, it is quite obvious that the **northern and the central European countries are underrepresented** in the group of countries with the highest share of physical and ergonomic risks. The central European countries (Austria, Germany, the Netherlands, Belgium, Luxembourg and France, and the two northern European countries Denmark and Sweden) are practically not present in these lists. The picture changes if it is about lifting or moving of people, a consequence of the relatively larger relevance of care work in these countries.

Physical inactivity and permanent or prolonged sitting or standing is a specific ergonomic risk with health impacts for the musculoskeletal system but also contributing to other health impacts like cardiovascular diseases, tendency to overweight and so on.[60] According to ESENER 2019, the second most frequently reported risk factor in the EU27 was **prolonged sitting**. By sector, it was most frequently reported by enterprises in financial and insurance activities (92% of establishments in the sector in the EU28), information and communication (92%), and public administration (89%). On average, three to four hours of this sedentary behaviour occurs at work. In the EU, 28% of workers report that their work involves sitting almost all the time and a further 30% report sitting a quarter to three quarters of the time, and throughout Europe 18% of the workers sit more than 7.5 hours a day.

As mentioned in previous chapters, there exists a **share of workers exposed to physical risks** that is prevalent in spite of all structural and sectoral changes. Some of the structural changes of the economy, for example, from industrial production to maintenance and repair,[61] might even cause higher ergonomic risks; in general it will be more difficult to use technical help tools in varying maintenance and repair situations, compared to more homogenous tasks in industry. Growing sectors, for example, home care of ill or elderly people, involve ergonomic risks due to transport and moving of patients and/or tiring positions.

OSH Barometer – Physical risks:

https://visualisation.osha.europa.eu/osh-barometer/working-conditions-preventions/physical-risk/vibrations-loud-noise-and-temperature

ESENER – Data visualisation:

https://visualisation.osha.europa.eu/esener/en/survey/datavisualisation/2019

EU-OSHA Themes – Musculoskeletal disorders:

https://osha.europa.eu/en/themes/musculoskeletal-disorders

3.3 Contract types and work locations

The chapter deals with the impact of **non-standard types** of work on working conditions in comparison to standard work, focusing on the impact of the 'Conditions of employment' on OSH.

Most studies that dealt with the **connection between the employment forms and health outcomes** and in particular safety and health aspects found significant correlations.[62] A census-based study from Belgium on non-standard forms of work and mortality from Belgium concluded (2021):

'*Our study, which to our knowledge is the first one to assess associations between forms of non-standard employment and mortality using population-wide data, revealed considerable mortality inequalities within the salaried employee population in Belgium. Over the subsequent 13 years and three months of follow-up, certain non-standard workers were at increased risk of death compared to permanently employed workers.*'[63]

The **conventional non-standard types** of work start with widespread temporary (or fixed-term) work, seasonal work, casual work, remote work in different forms (at home or other places), self-employed work, family work, mobile work in transport and often in construction, domestic work, care and craft work at the places of clients, plus several types of less regular and undeclared work.

High public awareness is directed to those types of non-standard work that are connected either to **new forms of contracts** (voucher, platform, zero-hours, etc.) or new types of work made possible by the

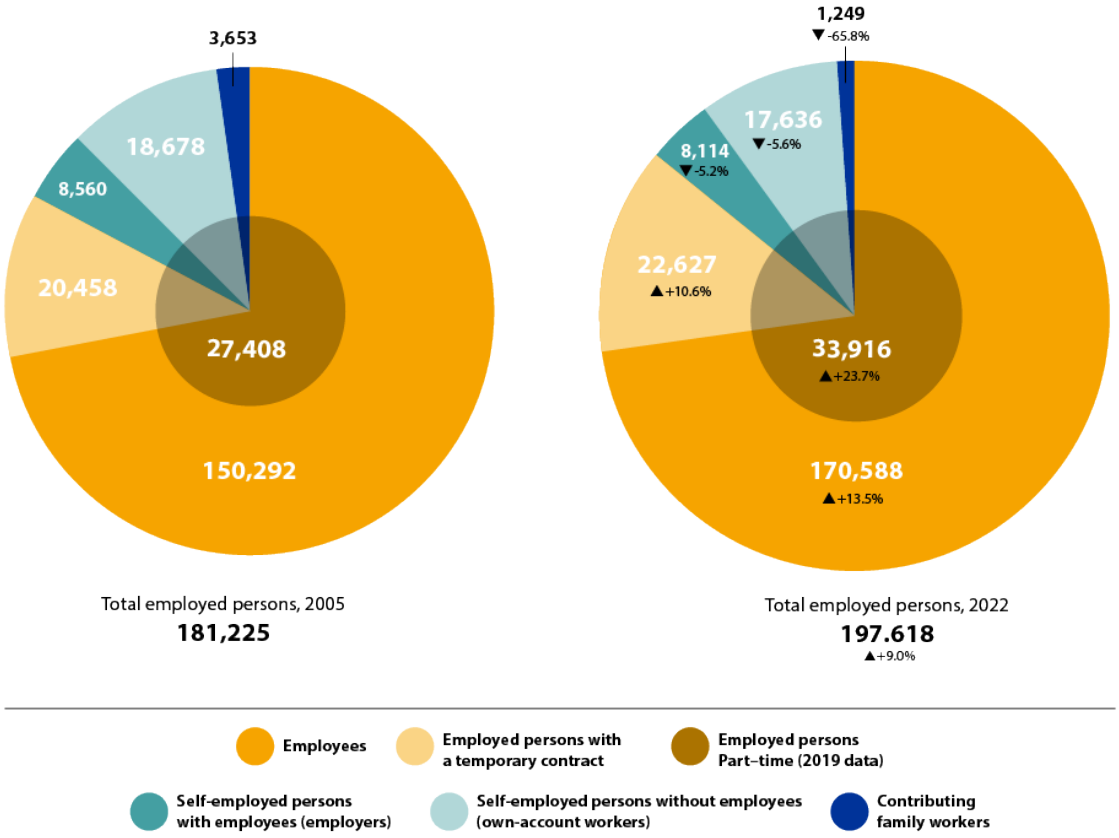
use of modern and powerful ICT technologies, or a combination of those two forms. Depending on the work tasks, ICT infrastructures enable complete independence and separation from the premises of the employer. In addition, they open opportunities for new forms of contracts and can go along with blurred OSH responsibilities.

These forms of work often have as a major quality (feature) a **less clear employer–employee relation**. The main structural element of the EU OSH legislation is the dual role of employers and employees in OSH. The **employer has the overall responsibility** for OSH (Framework Directive Article 5: *'… duty to ensure the safety and health of workers in every aspect related to the work …'*), and the **worker the obligation to contribute** (Framework Directive Article 13 … *'to take care as far as possible of his own safety and health and that of other persons affected by his acts or omissions …'*). Where OSH legislation has to be applied in less clear employer–employee relations, for example, in the case of self-employed, the relevance and impact of 'dyadic' OSH regulations seem to fade.

Not only the EU is struggling with this development, but Australia also introduced the legal identity of a **PCBU**: 'Significantly, the primary duty of care will shift from the "employer" to the broader **"person conducting a business or undertaking"** (PCBU) and duties previously owed to "employees" will now apply to all workers.'[64]

During the past decades, and especially after 1990, a much **greater variety of such contractual relations** has emerged. However, in 2019 the conventional employment contract (part- or full-time) still accounts for around 86% of the workforce (EU27), they are employees. Seventeen per cent of these employed persons have a part-time contract, 13% of the employees have a temporary contract, or both combined. Nine per cent are self-employed without employees. The remaining 4% are self-employed with employees (employers) and 1% are contributing family workers. The number of self-employed in agriculture halved between 2005 and 2019, which is the biggest factor in the reduction of contributing family workers and the stagnation of the number of self-employed.

Figure 18: Employment types in EU27, development 2005 to 2022[65] – Eurostat



The minor deviation of the sum of the different types of employment to the 100% 'Employed persons' is due to 'No response' answers. The data of part-time employees and of employees with a temporary contract are for the full year 2019, not for Q4.

The group 'employees' is characterised by **two major contractual distinctions** that are important for OSH: 1) **full- or part-time** work, and 2) the **time limit of the contract** (indefinite or temporary). Moreover, in many Member States there are major differences between employment contracts of private employers in comparison to public employers.

Definitions Eurostat[66]
Employers = self-employed with employee: employing one or more employees: persons who work in their own business, professional practice or farm for the purpose of earning a profit and who employ at least one other person.
Self-employed: not employing any employees (self-employed without employees): persons who work in their business, professional practices or farm for the purpose of earning a profit and who employ no other persons.
Employees: persons who work for a public or private employer and who receive compensation in the form of wages, salaries, fees, gratuities, payment by result or in kind.
Contributing family workers: persons who help another member of the family to run a farm or business, provided they are not classed as employees.

The quantitative amount of **other non-standard types of work** often is not well statistically monitored but based on estimates. There are several difficulties to generate reliable statistical data: many of these types of work are less regular, they can be below the level of notification obligations or fully undeclared, obligations for statistical notification are not issued or not followed, and/or these types of work are done in parallel together with other forms of work or income. The OECD estimates that the group with the highest share of these types of work are pensioners who perform such work as a second job.[67]

A special case of contract types are **posted and seasonal workers**[68] in the EU. Their numbers have been estimated, for example, in annual reports on 'Labour mobility'.[69]

Table 8: Posted and seasonal workers – Eurostat

Workforce structure – mobility, migration	Latest possible data
Posted workers[70]	2.37 m, approx, 1.2% (2020, EU-27)
Intra-EU seasonal workers[71]	Between 0.65 m and 0.85 m (2019, EU-27)
Seasonal workers – Extra-EU[72]	Approx, 0.1 m (2019, EU-27)

Regarding posted workers a recently published report shows the diversity of working conditions, a low availably of data and the high risk of infringements.[70]

Concerning **seasonal workers** several deficits of OSH were made public, particularly during the COVID-19 pandemic. The European Commission guidance on 'Seasonal workers' states:[71]
'… due to the nature of their work, seasonal workers are often more vulnerable than other workers to situations such as precarious working and living conditions, infringement of labour law, inadequate social security coverage, as well as undeclared work. Practices that ensure that employers and workers are provided with correct information and assistance can prevent or address these issues.'

Overall, the OECD estimates that the **quantitative amount of all types of non-standard work is more than 30%** of employment: *'All types of non-standard work combined, non-standard employment accounts for more than one-third of employment in OECD countries.'*[72]

The OECD also estimates that in 2019 the **new forms of non-standard work account for 0.5% to 3% of total employment**.[73] They highlight the change from traditional non-standard work to new forms: *'Non-standard work is undergoing substantive transformation. In recent years, the decline of some types of self-employment including in agriculture has been partly offset by the emergence and expansion of new forms of non-standard work, in particular jobs relying on new technologies, such as platform-based taxi-like drivers. While today this type of work accounts for only 0.5-3% of total employment in developed countries, it is of considerable importance for young people who rely on new forms of work more frequently than older generations and some of whom seem to set a higher value on work autonomy.'*[74]

The **extrapolation of these OECD estimates to the EU27 indicates** that the amount of **new forms of non-standard work** (i.e. beyond temporary contract or part-time) would be in a range between 1 million and 6 million persons in the EU27.

Eurofound distinguishes in its 2020 report on 'New forms of employment'[75] between nine different types: ICT-based Mobile work, Platform work, Casual work, Employee sharing, Job sharing, Voucher-based work, Collaborative employment, Interim management and Portfolio work. They report several estimates about the scale of these types of work per Member State but they do not present final quantitative estimates for the EU level.

Obviously, as the term 'non-standard' already indicates, these types of work and their consequences are much less documented and less visible than regular forms of employment. To gain a better quantitative **picture of the safety and health situation under such working conditions based on administrative data**, advanced administrative and research efforts would be necessary,[76] for example, a strong collaboration between labour inspections (and other OSH authorities) and those authorities that are supervising, enforcing and policing labour law and obligatory social security regulations, from employment services to police forces.

3.4 Mobile work, home as workplace and domestic work

The place of work — premises of the employer or any other place — is another major characteristic of working conditions, which significantly influences the risks and the preventive measures. This chapter takes a closer look at three types of work, that is, mobile work, private homes as workplace and domestic work, All pose — in a broad sense — similar challenges for OSH.[77]

For OSH, the major **question for all mobile and non-stationery work** is: **to what degree** does the OSH level at these workplaces' deviate **from the OSH level at stationary workplaces**? Current OSH legislation illustrates these difficulties: The Workplace Directive[78] excludes several types of mobile work, and the Display screen equipment directive[79] was issued in 1990 and does not reflect the variety and specific OSH issues of digital equipment development of the past 30 years. Both directives are currently under revision.

Mobile work is a standard characteristic of work in the **construction and transport sector**, extreme for workers in the maritime and other long-distance and international transport sectors, often in tourism and also for certain categories of **sales personnel**, and often standard for qualified **craft workers** during service or construction of plants and installations and during maintenance.[80]

Triggered by developments in digital and communication technologies, several new types of mobile work have developed. In principle, the place of work can be anywhere, in a car, train, hotel, at the premises of other employers, at remote office-like locations, or at the client's workplace or at private homes of clients; it is not 'place-bound'. Most of this mobile work still takes place in the contractual form of regular employment, but mobile work is also a major field for many new forms of new work contracts, triggered by the technological possibilities.

Traditional home-based work consists of the production of small goods that — from a technical point of view — can be produced in private homes (clothes, artisan work and very repetitive work like sorting). This work is performed for an enterprise or a person contracted by the enterprise for the organisation of home-based work and is located at the homes of the workers. It might require extra technical equipment, but sometimes usual private equipment is sufficient. The traditional home-based work very probably has decreased to a low level, the quantity of this type of home-based work is not monitored at EU level.[81] Regulation of OSH for such home-based work has a long tradition in OSH legislation, mostly aimed at achieving working conditions as similar as possible to the other employees in an enterprise, regarding wages, social protection, and safety and health.

Work at, from and in homes. We can distinguish major types: **work at (own) home**, either as independent work (self-employed) or classical home-based work; **work from private home** embedded in daily routine work processes in an enterprise or institution; and **work in homes of others**. Long-term care work, domestic work and teaching are large categories of work in homes; the work is performed in the private homes of clients. Regarding work that is done at **home, from home and in homes**, the application of some basic OSH standards has to take into account the dominantly private character of a home. This triggers the question of **responsibility and supervision**: Who is responsible for risk assessment and prevention measures? Is a supervision of compliance by state authorities in private homes legally possible?

The craft workers who are doing **technical services in homes** of clients are statistically not counted as home workers but as workers at the premises of clients (Eurostat). In some important OSH aspects, it is similar to the work of the other professions; these service workers fulfil their work tasks in a private environment where the employer can hardly perform a risk assessment, for example, of the electrical appliances or safety of floors, handrails or roofs. The risk assessment is done by the worker on the spot, based on experience. This is similar to short-term care work.

Table 9: Types of work: in, at and from home

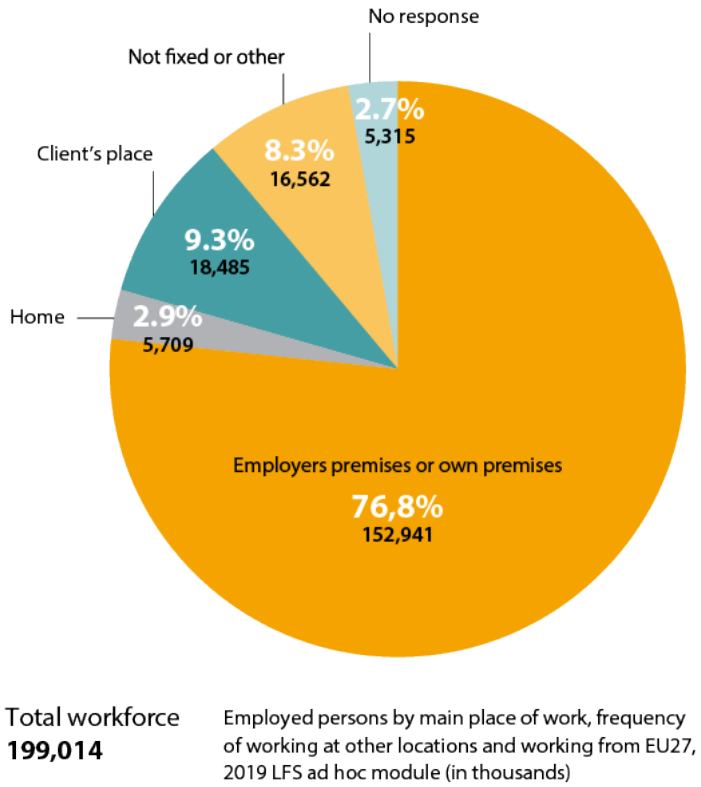
Traditional work at home – Production	Production of small goods or parts of products
Traditional work at home – Services Home as essential or work location for all or a large part of the working time.	• **Liberal professions** like architects, tax advisers, translators, lawyers, etc. • **Employees** using their home as additional workplace: Teachers, judges (paperwork, phone use). • **Combination of living and working** in own apartment or house with a variety of degree of separation between private space and workplace, e,g, tax advisers, lawyers, psycho- and physiotherapists, doctors, farmers etc.[85] • **Phone-based service processes** – a grey zone in transition to ICT-based teleworking.
Teleworking – work from home	Home-based work as part of a service process **embedded in an organisation and to a large degree ICT-based**, mostly for academic, managerial, technical, administrative and clerical professions.
Work in homes of clients – over a longer period	• **Household and personal services** (domestic work). • **Care work** (supervising of children, long-term healthcare).
Work in homes of clients – in general over a short period, some hours to a few days	• **Technical services**, repair, maintenance, gardening, etc. • Smaller **construction works**. • Short-term **supervising or teaching**. • Specific services (e,g, lighter care work like hairdressing).

Eurostat estimates the numbers of workers in three categories of non-stationery workplaces:

- employed persons who **work from home** (covering mostly the three groups 'Traditional work at home - production', 'Traditional work at home - services', and 'Teleworking');
- **at the place of clients**, for example, in domestic services and craft;[82] and
- at **non-fixed or other places**.

The estimate for **work from home** before 2020 was at around 5.7 million or 2.9%.[83] Work at the **'client's place'** is common for more than 9% or 18.5 million employed persons. More than 16 million workers work at **'Non-fixed or other places'** that refers to a large proportion of workers in transport, tourism, construction and craft.

Figure 19: Employed persons by main place of work – Eurostat



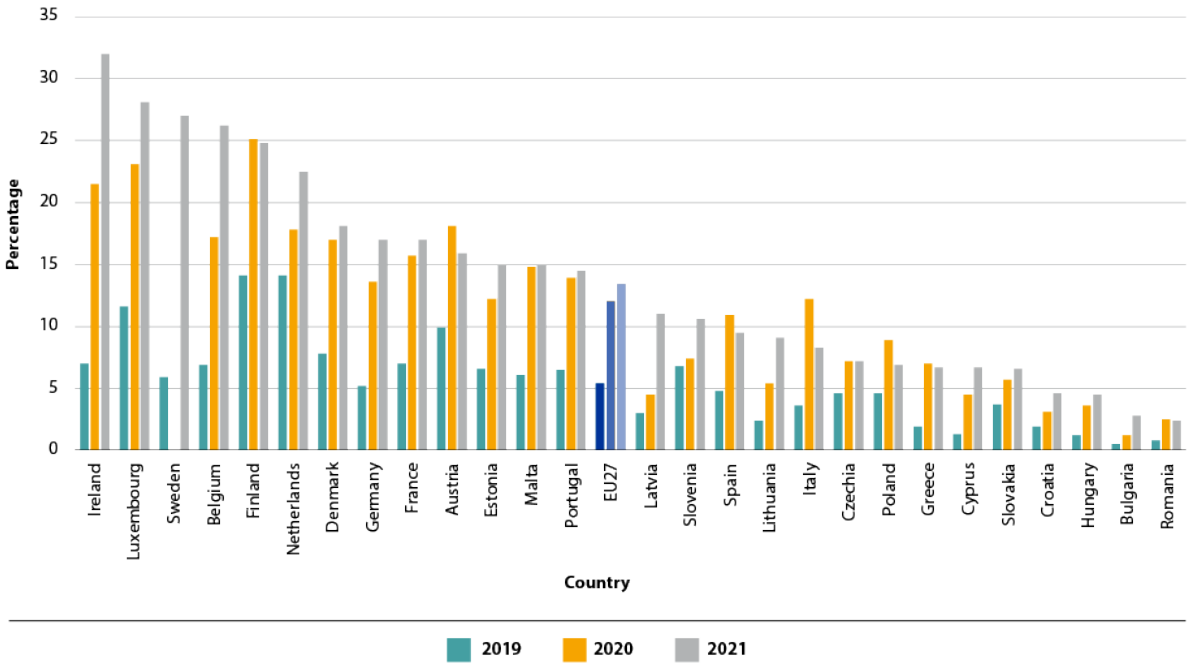
The discrepancy to the total number of employed persons and work at home in Eurostat statistics is due to the different approach in the LFS Ad hoc survey 2019 compared to the regular LFS survey. Note that depending on the type and point of time of Eurostat surveys, the data can be different.

Eurostat reports additional **figures for work from home**, based on the regular LFS survey for the EU27:

*'The percentage of employed persons aged 15 to 64 in the European Union (EU) who usually **work from home** stood at 5.0% in 2017. This figure was highest in the Netherlands (13.7%), followed by Luxembourg (12.7%) and Finland (12.3%), and lowest in Bulgaria (0.3%) and Romania (0.4%).'* [84]

The numbers looked quite different in 2020 and in 2021; in 2021 ca. 13.4% of the employed persons worked usually from home, that is, more than 25 million. This figure will probably even out to a more stable level in 2023/2024 after new post-pandemic teleworking arrangements come into force.[85]

Figure 20: Employees working mostly from home (in % of employed persons) – Eurostat[86]



Note: No data for Sweden for 2020

Some examples — domestic work, care work and ICT mobile work — might illustrate specific situations.

Domestic work is work performed within households to provide services mainly for consumption by household members. Domestic workers perform household and personal services in one or more different homes.[87] **Approximately 9.5 million people** work as domestic workers, 6.3 million declared and approximately 3.5 million undeclared.[88] In general these workers suffer from precarious working and employment conditions. EU-OSHA described — based on the opinion of sector experts — the biggest deficits regarding technical support for better working conditions as follows:

- '*PPE (Personal Protective Equipment) : that covers a large number of conditions encountered by PHS (Personal and Household Services) workers and intended to prevent possible occupational accidents in the sector;*
- *Equipment: that meets ergonomic requirements and increases work efficiency;*
- *Products: taking into account medical health (skin disorders, lung problems, etc.), the environment and the effectiveness of products'.*[89]

Care work in private homes can be a mixture of short-term and repeated mobile work at the home of clients but also fully residential at the home of the care receiver. Of all care workers, 71% worked in residential care and 29% worked in non-residential care, that is, they worked at the homes of the care receiver; 81% of all care workers are female. The number of care workers grew from 4.7 million in 2009 to 6.3 million in 2019 and made up 3.2% of the entire EU workforce in 2019, ranging from 0.3% in Greece to 7.1% in Sweden.[90] Twenty-nine per cent of these 6.3 million care workers do their work at the clients' places, this makes roughly 1.8 million workers.

Eurofound has analysed the working conditions in **long-term care (or LTC)**, that is, the support and care for a long-term or permanent care receiver, not only for some days or weeks to overcome a specific short-term emergency.[91] They summarise:

- *LTC workers often report that they do not believe they will be able to keep working until the age of 60.*
- *LTC workers often do shift work, in particular rotating shifts, and feel that they have no say in their working arrangements; they are often requested to come to work at short notice. Evening, night and weekend work is particularly frequent in residential LTC.*
- *Two-fifths (40%) of LTC workers report lifting or moving people more than three-quarters of the time (compared with 5% of all workers and 23% in healthcare).*

Live-in care is a special form where the carer lives permanently in the house or flat of the care receiver. Eurostat data are not available but national estimates are available for some countries; the estimate for Italy is 160,000 and for Germany 300,000.[92]

Overviews of the quantity of **ICT-based mobile work**[93] demonstrate that such schemes exist in many enterprises and workplaces, particularly for clerical, managerial and professional tasks. For a large share of clerical workers, it has become — latest with the push of the 2020/2021 pandemic — a usual way of working. The highest proportions of workers with arrangements for ICT mobile work are found int the following sectors: information and communication (57% of workers in the sector), followed by professional and scientific activities (53%), financial services (43%), real estate (43%) and public administration (30%).

Which **working** conditions characterise these groups of home workers and mobile workers and different types of work **from, at and in homes**?

As mentioned before, the principal **question for all these types of non-stationary work** is: **to which degree** does the OSH level at these workplaces at home or mobile deviate **from the OSH level at stationary workplaces**? And **which of these deviations are unavoidable, and where are better OSH solutions possible**?

Main issues are:

- space (in cars, trains, hotels, private flats, etc.);
- less well-adapted work equipment, for example, possibilities for ergonomic equipment at mobile workplaces;
- availability of tools, that is, for example, lifting equipment in home care;
- certain facilities like toilets, for example, at construction sites, for bus drivers;
- emergency facilities, for example, fire extinguisher;

- often less secure electrical systems and inadequate light levels;
- unsafe equipment in households like private ladders, unknown chemical products to be used by domestic and care workers;
- unsafe stairs, handrails and so on;
- temperature and ventilation;
- noise.

It is evident that often it is **not possible or very difficult to realise at every mobile workplace a standard close to that of a stationary workplace**. It is a permanent challenge for legislators and supervisors, which minimum limits have to be fulfilled, and at what point these working conditions pose a significant health risk where regulation of minimum standards is needed.

A major issue during the pandemic of 2020/2021 was the **drastically increased number of office workers doing remote or telework** who used without much preparation time mobile digital equipment in an often not well-adapted private home. The EU legislation closest to the **OSH aspects of ICT work and mobile ICT work are Directive 89/654/EEC (Workplace Directive) and Directive 90/270/EEC (Display screen equipment DSE Directive)** that set standards for stationary workplaces. However, the Workplace Directive excludes mobile workplaces, and the Display screen equipment directive refers to the technological situation of the nineties, that is, large monitors and desktop computers. As determined in the EU Strategic Framework 2021 to 2027 both directives will be revised in the next year; this revision might extend the scope to mobile workplaces that are until now excluded and refer to the current technological status of IT devices.

Beside these, there are **uncertainties in the application of OSH regulations for mobile workplaces or in private environments:** unclear responsibility and lack of risk assessment in mobile work and work at, in and from homes, pose an additional risk in OSH. Methods of risk assessment — if performed at all — differ substantially from risk assessment methods at premises, where employers, professionals and state supervisors have direct access to the workplace and control over most of the technical and organisational conditions.

In response to this increase in non-standard work, governmental institutions, business federations and unions developed **new formats of information** that take into account a **higher degree of individual responsibility and a decrease in employer oversight and responsibility**. OSH institutions promote and amplify good examples that already exist. Information via ICT devices has become a popular way of communication. Examples are **interactive response tools** that tailor the response to the needs of the users including employers, workers and OSH practitioners **(**e.g. EU-OSHA's **OIRA)**, and visual resources (**NAPO videos,** EU-OSHA). Some Member States have introduced OSH-specific helpdesks, for example, KOMNET.[94]

3.5 Worker groups with specific risks and needs

Already in 1996 the European Commission identified in its 'Guidance on Risk Assessment at Work'[95] **'sensitive risk groups'** as workers with disabilities, young and old workers, pregnant and nursing mothers, and untrained or inexperienced workers including temporary or migrant workers. Often these groups are addressed as 'Vulnerable groups'[96] or 'Groups at risk'.[97] Other institutions and authors include older workers, women, self-employed or low-qualified workers, and the ILO includes also workers in the informal economy. All these 'assignments' refer either **to individual (endogenous) characteristics** or to the **position on the labour market**.

The scientific literature on the group-related particular risks for health and safety at work is very broad. EU-OSHA and practically all national and international OSH organisations have published studies and provided fact sheets and guidance documents. An overview on such publications shows that awareness, knowledge and policies in and outside enterprises have substantially developed and increased, but there is less evidence about progress in practice.

The textbox below shows some of these specific characteristics for five groups: women, migrants, low-qualified workers, ageing workers and young workers. The Directorate-General for Internal Policies of the Union compiled this in 2010, based on several EU and OECD background documents.[98]

Women

· Most women in the EU bear the main responsibility of household work and childcare. The health risks from this non-paid work add up to the risks from their paid work; this double burden in general is not, however, considered when addressing occupational health problems faced by women.
· In surveys, about 6% of women under 30 in the EU have reported sexual harassment at work (though this may be an under-estimate).
· Overall, women report fewer work-related accidents than men, but higher levels of work-related health problems, including MSDs and stress (see also the overview in the EIGE 'Gender statistics database', section: Working conditions).[99,100]

Migrants

While a minority of migrant workers hold high-skilled jobs, many have jobs that are "dirty, dangerous and demanding" and consequently face high risks of work-related accidents and disease.
· Language and cultural barriers also contribute to higher risks for migrant workers.
· While EU-wide statistics are not available, country studies confirm that migrant workers suffer higher levels of work-related accidents and disease. Health and safety risks are believed to be higher for undocumented migrant workers although, because of their situation, there is a lack of data on their conditions.

Low-qualified workers

· Low-qualified workers are found mainly in traditional sectors, including manufacturing, agriculture, construction, wholesale and retail trades.
· Very often these workers have high-risk or elementary occupations that expose them to a higher rate of injuries and health-related problems.
· Low-qualified workers have less autonomy, less responsibility and overall experience less job satisfaction than workers with higher qualifications. Most low-qualified workers have low-paid jobs and many have temporary contracts.

Ageing workers

· Ageing workers are more at risk of occupational health problems than younger workers because they have been exposed longer to certain hazards. Older workers report more work-related health problems than younger workers, with backache and muscular pain for more than 70% of workers aged 55 and more.
· Older workers are at lesser risk of non-fatal accidents because they have greater experience; however fatal accidents are more frequent than for younger workers.
· Recovery time and return to work after illness are key issues to address when aiming to increase the employment rate of ageing workers.

Young workers[101]

· Overall, young workers have a higher rate of non-fatal injuries than older workers.
· Young workers are more likely to be employed under non-standard forms of contractual arrangements such as part-time or temporary contracts.
· Younger workers have less training, experience and maturity in their job, which puts them at risk of overestimating their physical capacities or underestimating the safety and health risks associated with their tasks.
· A further concern is that exposure to workplace risks when young can contribute to later disease – this factor is not, however, addressed by worker health and safety surveillance.

EU-OSHA specifies the particular disadvantages and **health and safety risks of women at work** on its thematic website on women and health at work,[102] and in several OSHWiki articles.[103]

- *Work in specific sectors and specific types of work*
- *Balance dual responsibilities at work and home*
- *Are underrepresented at supervisor and management level*
- *Are physically different to men, although there is often more variation between women than between men and women, for example, in physical strength*
- *Do jobs that are often wrongly assumed to be safe and easy*

As mentioned, women have a lower accident rate but report higher levels of work-related health issues.

Table 10: Accidents at work and health-related work problems, women and men – Eurostat[104]

Accidents at work (all NACE classes)	Women	Men
Non-fatal accidents at work – incidence rate	1,091	2,050
Fatal accidents at work – incidence rate	0.23	3.06
Health problem – Ad hoc module 2020	10.8%	9.8%

Also, the **burden of household work** is still higher for women. Regarding 'Food management and cleaning', Eurostat reports a much higher percentage of women doing these household tasks. The participation rate of women is on average double that for men regarding food management and two to five times higher regarding cleaning.

Table 11: Time spent for household and family care, men/women – Eurostat[105]

	Men	Women	Men to women in %
	Time spent (hh:mm)	Time spent (hh:mm)	%
Belgium	2:24	3:58	61%
Germany	2:17	3:46	61%
Estonia	2:25	4:00	60%
Greece	1:32	4:22	35%
Spain	2:04	4:33	45%
France	2:22	3:59	59%
Italy	1:39	5:06	32%
Luxembourg	1:51	3:49	48%
Hungary	2:33	4:46	53%
Netherlands	2:13	3:30	63%
Austria	2:18	4:31	51%
Poland	2:28	4:39	53%
Romania	2:10	5:01	43%
Finland	2:25	3:44	65%

Ageing can have positive consequences on safety and health.[106] Depending on the job profile, age might be an advantage if work experience and expertise are of high relevance.[107] The biggest disadvantages are higher rates of physical functional limitations, possibly comorbidities and connected to this a higher rate of health-related absences. There are evident differences between older and younger aged workers regarding length of absences (not frequency) and disabilities, that is, not only recognised serious disabilities but also minor restrictions can be sufficient to stop a physically demanding job.[108] Manual workers of higher age run in competition with younger workers and mostly cannot perform physically exhaustive work in the same way as younger workers. From a preventive point of view, age-related limitations should as far as possible be mitigated by workplace adaptation and help tools.

The higher accident rates of young workers are visible in the Eurostat ESAW statistics. In 2019, the standardised incident rate for non-fatal accidents of workers between 25 and 54 was at 2,469 for workers under 25, and at 1,667 for workers between 25 and 54 years, that is, ca. 48% higher.[109]

Table 12: Non-fatal and fatal accidents at work – incidence rate by age – Eurostat[110]

Accidents at work – incidence rate (per 100,000) NACE (Rev, 2) sectors, A, C-N	2010	2019
Non-fatal accidents at work – under 25 years	2,769	2,469
Non-fatal accidents at work – 25-54 years	1,969	1,667
Fatal accidents at work – under 25 years	2.66	1.28
Fatal accidents at work – 25-54 years	2.61	1.86

The rate for fatal accidents was much lower for young workers; in 2019 it stood at 1.28 for workers under 25, compared to 1.86 for workers between 25 and 54 years.

The main reason for this difference is a high employment rate of young workers in sectors that are more prone to accidents than others, that is, wholesale and trade and hotels and restaurants. Moreover, they have a much higher rate of precarious types of employment, particularly temporary contracts, that is, they are often less trained and less experienced regarding risks at the workplace.

Often one, two or more of these characterisations add to each other, that is, migrant, low-skilled and woman. The table below is one example of such 'crossovers'.

Table 13: Crossovers of health and safety risks among groups of workers (2010) – DG for Internal policies, policy department[111]

Ageing Workers	37.8% of women aged 55-64 work					
Young Workers	40.6% of women between 15 and 24 work	n.a.				
Workers with Disabilities	No information identified	**The rate of disability increases with age**	36% of low-qualified workers are over 55			
Migrant Workers	**Women migrant workers are often in low-skilled jobs**	People over 60 are underrepresented among migrants	**A high share of migrant workers are young**	37.5% of young workers have temporary contracts		
Temporary Workers	14.4% of female workers have fixed-term contracts	10% of workers over 55 have temporary contracts	**37.5% of young workers have temporary contracts**	Some disabled workers have part-time and temporary contracts	**Temporary migrant workers are common in high-risk sectors**	
Low-qualified Workers	24% of female workers are low qualified	**36% of low-qualified workers are over 55**	**37.5% of young workers have temporary contracts**	**Some disabled workers have part-time and temporary contracts**	**Many migrant workers take low-skilled jobs**	15% of unskilled workers have temporary contracts
	Female Workers	**Ageing Workers**	**Young Workers**	**Workers with Disabilities**	**Migrant Workers**	**Temporary Workers**

Sources: Eurostat 2010, 4th EWCS 2005, EU OSHA, Eurofound, OECD 2006, European Commission "Employment in Europe 2010"

In general, a **weak position in the labour market** bears the risk of a low level of safety and health measures. Safety and health risks due to individual characteristics might also be underestimated if the mainstream of OSH measures is designed and implemented for the dominant group in an enterprise or sector. In many enterprises awareness and knowledge of OSH is focused on the core business while other groups are regarded as auxiliary, for example, cleaning, canteen and drivers, also low-skilled clerical workers might experience a missing awareness for 'minority issues' in production-dominated enterprises. It can also be the other way around for manual workers who work in highly administratively dominated enterprises.

Some of these groups are **directly addressed by European and national legislation**, for example, workers with disabilities, young workers or pregnant women. For other groups of workers, for example, for women or migrant workers, the legislative protection is formulated as a general 'equal treatment' prescription, like to provide preventive measures for all groups in an enterprise (Framework Directive, Article 15 'Risk groups'), or to provide solutions that fit to the individual (Framework Directive, Art. 6.2.d.). There are some prescriptions that refer to specific preventive activities, for example, to provide written instructions in different languages for safe work with chemicals.

3.6 Conclusions

The exposure **to psychosocial risks** is increasing, with mental health prevalence still emerging. Major work-related exposures have grown in the past 15 to 25 years that is, time pressure, difficult clients, longer working hours and poor communication. There is also some evidence that countries with over-average employment in sectors like health and care or other human and client-oriented services (education, social work, tourism, entertainment) suffer from longer working hours and more mental burden. The northern countries are at the top of the countries with highest mental burden. The southern countries have a high share of specific psychosocial risks related to work in tourism and entertainment, characterised by atypical working times and issues with difficult clients.

EU-OSHA found in its ESENER 2014 data analysis:[112]
'Concerning the sectors, national context appears to be related to differences in psychosocial risk management in all types of organisations, although in some sectors this relationship is weak. In the agriculture, forestry and fishing sector and the sectors of mining, construction, electricity, trade, transport, and accommodation and food, the low level of psychosocial risk management is observed also in a favourable national context. An explanation for this finding might relate to the large proportion of small organisations in these sectors, which, as concluded earlier, have poorer psychosocial risk management independently of the national context.'

There is a stable **block of 'conventional' physical health risks** — ergonomics and risk from the work environment — and ergonomic risks that did not significantly change since 1990. It varies between 15% for exposure to smoke, fumes and dusts to over 60% for repetitive hand/arm movements. **Ergonomic risks** develop in two directions: 1) traditional risks stagnate in total, that is, lifting and moving heavy loads, painful or tiring positions, and shifts between sectors (from industry to transport, health and care); 2) risks of inactivity and highly repetitive hand/arm movements increase. Beside sectoral and occupational differences, it can be noted that in general higher percentages of exposed employed persons (workers and self-employed) are working in eastern and southern Member States.

Since 2006 the average **working time** per week went down by 15 minutes for employees, and a slight reduction of most atypical — or unsocial — working times can be observed. Work intensification has emerged until 2005 but seems to stagnate since then. There are strong indications but no quantitative evidence on the extent to which working long hours, work at atypical times and probably also work with higher risks were **transferred to workers in non-standard types of employment**.

Non-standard forms of employment are — according to EU-OSHA — characterised by a non-permanent employment contract and the work not being performed at the premises of the employer. Most studies that dealt with the **connection between the employment forms and health outcomes** and in particular safety and health aspects found significant correlations. **New forms of employment** have a wider spectrum of contract types — e.g. voucher, platform — and of places of work — for many types of work practically everywhere.

Non-standard locations of work — mobile work, homes as workplaces, domestic and care work — have as common characteristics special conditions concerning implementation of OSH standards and legislation, be it for technical or legal reasons. Quantitative evidence on working conditions in these types of work is less available than for stationary workplaces; moreover, the OSH responsibility can be blurred. **Mobile ICT work** is a field of new contractual arrangements that besides other aspects in

general reduce, limit or eliminate the employer's duties — and in parallel also the workers' obligations for occupational safety and health. These workers are often exposed to unhealthier working conditions and lower implementation of OSH standards and legislation.[113]

The legal obligation of an **equal level of safety and health for all groups** is difficult to convert into practice. Well-known but still very prevalent are the disadvantages of women, migrants, low-qualified workers, and ageing and young workers. The data show an unequal divide of specific risks, be it on purpose or due to missing awareness of the difference, or of lack of knowledge of the specific needs.

4 Trends in outcomes – safety, health and wellbeing

Work accidents, work-related diseases and the level of work-related wellbeing[114] are regarded as the three major health and safety outcomes of working conditions. They are used as **lagging indicators** (always **work accidents** and often **occupational** or **work-related diseases**, sometimes **wellbeing**) and as proof of evidence in political, scientific or practical discussions about the quality of working conditions and the effectiveness and performance of the OSH system.

Work accidents are probably the **most widely used indicator** for assessment of the effectiveness of the OSH systems and the working conditions in general, also in a broader public; thus, this report will tackle this topic more extensively than other topics. Work accidents are regarded as a result of **insufficient safety prevention**. **Occupational and work-related diseases** are regarded as **short- or long-term outcomes** of all disease-generating circumstances or exposures at work, caused by any type of material or substance, by unhealthy physical activity or unhealthy inactivity, or by disease-causing aspects of human interaction at work. Occupational and work-related diseases are categorised and assessed by experts, particularly by medical professions. **Wellbeing** is the newest concept, covering the individual or group perception of the working conditions.

The **presence of risk factors** and — if possible — the **level of exposure** makes up the largest block of datasets in the OSH Barometer that is used to assess working conditions.

4.1 Trends in safety outcomes – work accidents

The **development of better safety standards, safety technologies and preventive organisational approaches** were major factors to achieve a steady reduction of work accidents and fatal work accidents during the last 30 years. This is caused by crucial improvements in safety measures and technologies, by practical implementation of these measures in enterprises, by scientific developments, and crucially supported by the legal obligation to apply a comprehensive, proactive and preventive approach, as introduced in the EU Framework Directive.

The success of these efforts can be demonstrated by Eurostat's work accident data. In 1998, Eurostat registered in its — just in 1994 introduced — **'European statistics on accidents at work' (ESAW)** an incidence rate[115] of non-fatal accidents of **4,089** (Sector A and D-K, NACE Rev. 1.1, EU-15).[116] **This incidence rate fell to 1,713 in 2019** (Sector A, C-N, NACE Rev. 2, EU27).[117] That is, between **1998 and 2019 the incidence rate of non-fatal accidents in these sectors fell about 58%**. According to ESAW, the total number of non-fatal accidents for all NACE classes in 2019 was 3,140,950.[118]

The incidence rate for **fatal accidents dropped** from **5.03 in 1998**[119] to **2.17 in 2019**,[120] that is, between 1998 and 2019 the incident rate of **fatal accidents decreased by 57%**. The total number of fatal accidents in 2019 was 3,408.[121]

The incidence rate of accidents for **all NACE sectors** is slightly lower. For non-fatal accidents, it stands at 1,603 (compared to 1,713 for Sector A, C-N, NACE Rev. 2, EU27)[122]; for fatal accidents the incidence rate is 1.74 (compared to 2.17 for Sector A, C-N, NACE Rev. 2, EU27); all data for 2019.[123]

1998 using NACE Rev. 1 Sector A, D-K:
A Agriculture, hunting and forestry, **D** Manufacturing, **E** Electricity, gas and water supply, **F** Construction, **G** Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods, **H** Hotels and restaurants, **I** Transport, storage and communication, **J** Financial intermediation, **K** Real estate, renting and business activities.

2019 using NACE Rev. 2 Sector A, C-N:
A Agriculture, forestry and fishing, **C** Manufacturing, **D** Electricity, gas, steam and air conditioning supply, **E** Water supply; sewerage, waste management and remediation activities, **F** Construction, **G** Wholesale and retail trade; repair of motor vehicles and motorcycles **H** Transportation and storage, **I** Accommodation and food service activities **J** Information and communication, **K** Financial and insurance activities, **L** Real estate activities, **M** Professional, scientific and technical activities, and **N** Administrative and support service activities.

The two NACE Rev. 1 sectors **B 'Fishing' and C 'Mining and quarrying'** were not included in the calculations of 1998. They were implemented in the ESAW statistical data from 2008 onwards when NACE 2 was introduced. **'Fishing'** is in NACE 2 part of sector A, and **'Mining and quarrying'** is still sector B.
B 'Mining and quarrying' data are included in those Eurostat statistics about all NACE 2 sectors but not in those statistics that explicitly refer to **NACE Rev. 2 Sector A, C-N**. In 2019 the fatal accident incident rate of fatal accidents in the sector **'Mining and quarrying'** was five times over the average of all sectors (8.23).

International data show the **comparatively low level of work accidents in the EU**. Other countries like the United States showed a similar development during this period.[124] While it is estimated that work accidents contribute worldwide to 19% of all work-related deaths, this figure is 5% for the EU27. When counting DALYs, the work-related injuries account for 17% of all DALYS for injuries and diseases in the EU27, and for 29% globally.[125]

It is evident that **better technical and organisational prevention at workplaces** contributed to this strong reduction of accidents; **prominent examples** of **such improvements** are:

Technical safer design of moving vehicles, for example, fork lifts, heavy trucks and machines, light and noise warning signals for moving vehicles; safer design of machines like automatic shutdowns or disconnections, two-hand operating of machines, for example, for pressing and punching, safer cranes including better technologies for communication between co-workers, coverage of moving parts, safer company cars, for example, safety belts, safer tools, for example, for drilling or cutting; improved PPE like air-supplied breathing apparatus, steel-made gloves for meat workers, trousers that resist a chainsaw; minimum requirements for buildings, for example, forms and size of stairs and handrails, fire exits and fire alarms, safer ladders and scaffolds,[126] emergency equipment like eye wash and emergency shower; better monitoring of acute hazards, for example, in sewage water systems, exhaust and ventilation technologies, to avoid fumes, dusts, chemicals or contact with hazardous biological agents; strong safety obligations for work in confined spaces, work at height and work in trenches; introduction of explosion zones and of non-sparking tools, a comprehensive system of warning signals, warning signals for slippery floors and unsafe grounds, better warning systems and equipment in

particularly dangerous work environments like road maintenance, combined with better organisational measures; quality systems that promote continuous repair and maintenance of tools; regular instructions by safety representatives and safety coordinators, and guarantee of minimum safety standards of machines and products by European standards like CE and CEE.

If an accident takes place, the technical and organisational measures were either not perfect for all conceivable situations or not fully implemented. Based on ESAW, Eurostat analysed the **physical activities per sector** that trigger non-fatal and fatal accidents at work in the EU27 (in 2019).[127]

Table 14: Accidents at work by physical activity 2019 – Eurostat

2019 All Sectors	Non-fatal – % of all accidents	Non-fatal – Number	Fatal – % of all accidents	Fatal – Number
Operating machine	2.56	80,326	3.62	123
Working with handheld tool	7.01	220,297	5.73	195
Driving/being on board at means of transport or handling equipment	3.58	112,512	17.76	605
Handling of objects	12.53	393,647	6.74	230
Carrying by hand	9.34	293,427	2.65	90
Movement	18.58	583,545	16.09	548
Presence	1.74	54,646	8.38	285
Other specific activities	1.93	60,670	4.16	142

Note: Due to incomplete notifications of the 'Physical Activity', the percentages do not sum up to 100%. Also, the sums of the numbers are lower than the number of all reported work accidents.

Still, not only preventive measures but also other non-OSH-related developments worked in the same direction. The shrinkage of the workforce in certain sectors, for example, mining, textile, agriculture, and specific high-risk subsectors of manufacturing, that is, shipyards or foundries, has led to a reduction of the workforce in particularly dangerous working conditions. The production of these sectors was — partly or fully — relocated to other regions of the world, and EU enterprises import the needed products as part of global supply chains.

Major economic changes of sectors with over average work accident rates

The decrease of production in the mining and textile sectors was replaced by the import of mining or textile products. Nowadays the share of workforce in these sectors is much smaller in the EU than 30 years ago. In the EU28 in 2019, mining and quarrying employed 392,000 people, or 0.2% of all employed persons,128 and the textile industry[129] employed 1.5 million people, or 0.7% of all employed persons.[130]

The share of employees in agriculture, also a sector with high accident rates, dropped mainly due to automation from 6.5% in 2005 to 4.5% in 2019[131] (worldwide still at 27%[132]). In construction, another sector with work accident rates over average, the employment is quite stable in the past 25 years and fell only from 6.9% to 6.5%. Some specific works with high accident risk have been outsourced to other regions, well-known examples are the dangerous shipwrecking but also recycling of plastics and electric and electronic devices.[133]

The decline of these sectors and the growth of workforce in other sectors like wholesale, transport, education, health and care shifted the safety risks of working conditions. Several EU Member States also observe a growth of road transport-related accidents during work.[134]

4.1.1 Non-fatal work accidents

DEFINITIONS

Eurostat has developed the European Statistics on Accidents at Work, or ESAW, methodology to harmonise the monitoring of work accidents. This methodology describes how accidents at work have to be reported and defines several terms and conditions.

What is an accident?

'Accident at work' is defined in the ESAW methodology[135] as a **'discrete occurrence in the course of work which leads to physical or mental harm.'**

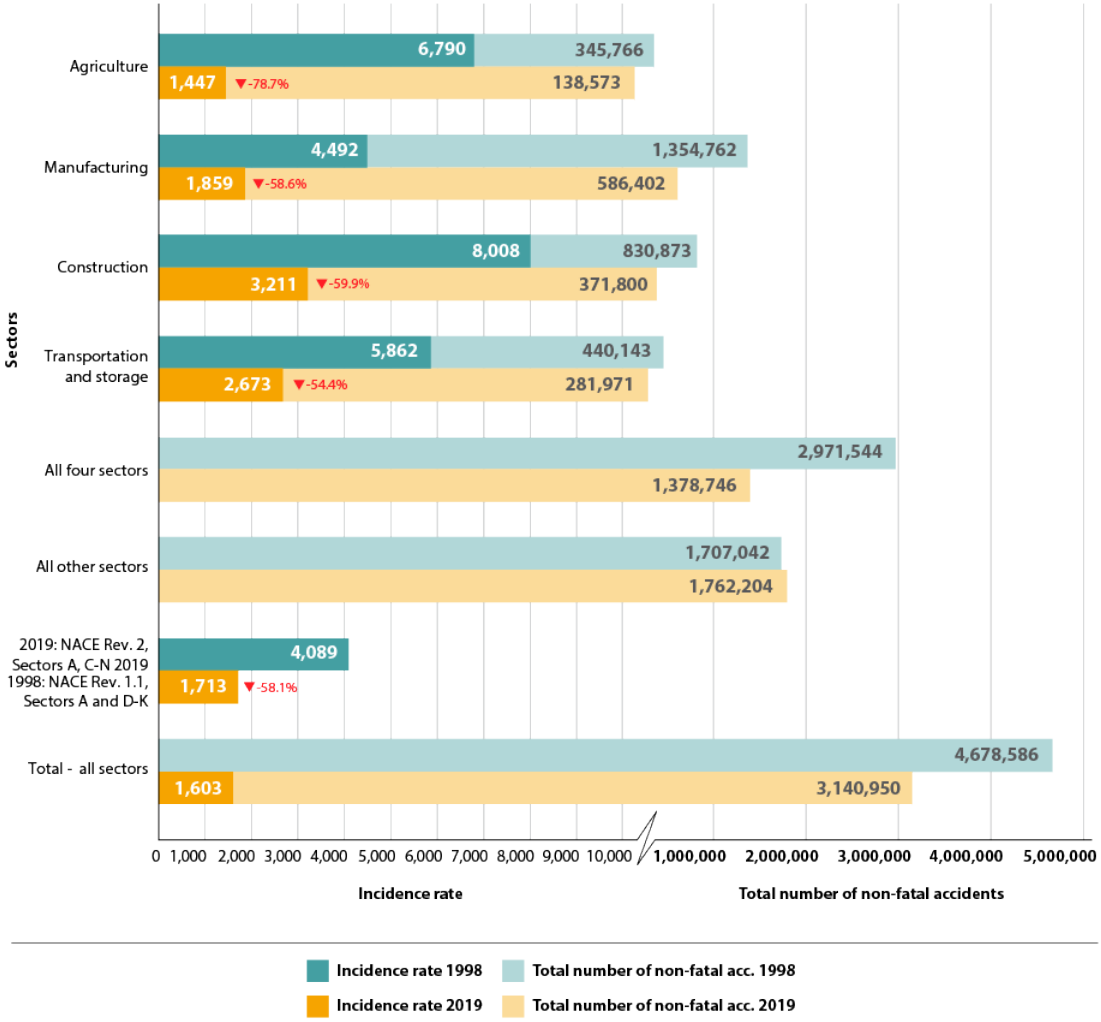
When is a non-fatal work accident counted?

ESAW counts a work accident *'if the resumption of work occurred 5 days after the work accident'*; Chapter 4.2 of the ESAW Methodology 2012 explains: *'Accidents at work with more than three calendar days' absence from work: Only full calendar days of absence from work have to be considered, excluding the day of the accident. Consequently, more than three calendar days' means "at least four calendar days", which implies that only if the victim resumes work on the fifth (or subsequent) working day after the date on which the accident occurred should the incident be included.'*

Exempted are: Commuting accidents, self-inflicted injuries (e.g. suicides), and strictly natural causes that injure people at their workplaces (e.g. earthquakes, floods).

The total number of reported non-fatal accidents for the EU27 was 3,140,950 in 2019.[136] As mentioned in the introduction to this chapter, the incident rates of non-fatal accidents fell in about 25 years from 4,089 (year 1998[137]) to 1,713 (2019), that is, **it decreased about 58%**.[138] The **greatest part of this decrease** took place between **1998 and 2010**,[139] the incidence rate halved to 2,021, **a drop of 51%**. Still, between 2010 and 2019 the incidence rate for the EU27 fell from 2,021 incidents per 100,000 workers to 1,713, a drop of a further 15% (taking 2010 as the reference year).[140]

Figure 21: Development of the total number of non-fatal accidents at work and incidence rates (accidents per 100,000 workers), 1998 and 2019 – Eurostat



Still today we can see **incident rates above average in sectors** like construction and manufacturing, wholesale and retail, transport and storage, and agriculture including forestry and fishing. These are sectors where work with dangerous working conditions is quite common, that is, use or handling of heavy or dangerous equipment (sharp, fast, moving, rotating, high-pressure, hot, etc.), work at height, work on slippery ground, work with electrical equipment, transport and so on.

The ESAW statistics demonstrate that **sectoral differences are still very relevant**.[141] The sectoral incident rates differed between 1,448 for the sector 'Public administration, defence, and compulsory social security' (Sector O) and are highest in 'Construction' (Sector F) at 3,211. In the period between 2010 and 2019 the rate for all sectors dropped from 1,799 to 1,603, that is, 11%. The sectoral rates developed as follows:

Table 15: Incidence rates of non-fatal accidents per sector in 2010 and 2019 (EU27)[142]

All Sectors, EU-27	Incidence rate 2010	Incidence rate 2019	Development 2010 to 2019
Agriculture (A)	1,309	1,447	plus 11%
Manufacturing (C)	2,454	1,859	minus 24%
Construction (F)	3,591	3,211	minus 11%
Wholesale (G)	1,662	1,415	minus 15%
Transport and storage (H)	3,126	2,673	minus 14%
Accommodation and food service activities (I)	1,991	1,757	minus 12%
Administrative and support service activities (N)	2,789	2,477	minus 11%
Public admin,, defence; compuls, social sec, (O)	1,149	1,347	plus 17%
Human health and social work activities (Q)	1,539	1,663	plus 8%
Arts, entertainment and recreation (R)	1,885	1,838	minus 2%
All sectors	**1,799**	**1,603**	**minus 11%**

These figures cover all employed persons, that is, employees, self-employed with employees = employers, self-employed without employees and contributing family member. Literature shows that some **categories of self-employed** have higher accident rates than employed worker persons.[143]**ESAW data can hardly be used for a comparison between self-employed and other groups**, because self-employed are in many EU Member States not part of an obligatory work accident insurance, but can instead take a choice between obligatory insurance, additional private insurance or full private insurance.[144] Moreover, according to the ESAW regulation, the EU Member States can decide whether to report work accident data of self-employed to Eurostat or not.[145]

Since the start of ESAW the identification of the **level of underreporting** was of **high importance**. Periodically, Eurostat itself estimates underreporting rates per country, for example, in the ESAW methodology 2001. This is necessary to understand the very different incidence rates in Member States, reporting at the lowest 62 (Romania) and highest 3,425 (France) non-fatal accidents per 100,000 employed persons (2019).[146] These enormous differences of the occurrence of non-fatal accidents can only be explained by different levels of reporting levels and respectively underreporting.

A quite common method for correcting underreporting is to extrapolate the number of fatal accidents — the reporting rate for fatal accidents is regarded as reliable — to calculate non-fatal accidents. Eurostat provides the coefficient between fatal and non-fatal accidents.

Methodology:
EU-OSHA used the average coefficient between non-fatal and fatal work accidents of the four countries Finland, France, Germany and Spain. The coefficient of registered non-fatal accident per fatal accident varies between 970 (France) and 2,085 (Germany), in 2019. The coefficient average for these four countries is 1,462. If we multiply all ESAW-registered fatal accidents in the EU27 (3,408 cases) with this coefficient, we end up at 4.98 million non-fatal accidents with more than three days of absence.

For the EU27 in 2019, the **average ratio is 922 non-fatal accidents for every fatal accident**.[147] For an estimate, the coefficients **of benchmark countries** with a known high reporting rate are used to estimate underreporting throughout the EU27.[148]

The following table shows the data and the calculation steps.

Table 16: Non-fatal accidents estimated via coefficient of fatal accidents, 4 benchmark countries[149]

Countries (Total, all NACE activities)	Reported Non-fatal Accidents 2019	Fatal Accidents 2019	Coefficient Non-f. Acc. per fatal Acc.
Finland	40,103	29	1,383
France	778,820	803	970
Germany	867,533	416	2,085
Spain	489,643	347	1,411
Four benchmark countries	**2,176,099**	**1,36**	**1,462** (Average)
All fatal accidents EU-27 (2019)		**3,408**	
Estimate of non-fatal accidents (Fatal accidents x coefficient benchmark)	*(3,408 x 1,462 =)* **4,982,496**		
Reported non-fatal accidents EU-27	**3,140,950**	**Reporting rate = 63%**	

The **application of the average coefficient of four benchmark countries to all** the EU27 leads to an estimated number of non-fatal accidents with more than three days absence of approximately 4.98 million. This is 1.84 million more work accidents than reported in ESAW; the **reporting rate of ESAW for non-fatal work accidents with four or more days of absence would be at around 63%**. Country-specific reports about underreporting determine similar figures and support these findings.[150]

There seems to be a **difference in the reporting level** between countries with a universal health system where the reasons for an accident play a minor role and do not impact compensation and treatment. In more fragmented health systems with distinguished work accident insurances, the 'sphere' (work or private life) — where the accident took place — is more relevant and influences the granted treatment and compensation. Some researchers perform this calculation only based on the coefficient of two countries, Finland and Germany.[151] Both have separated insurance-based systems and are regarded as countries with a high reporting level. The coefficient would be 1,734 (average of both countries without weighing of population size); this would result in an estimated number of non-fatal work accidents of 5.91 million.

Self-reports are another option to identify the number of work accidents. In the Eurostat **LFS Ad hoc modules of 2007, 2013 and 2020**,[152] 'Employed persons' were asked whether they had a work accident in the past 12 months.

Table 17: Self-reported work accidents during the last 12 months (EU27) – LFS Ad hoc modules

LFS Ad hoc modules Self-reported work accidents	2007	2013	2020
Percentage of respondents reporting one work accident	3.20%	2.80%	2.30%
Percentage of respondents reporting more than one work accident, Estimate EU-OSHA: 2,2 accidents	Not asked	Not asked	0.40%
Persons in labour force (EU-27)[157] (former name: Active persons)	184 m **-2006**	183 m **-2012**	194 m **-2019**
Extrapolated number of accidents (in millions) For 2020 also added 0,4% with two or more accidents	**5.89 m**	**5.12 m**	1.94 x 2.3 = **4.46** 1.94 x 0.4 = 0.78 **5.24 m**
ESAW Registered non-fatal accidents[158] (four days or more of absence, 2006, 2012, 2019, EU-27)[159]	3.96 m **-2006**	2.94 m **-2012**	3.14 m **-2019**
Rate of reported ESAW accidents to extrapolated LFS self-reported accidents	67%	57%	60%

Note: In 2020, in total 0.4% responded that they had more than one accident; these data are not available for 2007 and 2013.

In 2007, 3.2% of the respondents reported an accident, in 2013 this fell to 2.8%, and in 2020 2.3% of the 'Person in labour force', aged 15-64, responded with a 'Yes'. This corresponds to a decline of 28% from 2007 to 2020. The decline of the total estimated number of work accidents shows a similar trend, a 24% decrease from 5.89 million to 4.46 million (if the persons with more than one accident from the 2020 survey are not taken into account to achieve a better comparability with 2007 and 2013).

For 2020, **an estimate of the number of accidents based on the Ad hoc module results in a figure of 5.24 million**. The number of ESAW-registered non-fatal accidents in 2019 was 3.14 million, approximately 60% of the self-reported. One reason for this difference surely is that the respondents to the question in the LFS Ad hoc module **might refer to every work accident**, including those resulting in under four days of absence.[153]

Estimations

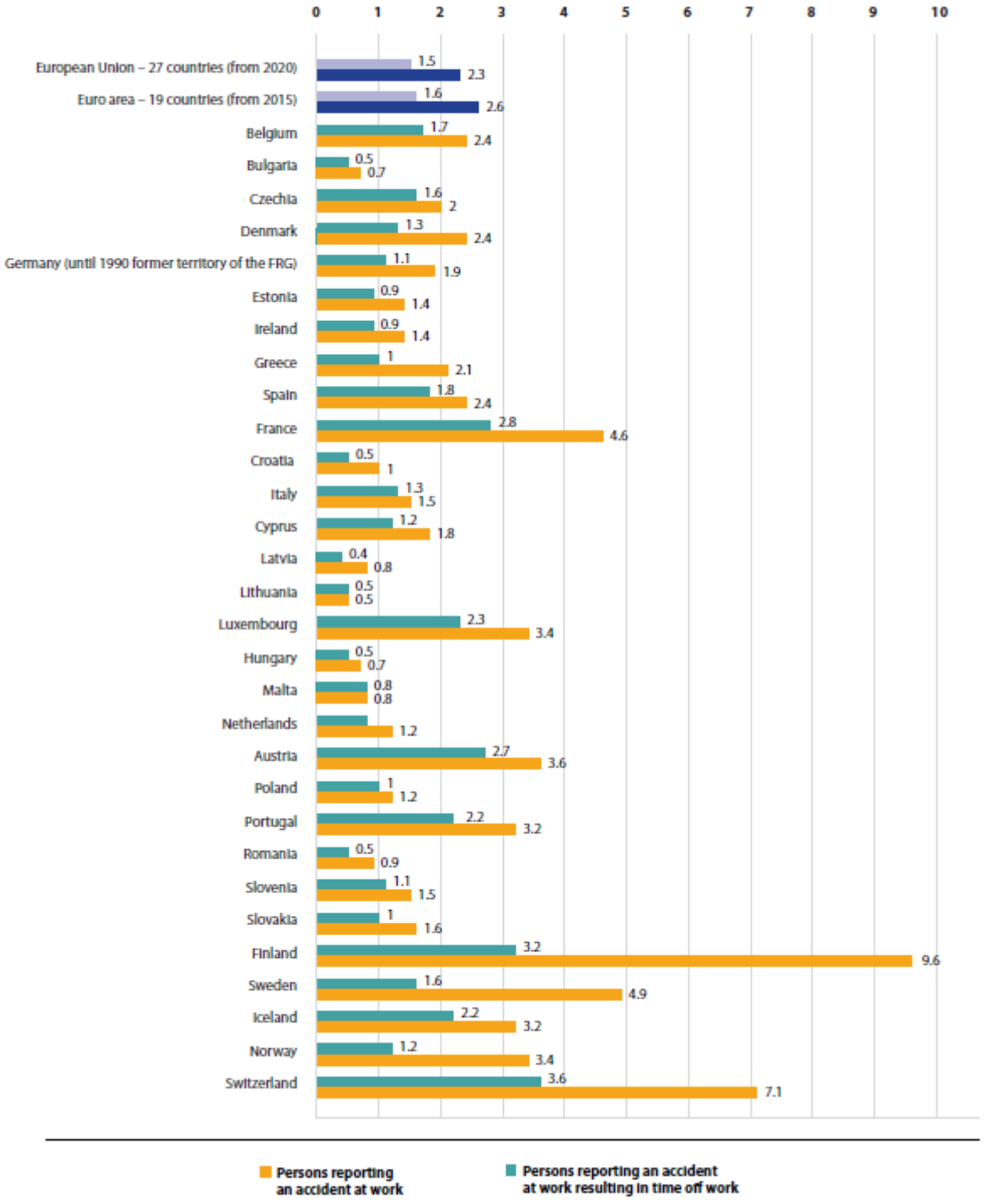
Eurostat itself estimated in 1999 that approximately 37% of the non-fatal accidents did not need to be registered because they resulted in fewer than four days of absence: *'Around 37% of accidents at work in the EU result in fewer than 4 days' loss of work.'*[154] In the estimate above the figures are in a similar range. The **LFS surveys also reveal strong differences between occupational groups**. The ISCO groups 1-3 have less than half the accidents compared to groups 6-7 and 8-9.[155]

Table 18: People reporting an accident by group of occupations (ISCO) – LFS Ad hoc 2020[156]

Self-reported work accidents	2020
Managers, professionals, technicians and associate professionals	1.5%
Clerical support workers, service and sales workers	2.1%
Skilled agricultural, forestry and fishery workers, craft and related trades workers	4.1%
Plant and machine operators and assemblers, elementary occupations	3.4%
Total	**2.3%**

In the Member States there exist very **diverging perceptions of which level of severity of a work accident justifies a notification** — or in the case of the LFS survey a positive response. In the LFS Ad hoc module of 2020, the figures vary significantly between Member States. Some countries practically report only accidents with 'Off work' periods, for example, Italy, Lithuania, Malta and Poland. In other countries the shares of work accidents reported that result in 'Off work' are under 40%, for example, for Sweden and Finland, Greece, Denmark and France.[157] That means that in these countries the respondents reported more than 50% such work accidents that did not cause an absence. Cultural differences in health perception in society and working life will probably be the major reason for these differences.

Figure 22: Share of people reporting any accident and accidents resulting in time off work by country, 2020[158]



The statistical analysis did not distinguish between different numbers of days of absence although the differentiation was included in the English master questionnaires. The reason given is the wording of this question in the national questionnaire; this illustrates the difficulties of surveys at EU level.[159]

4.1.2 Serious non-fatal and fatal work accidents

Eurostat defines a fatal work accident as follows: *'A "fatal accident" means an accident which leads to the death of a victim within one year of the accident'.*[160]
Fatal commuting accidents are excluded, or when counted at national level, excluded from the ESAW data.

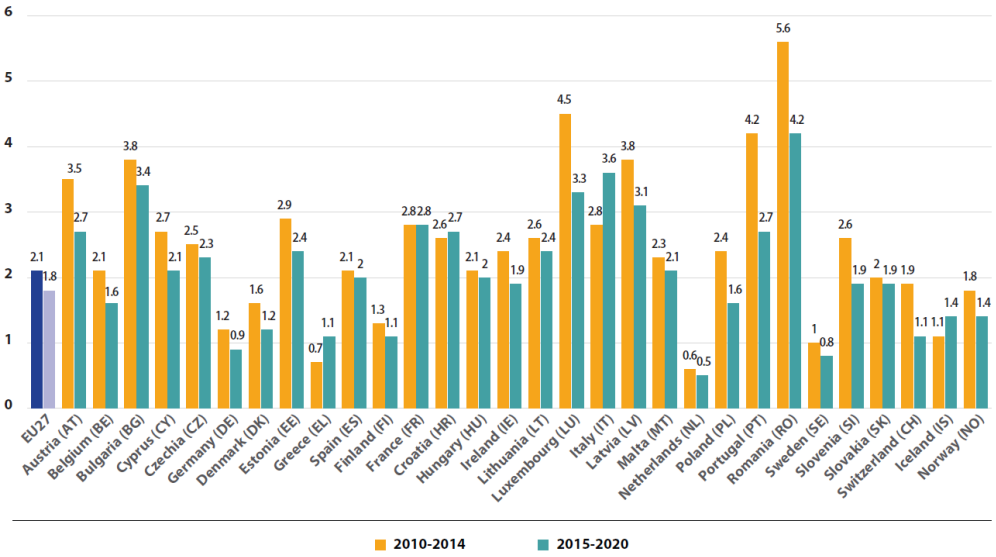
In the last decade, most EU Member States registered a **significant decrease of fatal work accidents**.[161] From 2010 to 2019, for the EU27, the **incidence rate of fatal accidents decreased over all sectors from 2.31 to 1.74**, or a minus of 25%. In the period between 2010 and 2019 the sectoral figures of five major sectors developed as follows:

Table 19: Incidence rates of fatal accidents per sector in 2010 and 2019 (EU27)[162]

Sectors, EU-27	Incidence rate 2010	Incidence rate 2019	Development 2010 to 2019
Agriculture (A)	4.55	4.44	plus 10%
Manufacturing (C)	2.27	1.6	minus 30%
Construction (F)	7.54	6.52	minus 14%
Wholesale (G)	1.43	1.0	minus 30%
Transport and storage (H)	7.16	4.84	minus 32%
All sectors	**2.31**	**1.77**	**minus 23%**

Also, large differences between countries can be noted. The following figure — taken from the OSH Barometer — calculates the number of fatal accidents in periods and compares the period 2010-2014 with 2015-2020. The reason is that — particularly in smaller Member States — a year with one serious and large work accident and several fatalities, or another year without any fatal accident, would distort the annual picture and create significant changes from year to year. Romania, Luxembourg and Bulgaria have the highest incident rates, and the Netherlands, Sweden and Germany the lowest. In 25 countries the rate fell or stagnated in these two periods, with exceptions being Luxembourg and Greece.

Figure 23: Comparison of the average incidence rate of fatal accidents in two periods: 2010-2014 and 2015-2020[163]



ESAW provides more detailed data about the **severity of non-fatal accidents**.[164] According to Eurostat's evaluation of 'Causes and circumstances' of work accidents (**data from 2005, EU-15 and Norway**), in 2005, 3.9% of the non-fatal work accidents or 157,494 non-fatal accidents led to **permanent incapacity** (full or partly), and 138,568 (3,4% of all accidents) to absences from three to six months.[165]

In 2019, the **outcome** 'Permanent incapacity or 183 days *(of time-off)* or over' **made up 4.4% of all non-fatal work accidents or a little more than 100,000 cases**. **As serious outcomes** we regard at least the cases in the ESAW category: non-fatal accidents involving these consequences are more than **34 times more frequent than fatalities**. These detailed time-off and outcome data are only available for the sectors A and C-N, not for the other sectors with lower accident rates. If we include in the definition of a serious accident also the **ESAW category 'Time off between 3 and 6 months', another 5.4% or 129,150 non-fatal accidents** would be added to the category 'Serious accident'.

This would **sum up to 232,892 accidents at work with a time off between three and six months, and of more than six months or a permanent handicap**.

Table 20: Severity of accidents in the EU27 in 2019 (sectors A and C-N)[166]

All Accidents in A, C-N	More than 6 months or permanent handicap (% of all accidents)	Fatal (% of all accidents)	Coefficient between more than 6 months or permanent handicap / fatal
2,377,146	103,742	3,008	34.5
100%	4.4%	0.13%	
All Accidents in A, C-N	**Time off between 3 and 6 months (% of all accidents)**	**Fatal (% of all accidents)**	**Coefficient between time off between 3 and 6 months / fatal**
2,377,146	129,150	3,008	42.9
100%	5.4%	0.13%	
All Accidents in A, C-N	**Time off between 3 and 6 months, more than 6 months or permanent handicap (% of all accidents)**	**Fatal (% of all accidents)**	**Coefficient between time off between 3 and 6 months. more than 6 months or permanent handicap**
2,377,146	232,892	3,008	77.4
100%	9.8%	0.13%	

National data showed similar coefficients; a calculation for two EU Member States showed a coefficient of 27 for Germany (only permanent handicap) and 66 for France.[167] EU-OSHA used the severity data of Eurostat in its study on 'The value of occupational safety and health and the societal costs of work-related injuries and diseases' (2019).[168]

According to the publication 'Causes and circumstances of accidents at work in the EU' (DG EMPL and Eurostat), the types of work accidents **causing the longest average days of absence** are: 'Slipping, stumbling and falling' (46 absence days), followed by three more categories at the same level: 'Loss of control of machines or handheld tools', by 'Shock, fright, violence, aggression, threat, presence',[169] and by 'Electrical problems, explosion and fire' (all three types of accidents with an average of 38 days of absence).[170]

To conclude, for an estimate of the burden of accidents at work, the distinction between fatal and non-fatal is too rough. **ESAW data allow a finer analysis, at least for the sectors with higher accident risks.** The high number of serious and permanent health outcomes cause human suffering and significant societal costs; but they play an undervalued role in discussions on work accidents as OSH indicators. It has to be mentioned that these data play a large role as **indicators in non-European OSH systems**; Canada uses the Disabling Injury Frequency Rate (DIFR).[171] Australia applies incidence and

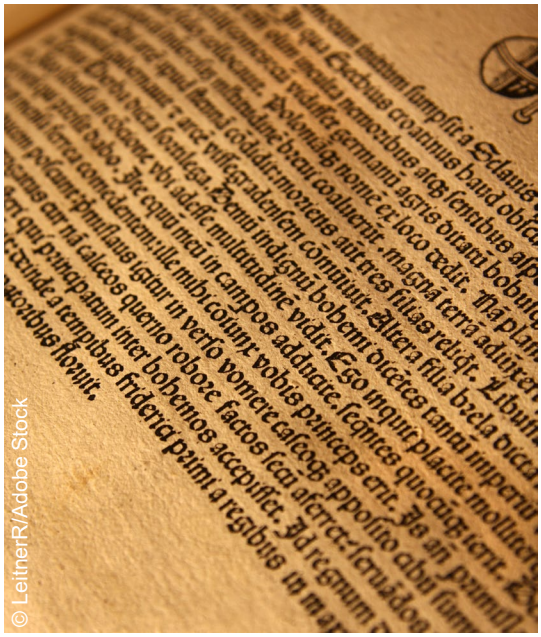
frequency rates, which show the incidence rate and frequency rate of long-term (12 weeks or more compensation) injury and disease claims.[172]

OSH Barometer – Non-fatal accidents at work:
https://visualisation.osha.europa.eu/osh-barometer/accidents-diseases-well-being/work-accidents/non-fatal-work-accidents

OSH Barometer – Fatal accidents at work:
https://visualisation.osha.europa.eu/osh-barometer/accidents-diseases-well-being/work-accidents/fatal-work-accidents

Eurostat – Accidents at work (ESAW and LFS Ad hoc modules):
https://ec.europa.eu/eurostat/web/health/data/database

4.2 Trends in health outcomes



'The misfortune (harm) that these types of workers get from the work in their workshops, beyond their uncomfortable sitting life, is the threat of Myopia. The well-known affection of the eyes, because self-evidently for a good visibility it is necessary to move the eyes closer to the objects of work.'[173,174]

Ramazzini, 1713: De Morbis Artificum Diatriba in its chapter *on 'Diseases of those who do fine work'. Ramazzini's observation anticipates somehow the 21st century knowledge on sedentary work and about accommodative fatigue at a near viewing distance.*

Work-related health outcomes represent a much higher burden for society than work accidents.[175] More workers are affected; the overall costs are much higher. At first glance, the trend of health outcomes (illnesses and wellbeing) **caused by 'exposures' at workplaces** is similarly decreasing like the accident trend; that is the case if the scope of the analysis refers to the **officially recognised occupational diseases**.

The situation is complex, because only few and mostly the recognised **occupational diseases** have a unique cause-effect relationship, that is, a **very strong relation between one specific exposure at work and one (or more) well-defined disease(s)** as a result of this exposure.

In 1987, a joint ILO/WHO expert committee on occupational health offered the suggestion that **the term *work-related diseases*** may be appropriate to describe not only recognised occupational diseases but other disorders to which the work environment and performance of work contribute significantly as one of the several causative factors (Joint ILO/WHO Committee on Occupational Health 1989):
'Nevertheless, it is not always that easy to designate a disease as being work-related. In fact, there is a wide range of diseases that could be related in one way or another to occupation or working conditions. On the one hand, there are the classical diseases that are occupational in nature, generally related to

one causal agent and relatively easy to identify. On the other hand, there are all sorts of disorders without strong or specific connections to occupation and with numerous possible causal agents.'[176]

Some professions and regular work tasks had and have very specific risks, for example, hearing disability through high noise levels, or musculoskeletal diseases caused by permanent repetition of a certain movement or posture, or specific cancers after exposure to carcinogenic chemical substances, infections in healthcare or work in laboratories, or allergies to natural substances in agriculture. Some examples are:

Occupation, work task, exposure	Occupational disease
• healthcare of infected persons	► infection with the same disease
• highly repetitive hand and arm movements	► epicondylitis
• quartz dust	► silicosis
• working long hours in a kneeling position	► bursitis
• extensive UV exposure	► skin cancer
• aromatic amines	► bladder cancer
• professional musicians	► focal dystonia
• grain dust (agriculture)	► allergies, asthma

Specific and strong connections between **a risk and an outcome (risk pairs)** are **covered by occupational disease recognition schemes** in the EU Member States.[177] Some countries have opening options in their list systems, that is, in principle every disease with a dominant cause in working conditions can be recognised. However, many court cases about the recognition of occupational diseases demonstrate that a clear cause-effect relationship is not always evident, that is, due to missing workplace exposure data from the past or competing causes in private circumstances. All occupational diseases with a principally unambiguous relation between cause and consequence account only for a small percentage of all **work-related diseases**.[178]

We can observe a **decrease of some of the major recognised diseases**,[179] either triggered by preventive measures or triggered by shifts of workforce to sectors with less recognised occupational diseases. The **new experimental EODS Statistics of Eurostat** [180] documents the following developments of recognised occupational diseases.

Table 21: Development of recognised occupational diseases in the EU 2013-2019

Disease	2013	2014	2015	2016	2017	2018	2019
Selected occupational cancers	100	100	93.8	94.6	91.9	81.5	86.3
Mesothelioma	100	98.5	97.8	96.2	100	92.7	86.2
Asthma	100	100	100	101.1	88.9	81.8	97.2
Pneumoconiosis	100	107.2	91.2	76.8	80	66.9	92.9
Contact dermatitis	100	100	98.1	101.7	101.1	98.4	77.8
Selected musculoskeletal diseases	100	104.3	100	111.6	106.5	100	99.8
Other diseases of the inner ear	100	87.4	91.3	78.9	81.1	78	53.7
Total	**100**	**102.2**	**100**	**100**	**98.5**	**86.2**	**93.3**

Even in the **short period between 2013 and 2018** (the period covered by these pilot statistics) the data show an overall decline and a decline of several relevant occupational diseases. The strongest decrease — practically a halving — can be seen for hearing impairments (diseases of the inner ear). Pneumoconiosis, mesothelioma and selected occupational cancers went down between 7% and 14%. **Asthma and some recognised MSDs** are more or less stagnating, probably due to unchanged exposure to biological or chemical substances and no change regarding the health outcomes of ergonomic working conditions.

If work is **one of some** causative factors, a clear assignment of work to a health outcome is complex. Moreover, in many cases a quite **long observation period** is necessary simply due to the **latency time between exposure at work, outbreak and detection of a disease**, which is obviously very different from the clear and immediate consequence of an accident at work.

The detection of a disease and the correlation between work and this disease depends highly on the **monitoring capacities of the health system and its ability, tradition and standards to connect diseases and work-related causes**. In a study on 'Asbestos-related occupational diseases in Central and East European Countries' the authors refer to different policies for identifying workers formerly exposed to asbestos and conclude:

'Consequently, large differences are observed from one country to another regarding the number of recognised asbestos-related cases. In Slovenia, for example, the annual asbestosis rate (cases of asbestosis/population) amounts to 14.9, in Croatia 5.3, and in Poland 2.1. Moreover, in Estonia, the incidence of asbestosis is unknown as there is no systematic collection of data.'[181]

For example, until now very few occupational diseases have been recognised as outcomes of psychosocial risks at work. The ILO proposes in its 'List of Occupational Diseases Recommendation' a large number of very specific and 'classic' occupational diseases — a very broad definition of *'Mental and behavioural disorders'* but leaving the responsibility to science and to 'national conditions'.[182] Similarly, the development of the European Schedule of Occupational Diseases (ESOD) aims to improve knowledge, step up prevention and provide assistance in linking occupational activities and diseases.

ILO 'List of Occupational Diseases Recommendation'

2.4. Mental and behavioural disorders

- *2.4.1. Post-traumatic stress disorder*
- *2.4.2. Other mental or behavioural disorders not mentioned in the preceding item where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to risk factors arising from work activities and the mental and behavioural disorder(s) contracted by the worker*

And there are also **emerging and new risks** where health data will **not be available until a certain number of workers are exposed for quite a while**. Some prominent examples are nanotechnologies, the significant increase of new chemically based technologies, vision impairment due to long hours of work under artificial light at the same distance with small digital equipment,[183] more exposure to 'global' biological agents due to more interactional tasks, and travel and transport between countries and continents. On that note, the Covid-19 pandemic could also be used as an example. In 2022, the Commission proposed an update of the Recommendation on the ESOD to recognise Covid-19 as an occupational disease for workers particularly concerned: health and social care, home help or where there is a proven risk of infection (during a pandemic) in other sectors[184].

It adds to these difficulties that workers are often not only exposed to one disease causing exposure but to **several exposures** at the same time (exposure is understood here in a broad sense: ranging from long working hours over postures and movements to harassment and violence and to noise and chemical and biological substances, etc.). **In theory, a single risk** — if below the threshold limit values and in line with legislation and standards — **will not cause harm — given that it is the only exposure**. The impact of this single exposure is not strong enough to generate a disease on the level of severity of a recognised occupational disease. A **combination of several risks** might add several exposures, worsen the impact and cause serious harm.

Quite well studied is the increased prevalence of musculoskeletal diseases, if not only ergonomic risks but also high psychosocial risks are prevalent at the workplace.[185] Research has also found unexpected connections like the synergistic effect of noise and certain chemicals on hearing impairments. Such outcomes of multi-risk profiles are often particularly difficult to identify and understand. Obviously, most sectors and occupations involve workplaces with **multi-risk profiles**. Some prominent major risks in certain sectors or occupations are:

- agriculture = accidents, chemical and biological agents, UV exposure;
- delivery services = traffic accidents, ergonomics, time pressure, exhaust fumes;
- decentralised renewable energy construction and maintenance = falls from height, electricity;
- waste and recycling = biological and chemical agents, cuts and accidents;
- mobile work = ergonomics, work without time and space limits;
- care at home = emotional, ergonomic, difficult clients, unsafe household situations, infection risks;
- healthcare = emotional, ergonomics, biological;
- personal and household services = emotional, ergonomic, unsafe household situations, e.g. unsafe electrical equipment, exposure to unknown chemicals;
- long-haul sea, train, road or air transport = atypical working times, shift work, monotony, long phases of physical inactivity;
- car repair = ergonomics, dust and fumes, chemicals;
- construction = falls from height, accidents with machinery or vehicles, slips, trips and falls, ergonomics, noise, chemicals, dust, UV exposure, etc.

4.2.1 Statistical picture of mortality and morbidity

The development of the **overall health status and its two major indicators — mortality and morbidity** — is of high relevance for OSH. First of all, these overall 'Outcome indicators' cover the whole population and can be an indicator for the health impact of working conditions. Secondly, the practical OSH management has to react to trends in health: this can be the general ageing of the workforce, changing morbidity patterns with impact on the overall ability to work and on the practical work organisation, or reactions to trends like physical inactivity, overweight or the rapid growth of mental diseases.

In public health, the probably most important and most used statistical indicator is **'Life expectancy'**. Life expectancy **at EU level** has increased steadily for many decades and reached 80.1 years in 2021.[186] It is 82.8 years for women in 2021 and was 81.5 years in 2006; for men it increased from 75.1 years in 2005 to 77.2 years in 2021.[187] It was highest in 2019 at 81.3 and fell by 1.2 years in 2021, mainly due to the COVID-19 pandemic.[188]

The Eurostat **life expectancy** statistics clearly document **serious differences between EU Member States**. Southern European countries have the highest life expectancy followed by northern and western countries. Below average we find those countries that joined the EU in 2004, for example, eastern European and Baltic states, and Denmark and Germany.

Table 22: Life expectancy by age and sex - in years at the age of 65[189]

TIME	2019					
SEX (Labels)	Total		Males		Females	
GEO (Labels)						
European Union - 27 countries (from 2020)	20.2	bep	18.3	bep	21.8	bep
Belgium	20.6		18.9		22.1	
Bulgaria	16.3		14.2		18.1	
Czechia	18.4		16.4		20.1	
Denmark	19.8		18.4		21	
Germany	19.9		18.3		21.4	
Estonia	19		15.8		21.1	
Ireland	20.8	e	19.4	e	22.1	e
Greece	20.4		19		21.7	
Spain	22		19.8		23.9	
France	22	p	19.8	p	23.9	p
Croatia	17.9		15.9		19.5	
Italy	21.4	b	19.7	b	22.9	b
Cyprus	20.3		18.9		21.5	
Latvia	17.4		14.4		19.4	
Lithuania	17.9		14.8		20	
Luxembourg	20.9		19.2		22.4	
Hungary	16.9		14.8		18.6	
Malta	21.1		19.4		22.5	
Netherlands	20.3		19		21.4	
Austria	20.3		18.7		21.7	
Poland	18.5		16.1		20.4	
Portugal	20.6		18.5		22.3	
Romania	16.9	e	14.9	e	18.6	e
Slovenia	20.1		18.1		21.8	
Slovakia	17.9		15.7		19.7	
Finland	20.6		18.8		22.3	
Sweden	20.9		19.6		22.1	

(bep): break in time series, estimated, provisional, (e): estimated, (p): provisional, (b): break in time series

The development of life expectancy and causes of lower mortality in the EU are summarised each year by the OECD/EU in their joint overview 'Health at a glance'.[190]

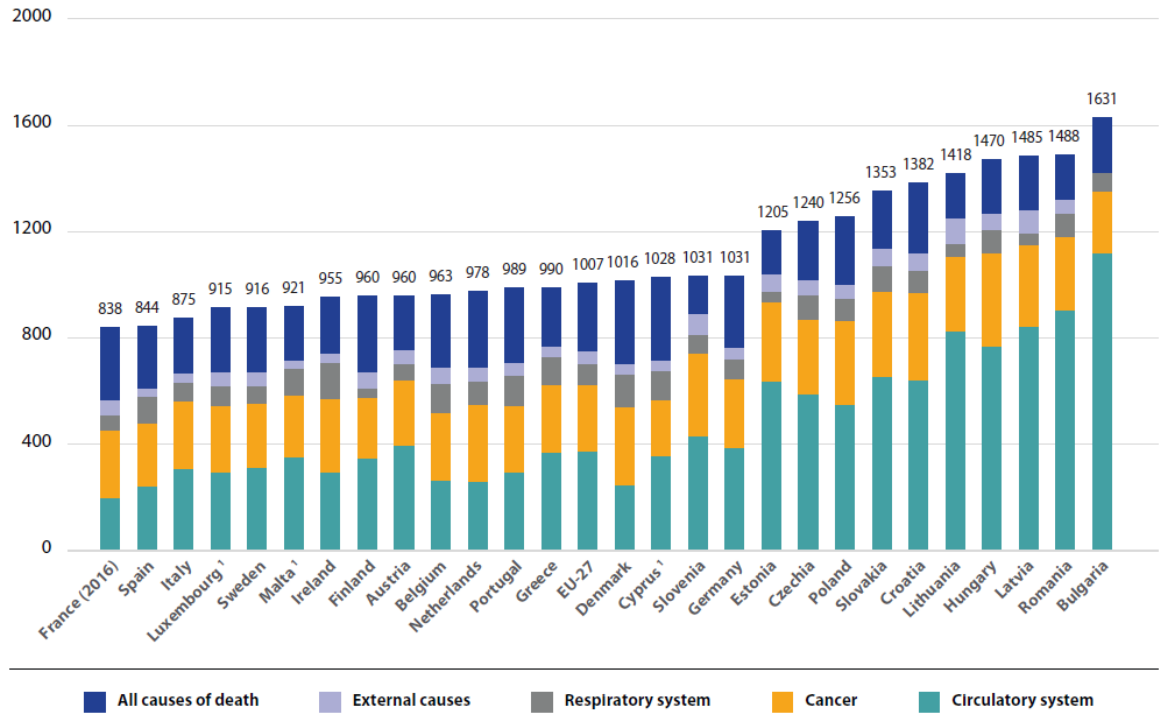
'Steady and substantial reductions in mortality rates from IHD (Ischaemic heart diseases), strokes and other circulatory diseases were the main driver of increases in life expectancy in previous decades, but these reductions have slowed down over the past five to ten years in several Western European countries (e.g. France, Germany and the United Kingdom). This has contributed to the slowdown in life expectancy improvements.' (OECD/The King's Fund, 2020)[191]

The overview includes the **life expectancy of persons at birth and being 65 years old**, in the EU plus neighbouring countries that report to the EU. The geographical disparities of the life expectancy repeats;

people in eastern European and Baltic states have a life expectancy (at the age of 65) of less than 17 and up to 19.5 years, they all are under the average of 20.0 for the EU28. Some mixed results can be observed for Germany, Belgium and Denmark, but clearly southern and northern countries as well as France have the highest life expectancy.

Regarding mortality and morbidity, in 2019 at EU27 level the **main causes of death** were cardiovascular diseases plus stroke and ischaemic diseases (35%), cancer (26%), respiratory diseases (8%), and accidents and external causes (5%).[192]

Figure 24: Main causes of mortality 2019, EU27



Note: External causes of death include accidents, homicides and other causes. The EU average is weighted (using inputed estimates for France for 2017). Data for France refer to 2016. 1. Three-year average
Source: Eurostat Database

Generally, academic literature groups the main **determinants of life expectancy** into three main categories: **resources of the healthcare system, factors related to lifestyle, and socioeconomic factors**.[193] **Working conditions are in general regarded as part of the socioeconomic status.**

'A number of studies have turned to examining within-country health inequalities in order to understand population health. One of the first notable studies was the Black Report (Black 1982), which exposed staggering differences in health across socio-demographic groups in Britain. Since then, it has been shown that systematic and persistent health inequalities exist worldwide, whereby individuals with lower income, education, and occupational status tend to enjoy considerably worse health.'[194]

Due to the difficulty to receive harmonised morbidity and health data from administrative sources of the national health systems, **European quantitative overviews often rely on surveys** that ask for self-reported health data (Eurostat: Survey on Income and Living Conditions SILC, Eurofound: European Quality of Life Survey EQLS, etc.[195]).

The **EU Statistics on Income and Living Conditions (EU-SILC)** corroborate the impact of the socioeconomic status for an unequal health status, life expectancy or expected healthy life years. **People with lower income are less likely to report being in good health**: 59% of EU citizens in the lowest income quintile (the lowest 20%) report being in good health compared to 80% of those in the

highest quintile, a difference of 21% (EU27, 2019).[196] The **European Quality of Life Survey** (EQLS) finds that 13% of the lowest quartile report bad health (EU28, 2016), compared to only 4% of the respondents of the highest income quartile.[197]

The **relation between socioeconomic status — measured by income — and working conditions** is often not further analysed, at least not on an aggregated statistical level. Due to complex methodological difficulties and strong national variations of the health systems, there are until now **no EU-wide morbidity statistics available, based on administrative data**.[198] A 'Morbidity Task Force' at EU level worked between 2005 and 2011 on the development of such statistics.[199] Country-specific data — without a harmonised approach between countries — are provided in EU and OECD publication series.[200]

The system of **European Core Health Indicators (ECHI)** provides an overview on prevalence of major diseases.[201] Main morbidities covered until now are asthma, chronic obstructive pulmonary diseases (COPD), communicable diseases, depression, dementia, diabetes, diseases caused by drugs, HIV/AIDS, and physical or sensory functional limitations. However, in ECHI there is no option to relate these diseases to sectors or occupations.

The impact of work — as one essential element of the socioeconomic status — on health was the subject of numerous academic studies, often performed as specific case studies. The authors of an overview study on 'Cross-country inequality in the EU' summarise (more references in the original text):

'Occupational grade and labour market status are among the factors most often studied in relation to health and mortality. Occupational grade has been found to be associated with self-rated health, mental and physical health, such as the presence of long-standing illness and a number of diseases. Lower occupation might affect health through poor working conditions, such as the higher exposure to occupational hazards and toxic compounds, health-damaging behaviours and psychosocial stress. Work-based stress combined with a lack of autonomy over one's work are believed to be the psychosocial factors that can cause physiological changes, such as increased risk of cardiovascular diseases and reduced immune system response. It has been shown that the gaps in mortality between different occupational grades persist in old age and tend to widen with age.[202]

Eurostat provides in the LFS **2020 Ad hoc module** on 'Accidents at work and other work-related health problems' a rough overview on such relations, with some specification, for example, for sectors, attainment levels, professional status, size of enterprise or occupation.[203] The differences between four aggregated occupational groups and work-related health problems is shown in the next table.

Table 23: People reporting work-related health problems by group of occupations (ISCO) – LFS Ad hoc 2020[204]

Work-related health problems	2020
Managers, professionals, technicians and associate professionals	9.40%
Clerical support workers, service and sales workers report	9.40%
Skilled agricultural, forestry and fishery workers, craft and related trades workers	13.40%
Plant and machine operators and assemblers, elementary occupations	11.80%
Total	**10.30%**

9.4% of the group of 'Managers, professionals, technicians and associate professionals' and also 9.4% of the group of 'Clerical support workers, service and sales workers' report work-related health problems, 2.4% to 4% lower than the two groups with predominantly manual occupations.

Based on a systematic review of literature on the topic of health factors, a consortium of World Bank and Harvard School of Public Health developed for the WHO in the early 1990s a new approach, the **Global Burden of Disease (BoD)**.[205] This approach is meanwhile used by researchers and health institutes across the globe.[206]

A fundamental element of these disease statistics are the DALYs (DALY = lost life years due to disability or in other words: **One DALY is one lost year of healthy life**).[207] These DALYs are a combined value of the mortality rate YLL (Years of Life Lost due to premature mortality) and the YLD (Years Lived with Disability). DALYs are regarded as a comprehensive and comparable method to measure the health of a population.[208]

Based on this framework, the Institute for Health Metrics and Evaluation (IHME) provides interactive statistical data of the trends and status of risk factors and outcomes (Death and DALYs). These data are constantly updated and visualised; the risk factors are: environmental risk, occupational risks (e.g. occupational ergonomic factors), behavioural risks (e.g. dietary) and metabolic risks (e.g. high systolic blood pressure).[209]

4.2.2 Attributable fractions, risk pairs and burden of disease

As mentioned, for the **majority of diseases the working conditions are one of several influence factors** in combination with other factors like private life, social and medical system, genetics, environment and so on. The exact impact of this factor, that is, the fraction of disease generating or intensifying impact **attributable to work**, is the subject of numerous studies in occupational epidemiology.[210]

The overall relation between work and illnesses is moving towards **a less unambiguous picture** compared to occupational diseases, where a strong relation between a single (over-)exposure and a specific illness existed. These were mostly high exposure levels that could not be found outside workplaces. Obviously, many such high exposures still exist and are important for prevention and compensation. However, many exposures at work approximate to other non-work exposures, like permanent sedentary work. This makes it more difficult to separate unambiguously the impact of work.

Science, in particular occupational epidemiology, and institutions like the ILO and WHO studies have engaged to identify the approximate impact of work for diseases, the **attributable fraction of work**.

For example, the **WHO** summarised their estimates in the year 2017:

'Certain occupational risks, such as injuries, noise, carcinogenic agents, airborne particles and ergonomic risks account for a substantial part of the burden of chronic diseases: 37% of all cases of back pain, 16% of hearing loss, 13% of chronic obstructive pulmonary disease, 11% of asthma, 8% of injuries, 9% of lung cancer, 2% of leukaemia and 8% of depression."[211]

One major difficulty surely is the **reliable description of exposures at work**. Workers might have had **several occupations during their working life, or changed work tasks in the same occupation** due to organisational and technological developments, and they might also have changed the specialisation in this occupation; also the **level of prevention measures differs** between sectors and countries. Of course, all this influences the exposure patterns.

EU-OSHA applied in its study on 'Costs and benefits' estimates, attributable fractions (AF) based on the evaluation of literature and statistics. The AF vary between 1% for all respiratory diseases, 3.2% for neoplasm and 12.4% for circulatory diseases up to more than 90% for mesothelioma and 100% for pneumoconiosis.[212] For mental diseases the estimated AF is 17.4 % for males and 20.7 for females.[213]

There are very clear connections between specific lung diseases (e.g. pneumoconiosis) and work because **such exposures are often restricted to workplaces**, as outside work there is practically no exposure; many of these diseases are recognised as occupational diseases. Much less clear are the attributions of work to cardiovascular, mental, other respiratory diseases like asthma or COPD, and digestive diseases.

Lately, the **WHO and ILO have made joint efforts** to identify the best possible estimates based on the systematic review of scientific literature on such connections. The newest WHO/ILO review of risk pairs[214] identified several significant relations between specific risks of work conditions and related diseases, for example, long working hours and stroke, or exposure to particulate matter, gases and chronic obstructive pulmonary diseases. For some specific chemicals and metals, the AF is very low because other exposures — nutrition, environment — might have a much bigger impact than workplace

exposures. The WHO/ILO study estimated the highest AF for the risk pair asbestos and mesothelioma, for occupational ergonomic factors and back and neck pain, and for some types of occupational injuries.

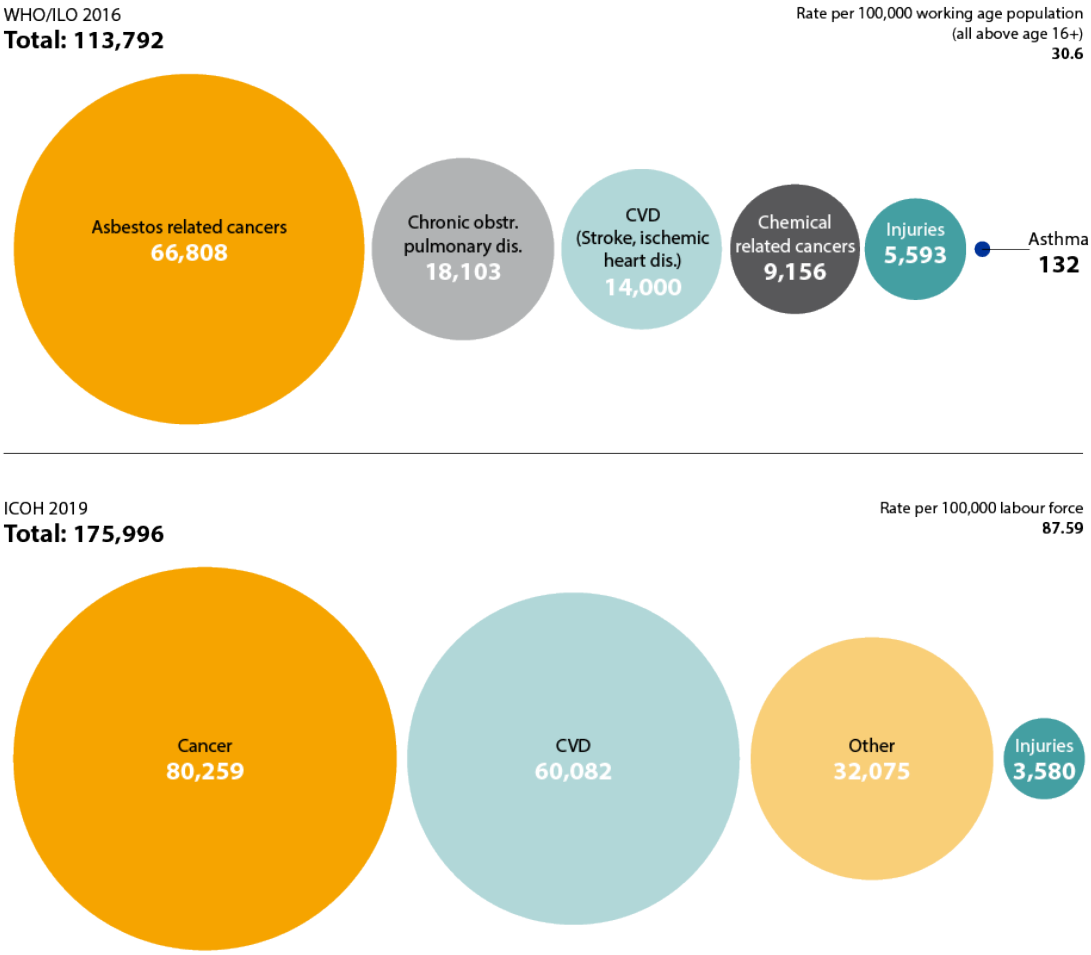
Table 24: Examples of fractions of diseases attributable to work (AF) – WHO/ILO[215]

Attributable Fractions – Global	Health Outcome	DEATHS	DALYs
Asbestos	Mesothelioma	91.45	86.73
Asbestos	Trachea, bronchus and lung cancers	10.48	8.06
Occupational particulate matter, gases, fumes	Chronic obstructive pulmonary diseases	14.87	15.14
Occupational injuries	Cyclist road injuries	16.66	19
Exposure to silica	Trachea, bronchus and lung cancers	2.49	3.24
Occupational asthmagens	Asthma	7.35	10.81
Occupational noise	Hearing loss	--	18.24
Occupational ergonomic factors	Back and neck pain	--	26.38
Long working hours	Ischaemic heart disease	3.69	5.26
Long working hours	Stroke	6.93	9.29

In 2021, the WHO and ILO published their estimates of the burden of work-related diseases, named the 'WHO/ILO joint estimates of the work-related burden of disease and injury, 2000-2016'.[216] WHO/ILO calculates for the EU27 114,000 **work-related deaths per year in 2016**. When setting the **absolute number of work-related deaths** (114,000) in relation to the EU27 population above 16 years (371 million) in 2016, this results in approximately **31 deaths per 100,000 population in working age above 16 years**.[217]

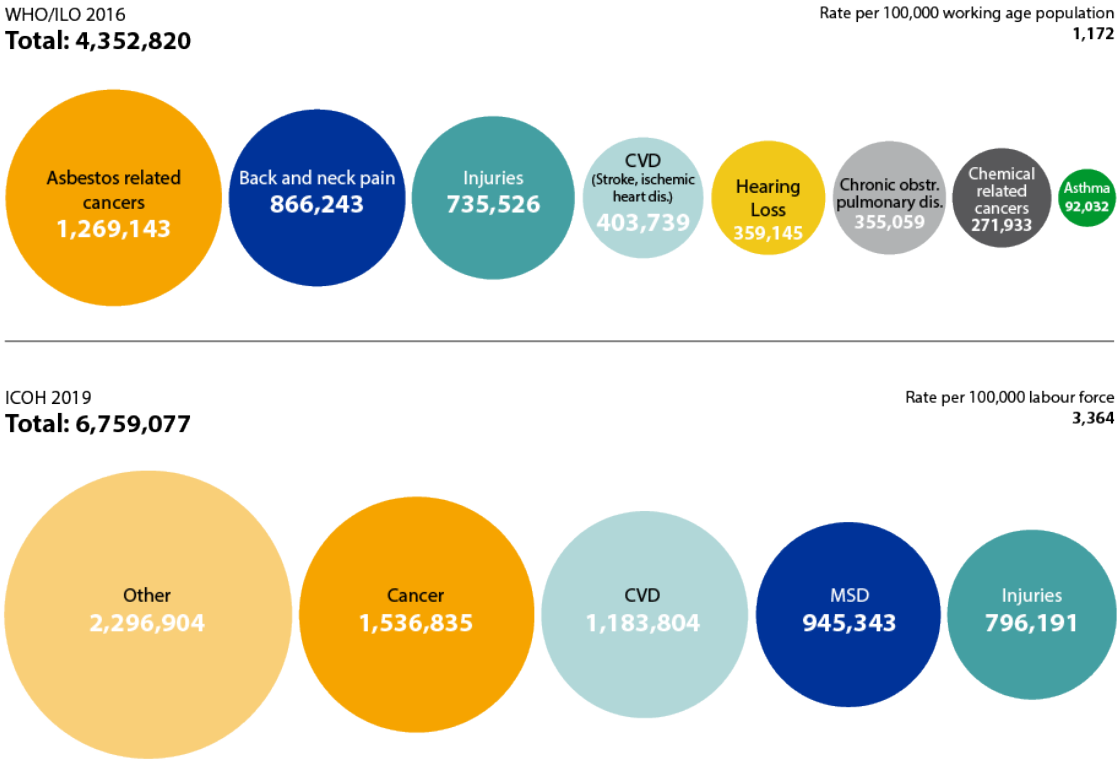
The second reference estimate was provided by the **International Commission on Occupational Health (ICOH)**. The size of the two major health consequences ('Outcomes') was calculated, that is, **work-related deaths**, and **work-related diseases**. ICOH estimates in total **179,000 deaths**; moreover, they refer to the much smaller **labour force** population (209 million) and calculate **89 work-related deaths per 100,000 labour force**. The main reason for these different estimates is the general approach: WHO/ILO restricts their analysis to selected risk-outcome pairs, for example, long working hours as risk and stroke as outcome, whereas ICOH aspired to cover all work-related diseases.

Figure 25: Work-related deaths – estimates by WHO/ILO[218] and ICOH[219] for EU27



The figure below displays the relation between **major risks** and the **health outcome in DALYs**. The estimates of DALYS that are attributable to work vary between 6.8 million years (ICOH) and 4.4 million years (WHO/ILO), both for the EU27.

Figure 26: Work-related DALYs – estimates by WHO/ILO and ICOH for the EU27



Putting the absolute numbers of WHO/ILO in relation to the EU27 population above 16 years this results in approximately **1,172 lost life years per 100,000 working-age population** (WHO/ILO). ICOH calculates in absolute numbers 6.8 million lost life years for the labour force population, resulting **in 3,364 DALYs per 100,000 labour force**.

It can be concluded that despite methodological differences the estimates **do not vary that much if the same reference population** is used in the calculation. Future research will contribute to a better attribution of the impact of work on these diseases. **In the future, relevant disease groups will be incorporated in these estimates**, that is, the impact of work on the prevalence of **mental diseases** and of communicable diseases caused by biological agents needs to be incorporated.

The next table shows the **difference between major occupational risk factors and deaths** at the EU27 level and the global level. At EU27 level asbestos-related cancers are clearly the most frequent reason for work-related deaths with nearly 60% of all cases; the two next main causes are COPD (15.9%) and CVD (12.3%). The global situation is quite different. CVD account for nearly 40%, COPD for 24% and injuries for 19%.

Table 25: Summary Burden of diseases EU27, Global deaths – WHO/ILO 2016[220,221]

Summary table DEATHS EU-27	Cases EU-27	%	Cases GLOBAL	%
Asbestos-related cancers	66,808	58.70%	209,481	11.10%
Stroke, ischaemic heart diseases (CVD)	14,000	12.30%	744,924	39.60%
Injuries	5,593	4.90%	363,283	19.30%
Chemical-related cancers	9,156	8.00%	82,180	4.40%
Chronic obstructive pulmonary diseases (COPD)	18,103	15.90%	450,381	24.00%
Asthma	132	0.10%	29,641	1.60%
Total	**113,792**	**100.00%**	**1,879,890**	**100.00%**
Deaths per 100,000 working age	**30.6**		**34.7**	

The global number of deaths per 100,000 population (≥ age 15) is 34.7 cases, and for the EU27 it is at a level of 30.7 cases per 100,000 (≥ age 16).[222]

The next table displays the relation between **major work-related risks** and the **health outcome measured in DALYs** at a European and a global level. Asbestos-related cancers account for the highest share of more than 29% (1,269,143 DALYs); the second and third largest group of diseases are back and neck pain and work-related injuries. At a global level, injuries dominate (29.4%), followed by cardiovascular diseases (25.9%), and back and neck pain (13.7%). The data for the EU27 and 'Global' look quite similar for hearing loss and asthma. The global number of DALYs per 100,000 population (≥ age 15) is 1,657, for the EU27 it is at a level of 1,172 cases per 100,000.

Table 26: Summary Burden of diseases table DALYs WHO/ILO[223]

Summary table DALYs EU-27	DALYs EU-27	%	DALYs GLOBAL	%
Asbestos-related cancers	1.269.143	29.2%	3.973.221	4.4%
CVD (Stroke, ischaemic heart diseases)	403,739	9.3%	23,258,503	25.9%
Injuries	735,526	16.9%	26,400,052	29.4%
Chemical-related cancers	271,933	6.2%	2,653,420	3.0%
Chronic obstructive pulmonary diseases	355,059	8.2%	10,855,103	12.1%
Asthma	92,032	2.1%	2,104,429	2.3%
Hearing loss	359,145	8.3%	8,164,140	9.1%
Back and neck pain	866,243	19.9%	12,267,159	13.7%
Total	**4,352,820**	**100.00%**	**89,676,027**	**100.00%**
DALYs per 100,000 working age	**1,172**		**1,657**	

The **differences for this deviation between the EU27 and the global situation** will be the subject of future research and analysis. It can be assumed that different working conditions and a different level of prevention measures are important factors. A crucial factor is the monitoring capacity, that is, the ability — and/or obligation — of the health system to identify and register work-related diseases, and the publication of reliable and well accessible statistics.

ICOH used for its estimates more risk factors, different disease categories and different values of AF. This methodology results in significantly higher figures for CVD and other diseases.

The same applies for DALYs; **WHO/ILO estimates sum up to approximately 63% of the ICOH values**. The main difference is due to the approximately 2.3 million DALYs that ICOH calculated for other work-related diseases. WHO/ILO applied strict methodological criteria and consequently excluded quite a large number of studies as a base for their estimates. They write:

'Third, it must be noted that not all occupational risk factors and attributable burdens of disease have yet been quantified. The production of estimates for some pairs was not possible in this estimation cycle, such as: occupational exposure to biological risk factors and infectious diseases; occupational exposure to psycho-social risk factors and mental health outcomes; and occupational exposure to ambient air pollution and its various health outcomes. Further, while there are established methods for estimating the burdens of silicosis, asbestosis, coal worker's pneumoconiosis and unspecified pneumoconiosis attributable to occupational exposure to dusts and fibers, WHO and the ILO are currently reviewing these methods and the available bodies of evidence (10); these pairs were therefore not included in this estimation cycle. While this means that the work-related burden of disease is ***almost certainly higher than the current estimate of selected pairs****, the addition of such pairs in future will broaden the scope of these estimates and capture the work-related burden of disease more comprehensively.'*[224]

All estimates depend on good monitoring capacities of the health system but also on reliable quantitative overviews of exposure situations at workplaces. In research and monitoring of occupational cancer some quantitative overviews on such exposures have been established (see for example, CAREX Finland, its follow-up projects, e.g. in Canada, and the many approaches for exposure assessments).[225] One of the reasons for the establishment of a clear relation between long working hours and stroke is the comparatively excellent data situation concerning working hours and long working hours in combination with administrative health data about stroke.

4.2.3 Examples of specific prevalence estimates

The methodologies to estimate the burden of diseases have been developed over the past 30 years. In the coming years we can expect that **research will contribute to more precise estimates** of the work-related share of the burden of the diseases.

Very probably **mental health and biological agents will be fully incorporated in such estimates**, and research will contribute to better explanations, for example, of the work-related prevalence of MSDs. Two groups of diseases examples — **mental health** and **musculoskeletal diseases** — are briefly presented in this chapter.

The first **'Global Burden of Disease' study** (1996, the study was the breakthrough for the concept of DALYs) is quite astonishing. Already then, the authors complained that the *'burden of psychiatric conditions has been heavily underestimated*'. In their estimation of the globally leading causes of disability they put four psychiatric conditions under the first 10:

- Unipolar major depression – 10.7% (of all causes)
- Bipolar disorders – 3.0% (of all causes)
- Schizophrenia – 2.6% (of all causes)
- Obsessive-compulsive disorders – 2.2% (of all causes)

The data of the first overview (based on data from 1990) were updated in 2019 and show an even worse picture:

'From 1990 to 2019, the global number of DALYs due to mental disorders increased from 80.8 million to 125.3 million, …. Age-standardised DALY rates remained largely consistent between 1990 (1581·DALYs per 100,000 population) and 2019 (1566 DALYs per 100,000 population). YLDs[226] *contributed to almost all of the mental disorder burden, accounting for 125.3 million YLDs or 14.6% of global YLDs in 2019.'*[227]

In 2019 the WHO stated that one in every eight people, or 970 million people around the world, were

living with a mental disorder, with anxiety and depressive disorders being the most common.[228] The OECD estimates that approximately one-third of all disability benefits is due to these groups of diseases.[229]

WHO definition of mental health from 2001: 'Mental health is a state of well-being in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully and is able to make a contribution to his or her community'.

ICD 11 (06) Mental, behavioural or neurodevelopmental disorders: 'Neurodevelopmental disorders / Schizophrenia or other primary psychotic disorders / Catatonia / Mood disorders / Anxiety or fear-related disorders / Obsessive-compulsive or related disorders / Disorders specifically associated with stress / Dissociative disorders / Feeding or eating disorders / Elimination disorders / Disorders of bodily distress or bodily experience / Disorders due to substance use or addictive behaviours / Impulse control disorders / Disruptive behaviour or dissocial disorders / Personality disorders and related traits / Paraphilic disorders / Factitious disorders / Neurocognitive disorders / Mental or behavioural disorders associated with pregnancy, childbirth or the puerperium.'

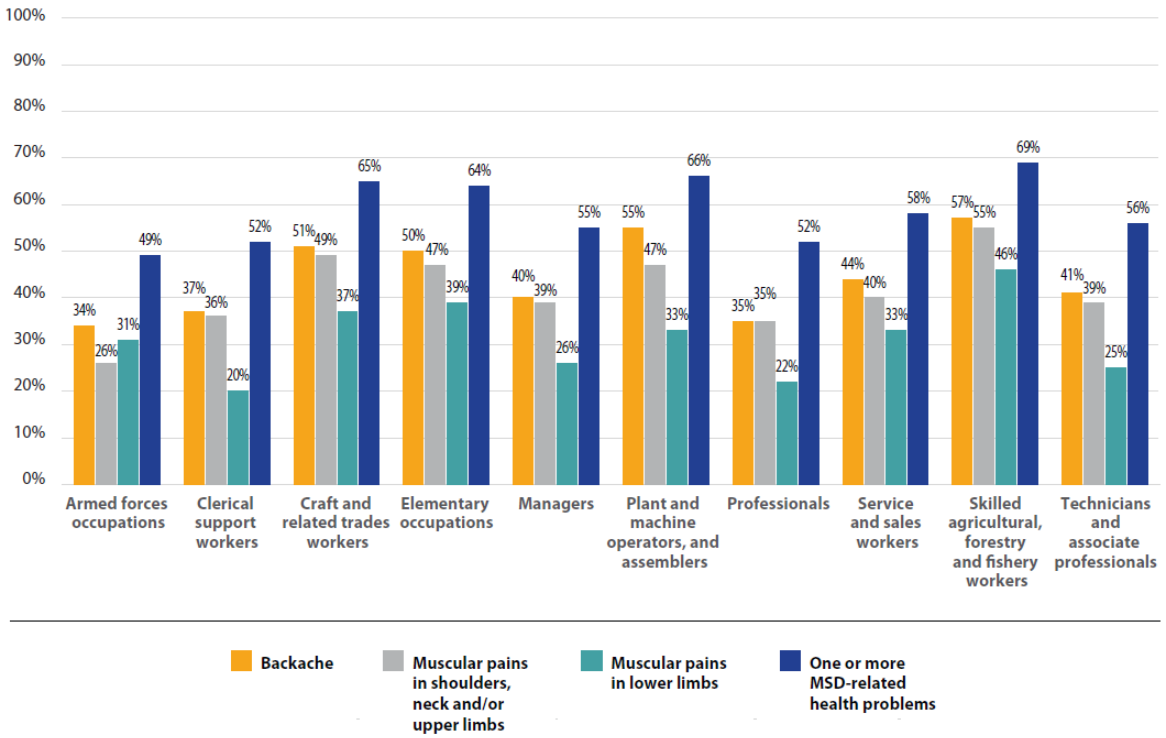
The cost factor is enormous; the OECD and **European Commission estimated that the overall financial costs of mental disorders**, including direct medical as well as indirect costs through care and lost productivity, **amount to more than €600 billion per year in the EU**[230] (see also Andlin-Sobocki et al. (2005)[231]). ICOH has started to integrate the newest estimates of mental health disorders with the AF (based on Niedhammer et al.[232]). The first calculations result in 7.5 million DALYS for the EU27, for work-related job strain, depression and resulting cardiovascular diseases (all other diseases 6.9 million). The strong rise in 'Mental and behavioural disorders' as a reason for absence from work or early pensions surely contributes to this change.[233] EU and global institutions have started several long-term policies and actions on mental health, for example, the EU Framework for Action on Mental Health and Wellbeing.[234]

The term 'Musculoskeletal diseases' covers the most common group of diseases (ICD 11-15 'Diseases of the musculoskeletal system or connected tissue').[235] These diseases have the highest prevalence, approximately 60% of the EU working population report one or several MSDs.[236] MSDs that are caused or made worse by work can be defined as work-related MSDs.[237] Work-related MSDs arise from regular exposure to a certain posture or workload. It is a problem that affects all forms of working environments, from physically arduous work to low-intensity static work.[238]

Moreover, **the prevalence of MSDs is not decreasing**, as could be expected due to the sectoral shifts of workforce from industry and agriculture to services. The authors of the EU-OSHA study 'Work-related musculoskeletal disorders: why are they still so prevalent?' consider several reasons for this: the ergonomic burden shifted to other tasks, for example, handling of patients instead of handling of heavy loads, more inactivity with other musculoskeletal consequences, more time pressure, an ageing workforce, and inadequate work organisation and contractual arrangements.[239]

The tremendous shift of workforce to administrative and often digitalised work contributes to an increase of the number of workers suffering from the consequences of **physical inactivity** due to **permanent sedentary work**, mostly with digital equipment. The figure below shows the spread of these diseases in different occupations.[240]

Figure 27: Prevalence of musculoskeletal diseases – EWCS 2015



Absence from work due to MSDs accounts for a high proportion of working days lost in EU Member States. In 2015, more than half (53%) of workers with MSDs (including those with other health problems) reported being absent from work during the past year, which is considerably higher than the proportion of workers without health problems (32%). Workers with MSDs are not only more likely to be absent from work, but (given absence) on average are also absent for a longer period. For example, 26% of workers with chronic MSDs and other health problems report being absent for more than eight days during the past year, which is considerably higher than the 7% for workers with no health problems.[241]

Overall estimates of the burden of MSDs for the EU27 seem to be difficult, due to different recognition and treatment schemes.[242] The estimates of WHO/ILO and ICOH result in 850,000 and 950,000 DALYs for the EU27, based on a fraction of 26.38% attributable to work; in total, MSDs are the cause of 15-20% of all DALYs.

OSH Barometer – Accidents, diseases and wellbeing – Diseases:
https://visualisation.osha.europa.eu/osh-barometer/osh-outcomes/work-related-diseases/who-ilo/prevalence-of-diseases/all-diseases

Eurostat – Data and databases on health:
https://ec.europa.eu/eurostat/web/health/data/database

WHO – Occupational Burden of Disease Application:
https://who-ilo-joint-estimates.shinyapps.io/OccupationalBurdenOfDisease/

4.3 Wellbeing and health status

Existing concepts of **wellbeing** cover **more aspects of work than working conditions or safety and health** at workplaces. Eurofound mentions as the most relevant components: *income, working time arrangements, possibilities for skills development and career advancement, and the degree of individual control over work*.[243] The United Nations Economic Commission for Europe (UNECE) developed a scheme of quality of employment that covers these aspects: *safety and ethics of employment, income benefits and employment, working hours and balancing working and non-working life, security of employment and social protection, social dialogue, skills development and training, workplace relationships and work motivation.*[244]

This chapter **focuses on the health and safety aspects** of wellbeing, although the OSH aspect is often not clearly separable from the above-mentioned aspects, that is, when surveys are intending to identify the level of 'satisfaction at work'. Still, due to its serious impact on all other aspects of working conditions, the consequences of insufficient health are regarded as critical:

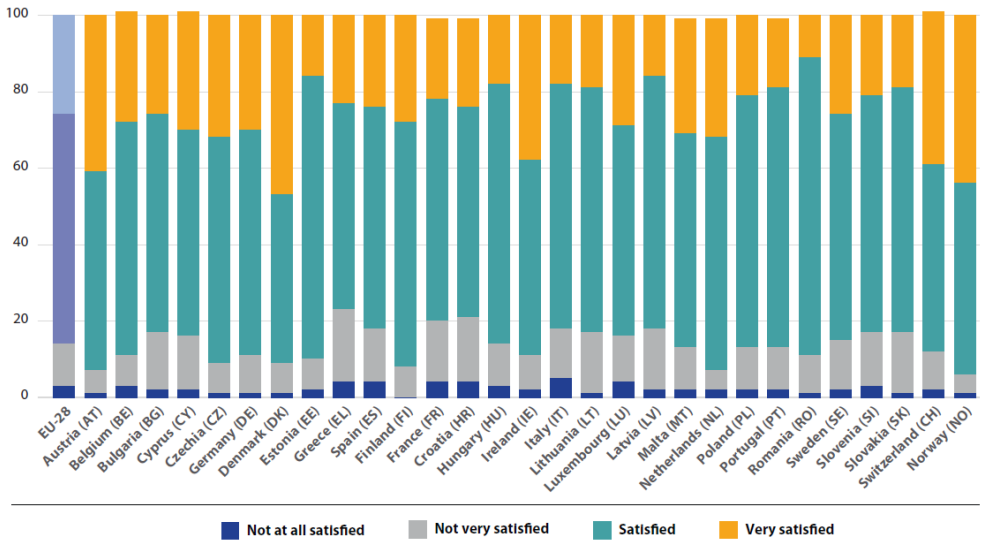
'While OHS is only one substantive working condition, like earnings and job insecurity it is arguably a critical one for many workers. In terms of scope and severity, even official data … suggests poor OHS is something most workers will experience at some point and many far more frequently.'[245]

A common methodology to collect data on **health status** and wellbeing is **self-reporting and self-assessment** of workplace risks, health risks and health problems, absence, job satisfaction and working life perspective from a health point of view. The data are in general collected by EU-wide surveys, for example, by the EWCS, the Flash Eurobarometer, ESENER or the LFS Ad hoc modules. The description of working conditions in the OSH Barometer starts with responses regarding the **'Overall opinion'** on working conditions. This allows insight into the subjective assessment of health risks at work and wellbeing.

4.3.1 Satisfaction at work

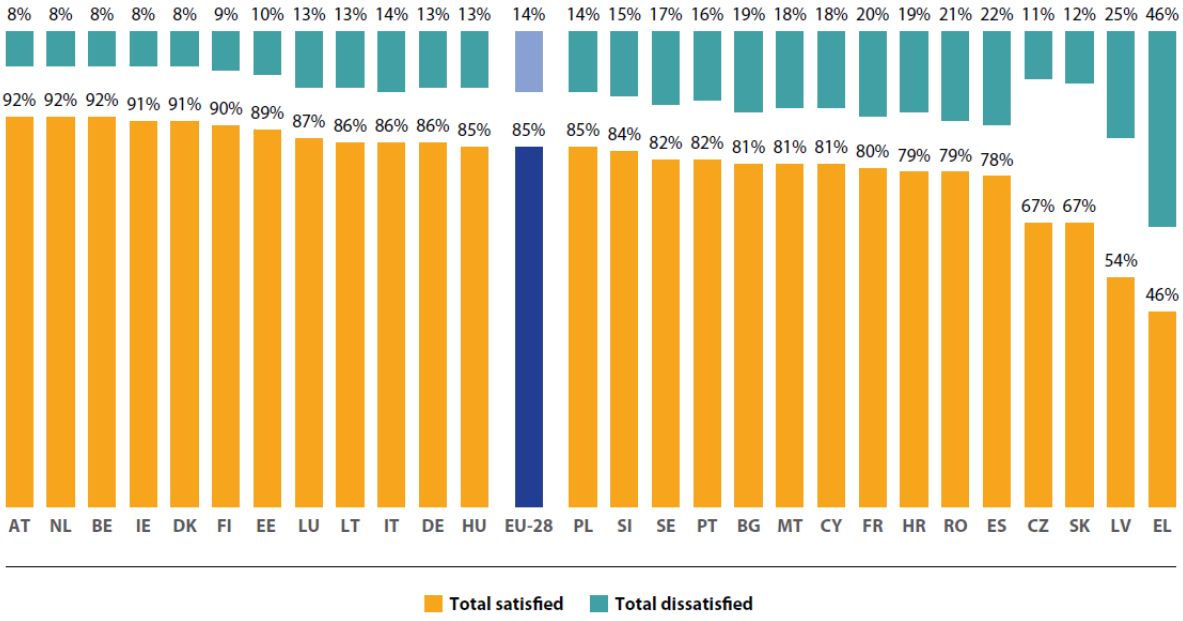
In the EWCS of 2015, at EU level 86% of the workers respond that they are **'satisfied'** (60%) or **'very satisfied'** (26%) with their work. Country differences exist but are not striking. The EU Member States with the highest satisfaction rates are Austria, the Netherlands, Finland, Czechia, Denmark, Belgium and Estonia; they range between 93% and 90%. The six countries with the lowest sum of satisfied and very satisfied responses are Greece, Croatia, France, Spain, Italy and Latvia; their values range between 77% and 82%.

Figure 28: Satisfaction with working conditions in the main paid job – EWCS 2015[246]



These EWCS findings are approximately in line with the results of the Flash Eurobarometer from 2014 where 77% of the workers respond that they are overall **satisfied with working conditions** and 85% that they are **satisfied with health and safety**. In the Flash Eurobarometer for responses to the specific question on **satisfaction with health and safety at work** (see next figure), Austria, the Netherlands, Belgium, Ireland, Denmark, Finland and Estonia are the top seven countries with the highest satisfaction rates. Cyprus, France, Croatia, Romania, Spain, Latvia and Greece form the group of the seven countries with the lowest satisfaction rates.[247]

Figure 29: Flash Eurobarometer 2014 – Satisfaction with health and safety at work[248]



In 2005, just after the accession of 10 new EU Member States, **the average EU level was slightly different, four percentage points lower at 82%**[249] (EWCS, 2005). In that year, the six EU Member States with the highest rates of satisfaction were Denmark, Austria, Belgium, Germany, the Netherlands and Luxembourg (all around 90%). The **lowest degree of satisfaction** was reported by the workers of Romania (not an EU member at that time), Greece, Bulgaria (not an EU member at that time), Lithuania, Latvia and Slovenia, **significantly lower than today**, between 58% and 72%.

The most visible change is that in 2005 the lowest degree of satisfaction was exclusively reported in south-eastern European countries and the Baltics. **In 2015, three southern and south-western EU Member States**, that is, France, Italy and Spain, **were part of the six countries with the lowest** satisfaction rate, while the states from south-eastern Europe and the Baltic states showed low but increased satisfaction rates.

In 2015, the percentage of workers who responded to be 'unsatisfied' or 'very unsatisfied' is characterised by the following patterns:[250]

- Sectoral: the highest rates of dissatisfaction were reported in the three sectors agriculture, hotels and restaurants, and manufacturing.
- Level of education: 51% of workers with third-level degree (ISCED 5 or 6)[251] report being 'very satisfied' compared to an average of 25% for the whole sample.
- Less differences can be seen for the form of work, that is, those with a permanent contract and those with 'Other arrangements'.

Age and gender have a minor influence on responses to the question on job satisfaction.

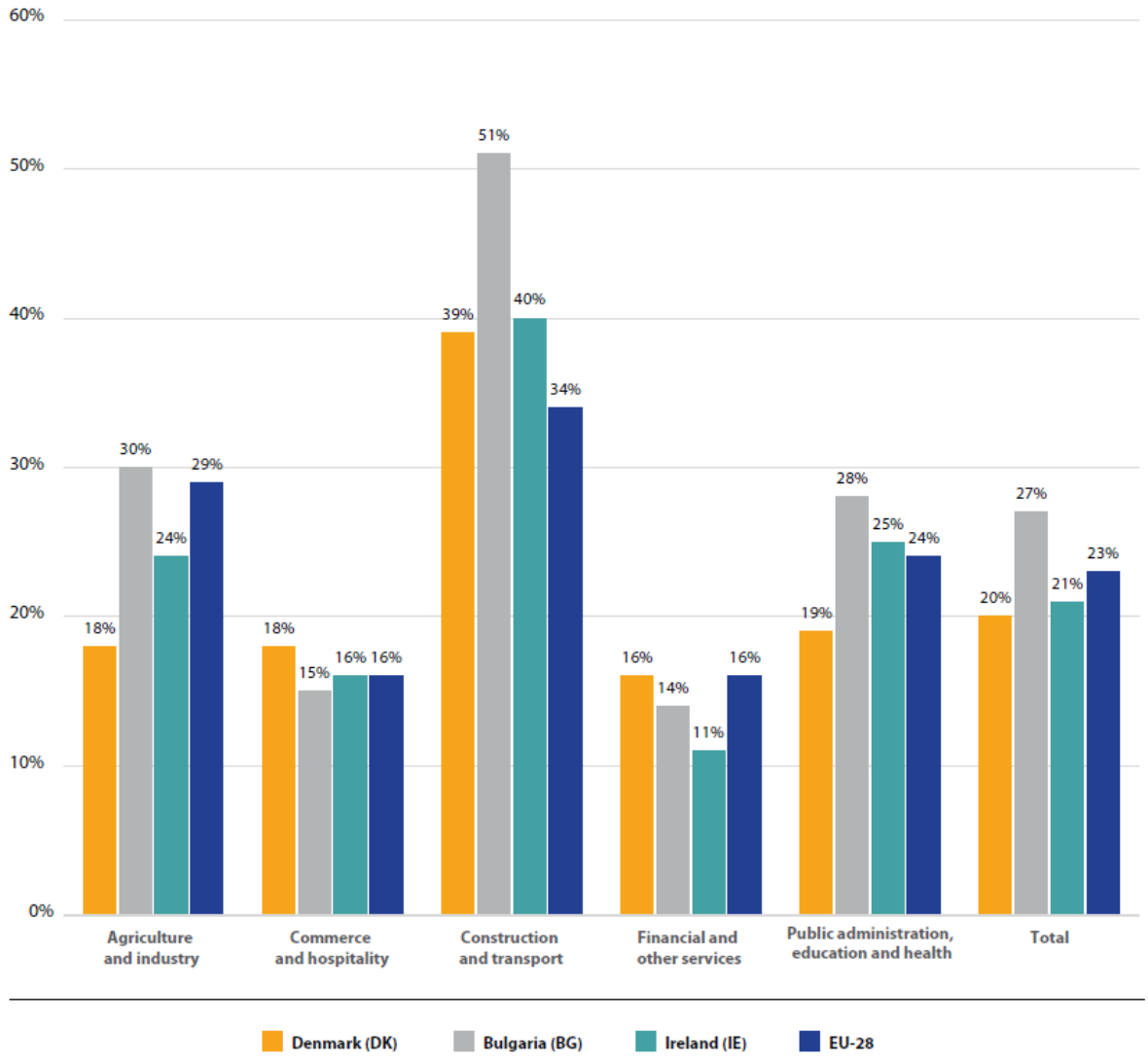
4.3.2 Health affected – overall opinion

The self-assessment of **health risks at work** is a question in the EWCS. According to the responses to the EWCS 2015, work is regarded by exactly one-quarter (25%) of the workers in the EU as a health risk. (The OSH Barometer provides more details; links in the text box at the end of this chapter.)

The countries with the **lowest percentage of perceived affection of health at work** are Portugal at 15%; below or around 20% are also Italy, Ireland and Czechia, Germany, Hungary and Romania. The countries with the highest percentage of perceived health risks at work are Latvia (41%), followed by Spain and Slovenia (both 38%), Lithuania (37%), and Estonia, France and Malta (all 35%).

At EU level the **aggregated sectors** 'Construction and Transport' show the highest figures (35%) and 'Commerce / Hospitality' (20%) and 'Financial / Other services' the lowest (20%). These sectoral differences repeat in most countries.

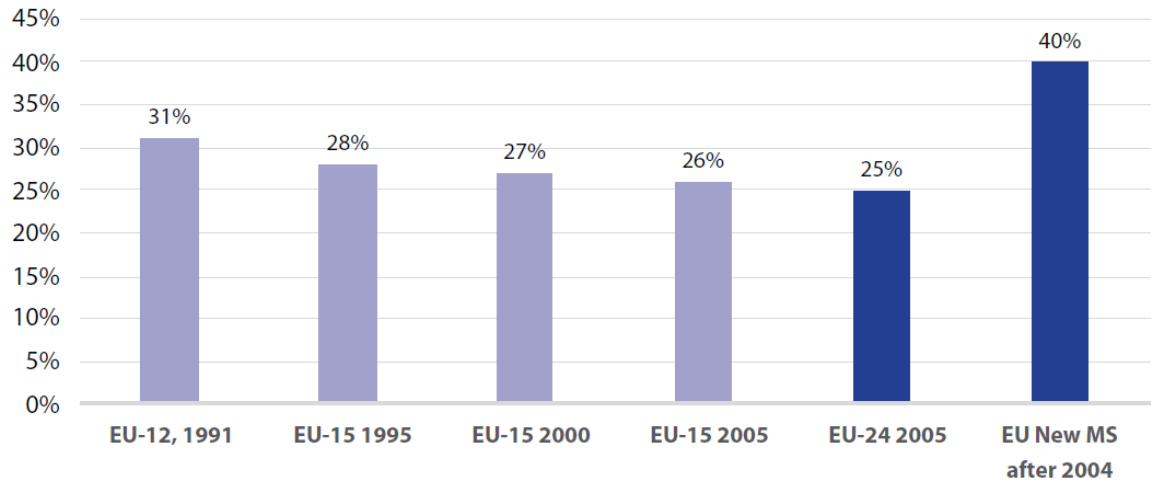
Figure 30: 'Health at risk', sectoral responses for EU and three countries – EWCS 2015[252]



Regarding this question, **age differences are negligible**. **Concerning gender**, male respondents report more often that their work imposes health risks; at EU level the values are 23% for female workers and 27% for male workers.

In 2005, the workers in the 10 new Member States responded much less positive; 40% of the workers in the 10 new Member States considered their health and safety to be affected because of their work.

Figure 31: 'Health at risk', responses in groups of EU Member States – EWCS[253]



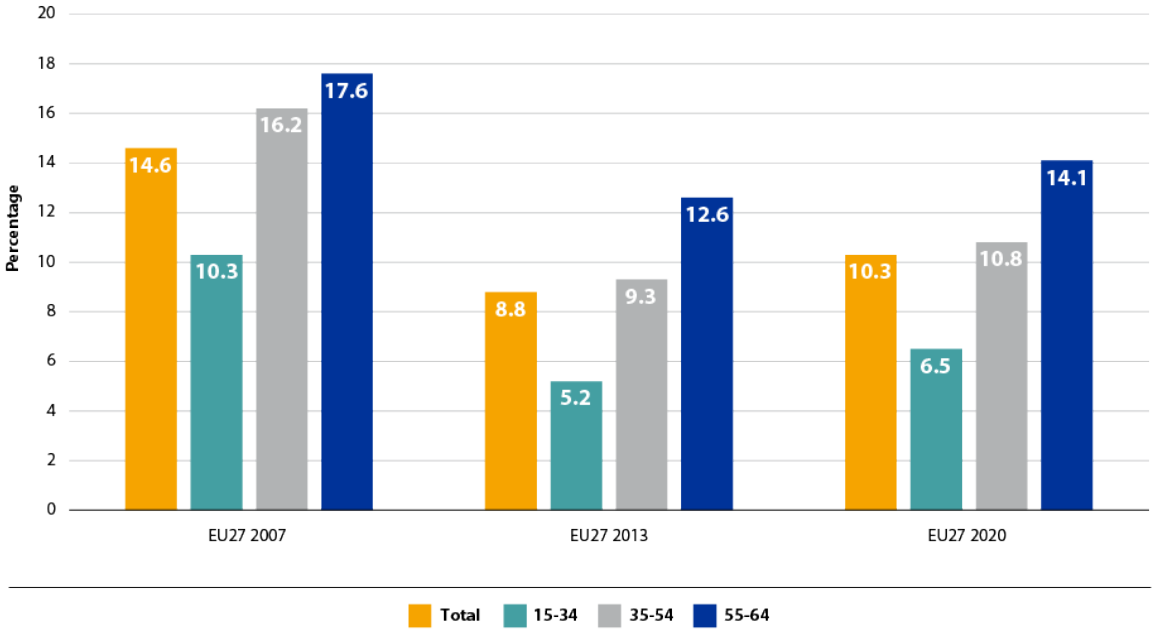
For the EU-15 (Member States that joined the EU before 2004), the 'Yes' responses to this question decreased from 31% in 1991 (first EWCS) to 28% in 2005 and reached 26% in 2015. For the 10 new Member States the rate decreased, from previously 40% in 2005 to 29% in 2015.[254] The EU membership has definitely created **more convergence** between the countries.

4.3.3 Reported health problems

The identification of current **work-related health problems** is another approach to create an indicator for health status. Eurostat collected this data in the LFS Ad hoc modules 2007, 2013 and 2020, *Persons reporting a work-related health problem by sex, age and NACE Rev. 2 activity*.[255]

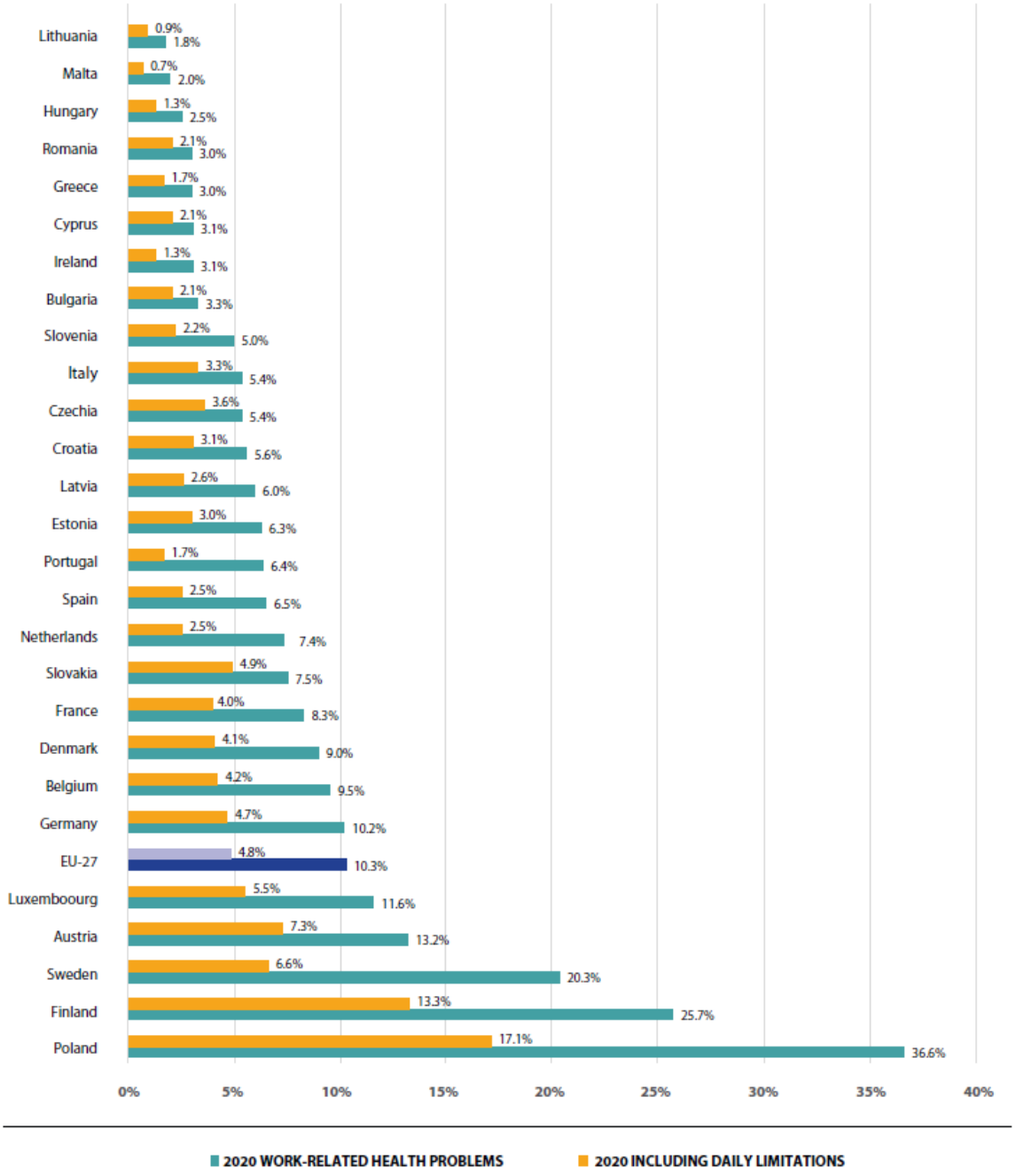
In 2007, 14.6% of employed persons reported a work-related health problem; **this figure decreased in 2013 to 8.8% and went up again to 10.3% in 2020**[256] (EU27 level). As expected, **age is one of the factors** that influence the response to this question. In 2020, 14.1% of the workers in age class 55-64 years reported a work-related health problem, compared to 6.5% in age class 15-34 years and 10.8 in age class 35-54 years. These differences between the age classes were quite similar in all three points of time.

Figure 32: Age classes and work-related health problems in 2007, 2013, 2020 – LFS ad hoc module



When looking at the **differences between countries** in 2020, the countries with the highest values are: Poland (36.6%), Finland (25.7%) and Sweden (20.3%); all three are far above the average. Austria, Luxembourg and Germany have figures close to the EU27 average of 10.3%. In most other countries the response values are under or close to 6%, like in Estonia, Romania, Ireland, Latvia, Lithuania, Hungary, Malta, Bulgaria, Greece, Croatia, Cyprus, Czechia and Slovenia.[257]

Figure 33: People reporting a work-related health problem and People reporting a work-related health problem causing daily limitations 2020 – LFS Ad hoc module 2020



These responses are probably very much influenced **by occupational, sector and country-specific cultures of defining and expressing a health problem** and a different opinion on the job. It is clearly not realistic that workers in Poland or Sweden suffer 10 times more often from a work-related health problem than workers in Ireland or Romania. Suppression or resistance to express a health problem might be one cause for such low figures for countries with a high degree of manual work, be it highly or low skilled.[258] It might also be that a high awareness of health issues — not only caused by the risk but also by the necessary prevention measures — results in high response values for both questions, that is, **high awareness of risks might be the cause for well-developed prevention measures and**

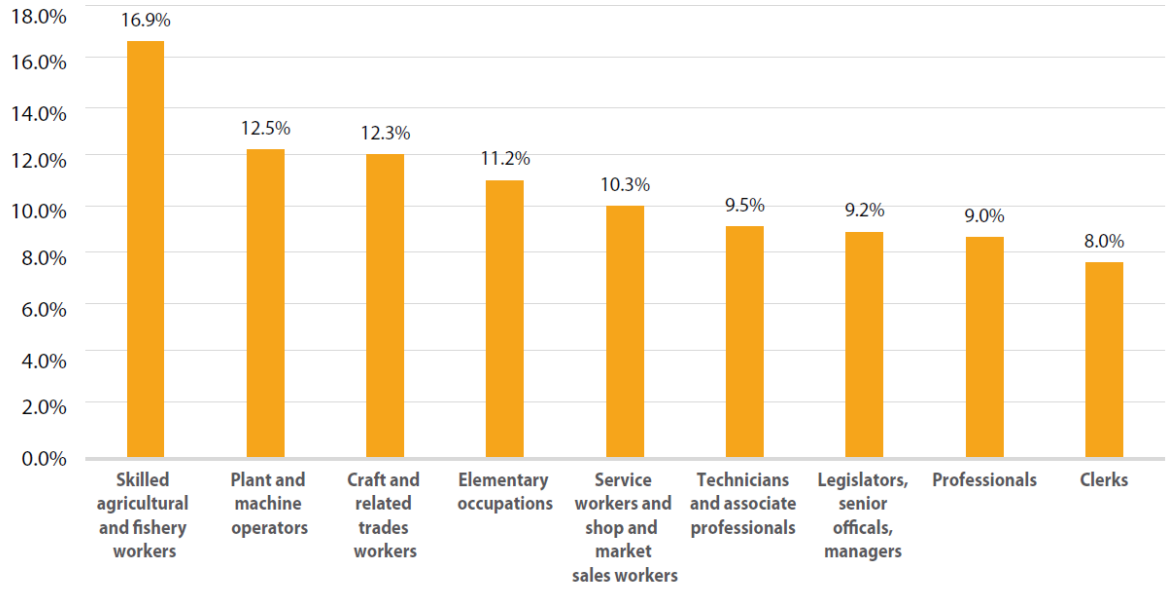
result in high values for both responses. That is, high risk but also high satisfaction with health and safety.

The picture of country positions in this ranking changes again when looking at the **response on the off-work periods** due to a work-related health problem.[259] In 2020, around 10% report that they had a **work-related health problem that kept them more than six months away from work**. The rate is at 10.1% for the EU27; the countries with the highest rates above 20% are Hungary (30.3%), Lithuania (29.9%), the Netherlands (27.6%), Belgium (20.9%) and Romania (20.7%). The countries with lowest rates under 10% are Poland (2.6%), Denmark (6.0%), Sweden (6.2%), Italy (6.5%) and Finland (9.0%).[260] The country positions do not change much when looking at all absences over one month (18.7% for the EU), or three months or over (12.6% for the EU27).[261] **That means that — at least at the first glance contradictory — countries reporting highest health risks have the lowest number of long-term off-work periods.** These figures are probably much influenced by social security and compensation rules. This is another indication that **high exposure and identification of health risks — fortunately — does not materialise in serious disease episodes, and this could be attributed to on the effectiveness of prevention measures**.

There might also be structural reasons for low levels of reported health problems, for example, a **high percentage of young workers** with low illness rates in highly skilled clerical work; Ireland is probably such an example.

The responses to **'work-related health problem'** vary also between different **occupational groups**.[262] The skilled agricultural and fishery workers (16.9%) report the highest values, followed by plant and machine operators and assemblers (12.5%), craft and related trades workers (12.3%), and the group of those with elementary occupations (11.2%). The lowest shares were found for the professionals (9.3%), legislators, senior officials and managers (9.0%), and clerks (8.0%).

Figure 34: People reporting a work-related health problem by occupational category 2020 – LFS Ad hoc module 2020



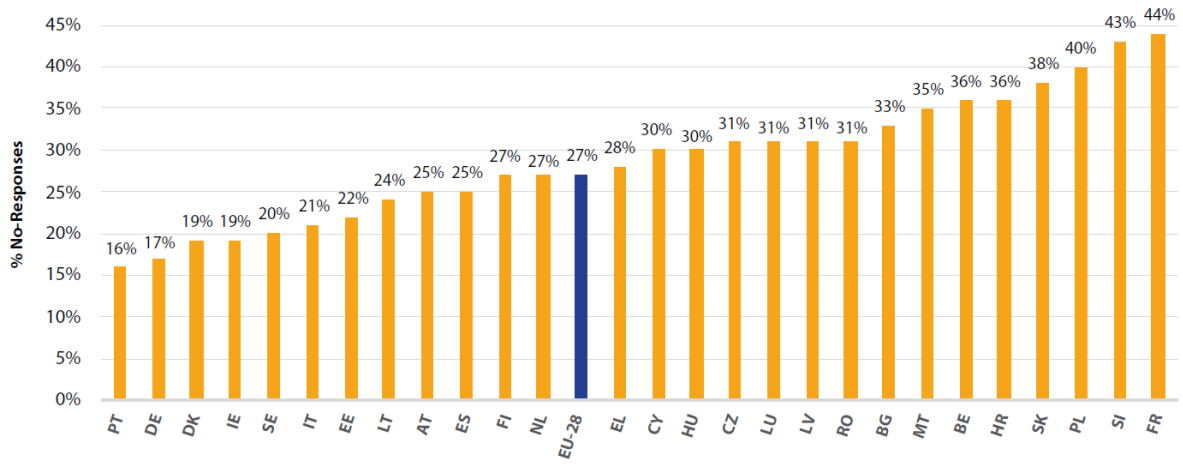
These differences between occupational groups are not surprising; they repeat the results of other studies, statistics and surveys where manual workers show higher levels of illness / morbidity.

4.3.4 Working life perspective – health

This EWCS 2015 question on the **working life perspective** (*'Will you be able to do this or a similar job at 60 years of age?'*) gives quite a good hint to the individual long-term prospects, which might even be more valuable than the question on currently affected health because it is a personal assessment of the overall status of health.

Differences between countries are significant but not as significant as between other categories, for example, between sectors and occupations. The EU average of 'No' responses to the question *'Do you think you will be able to do your current job or a similar one until you are 60 years old?'* is at 27%; the eight countries with the highest rates of 'No' responses (between 44% and 33%) are France, Slovenia, Poland, Slovakia, Croatia, Belgium, Malta and Bulgaria. Under 25% of 'No' responses were given in eight countries, starting from Portugal (16%) over Germany, Denmark, Ireland, Sweden, Italy, Estonia and Lithuania (24%).[263]

Figure 35: Opinion on work until the age of 60 – EWCS 2015



Young workers under 35 are much more sceptic than those over 50; 38% say that they will not be able, a much higher percentage than the 22% of workers aged over 50. The employment status is also very important; 26% of the permanently employed respond with a 'No' compared to 39% of those with 'Other arrangements'. Remarkably, only 19% of the self-employed do not believe that they will be able to do their job at 60 years.

Large differences can be seen between occupation levels. 37% per cent of the low-skilled manual workers respond with 'No', and 30% of the highly skilled manual workers respond 'No', as do 27% of the low-skilled clerical workers and only 21% of the high-skilled clerical workers, a 16% difference between high-skilled clerical workers and low-skilled manual workers. In some countries only 10% to 15% of the highly skilled clerical workers respond with 'No' while in a number of countries more than 50% of the low-skilled manual workers respond with 'No', for example, in Slovenia, Croatia, Slovakia and Czechia.

The authors of the Senior Working Life study describe these differences as follows:[264]

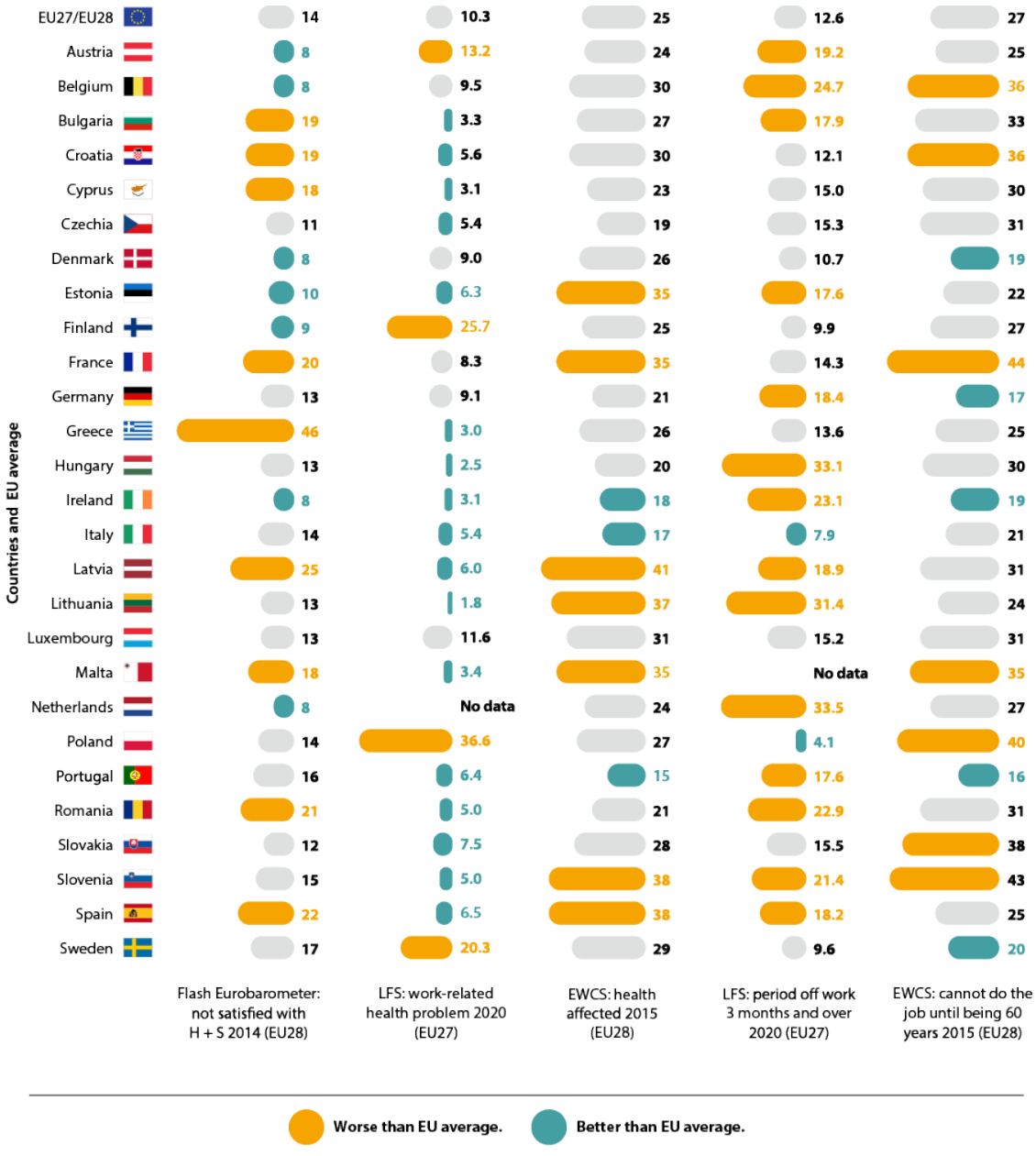
'For ISCO groups 1–4 (seated work) main expected reasons for retiring were freedom to choose and desire for more leisure time, but many would consider staying longer if there were better possibilities for additional senior days, longer vacations and flexible working hours. For ISCO groups 5–9 (physical work), poor physical health and not being capable of doing the job were common expected reasons for retiring, but many would consider staying longer if the work were less physically demanding and there were more senior days. Possibility for pension was a general expected reason for retiring. Expected reasons differed to a less extent between genders than between ISCO groups, e.g. economic factors were more important for men and high work demands more important for women.

The strong differences in the **expectations to do the job until 60 years of age** are probably also caused by the circumstance that the labour market for physically demanding jobs is more rigid. For example, one serious musculoskeletal issue might mean being out of a manual job far before the pension age. For diseases caused by excessive psychosocial burden, other difficulties can be observed: the recognition as work-related is less accepted, work-related and private life causes are closely intertwined, and the diagnosis can be difficult.

4.3.5 Summary of survey results on wellbeing and health status

An overview table on the responses to five questions in three different surveys reveals partly consistent and partly contradictory results per country. There are countries that have a consistent outcome over all questions, while others show a mixed or contradictory picture.

Figure 36: Comparison of responses to self-rated work satisfaction, health risks and working life perspectives – Flash Eurobarometer, LFS and EWCS



Values better than 25% of EU average are marked in aquamarine, and values worse than 25% of EU average in orange. Other values are not marked.

Denmark, Czechia, Italy and Luxembourg are the countries over or at average for every item. Some countries are mostly at average, or have a negative result for one item, often the period off work or low

satisfaction, for example, Austria, Cyprus, Germany, Greece, Ireland, Hungary, the Netherlands, Portugal and Slovakia. The one negative item might also be work-related health problems, for example, for Sweden and Finland.

Most countries show more extreme contradictions, that is, being in some aspects better and in others worse than average, like Estonia, Lithuania, Poland, Bulgaria, Portugal, Slovenia and Spain. Many of these countries have very low figures for work-related health problems. Contradictory but mostly negative responses (two or three fields with values under average) we find for Austria, Belgium, Croatia, France, Latvia, Lithuania, Malta, Romania, Poland, Spain and Slovenia.

4.4 Conclusions

Work accident data — fatal and non-fatal — show an impressive decline in the past 20 years, even if one takes into account the significant level of underreporting. Preventive technical and organisational safety measures and sectoral shifts were the crucial factors for this improvement. The relevance of **non-fatal accidents with severe health consequences** — permanent disability or more than three months' time-off period (more than 230,000) — should be recognised and further investigated.

Public health data show a significant increase in **life expectancy** and **substantial shifts in morbidity** during the past three decades at EU level, also documenting major differences between EU Member States in mortality and morbidity. **Socioeconomic inequality** is an evident reason for higher mortality and morbidity. There is less evidence concerning the correlation between working conditions — as a major element of the socioeconomic status — and mortality and morbidity at EU level.

The clearest evidence on the **relationship between working conditions and diseases** exists for recognised occupational diseases, and for these, the trend is also strongly downwards. In contrast, the estimates of the development of **work-related diseases** — based on fractions of diseases attributable to work occupation — show a persistently high burden. The current estimates of ILO/WHO and of ICOH range between 115,000 and 180,000 deaths and between 4.5 million and 6.9 million DALYs; advanced research and the incorporation of more disease groups — mental health, diseases caused by biological agents — will significantly increase these figures. Literature, studies and surveys like the EWCS, LFS and the Flash Eurobarometer clearly show the strong relations between health status and occupation. Eurostat works on improvements concerning the morbidity statistics (task force, pilot statistics on occupational diseases). EU-wide morbidity statistics from national administrative sources might be available in the future; currently self-reported health data are the major source for EU-wide harmonised quantitative data.

Wellbeing and satisfaction at work show similar patterns as health and work accidents and work-related health issues. Sectors with high physical demands and high customer and client orientation and occupations with a lower skill level report lower wellbeing and satisfaction levels; these groups report a good health status — mostly being younger — but fewer expectations to be able to work in this occupation until the age of 60. Professions with strong customer and client orientation have lower-than-average wellbeing and satisfaction rates.

Workers in manual occupations [265] have higher accident rates, lower life expectancy and less expectancy to do the job until age 60. **Administrative workers (clerical, managerial)** have a better status in the above-mentioned aspects but report a worse health situation. For many items the eastern EU Member States — often all of them — report the least positive data. The **healthy worker effect and cultural differences** — to express not being healthy — probably strongly influence the self-assessment.

Concerning the levels of **self-reported 'Health at risk'**, the comparison between 2005 and 2015 suggests that the situation has slightly improved for all EU Member States; sector differences remain significant, but the East-West divide has become much smaller. Still, in some respect eastern and some southern European countries show worse data compared to central/western and northern European countries.

Overall, when looking at all the quantitative indicators we find a **strong influence of sector, professional status and occupation on the level of accidents, of work-related diseases, and the status of health and wellbeing** — and for some data **serious differences between countries** or **groups of countries**.

OSH Barometer – Working conditions, Health perception of the workers, Health problems in the last 12 months: https://visualisation.osha.europa.eu/osh-barometer/accidents-diseases-well-being/health-perception

OSH Barometer – Working conditions, Working conditions, Overall opinion, Health at risk: https://visualisation.osha.europa.eu/osh-barometer/working-conditions-preventions/overall-opinion/health-at-risk

OSH Barometer – Working conditions, Overall opinion, Satisfaction with Health and Safety: https://visualisation.osha.europa.eu/osh-barometer/working-conditions-preventions/overall-opinion/satisfaction-health-safety

5 Major context developments and their influence on working conditions

In many cases, one can find **overwhelming evidence about 'structural' trends and developments** that influence OSH at workplaces. For example, looking at the data there can be no doubt that the EU population and workforce is ageing, there can be no doubt about the decline of workforce in certain sectors and growth in others, there can be no doubt that education is longer, skills are higher and work life starts later.

Still, in many cases the **available data lack a sufficient level of reliability**, the data from different sources are contradictory or ambiguous, and the hypotheses about the reasons for findings differ. Consequently, the influence is either not clear or definitely ambiguous in its impact on OSH, as often holds in the case of new technologies. For reasons of readability and size of this report, we exclude a detailed description of some context factors, for example, the development of industrial relations, labour law and social security legislation, or public health policies**.**

The chapter focuses on **four major context factors: changes from industrial to service sectors, technological developments, workforce structure and the impact of globalisation**.

5.1 Changes from industrial to service sectors

In the last three decades, **sectoral employment** has changed in line with the continuous global trend from **agriculture and industry** to **service sectors**. This 'megatrend' started more than 250 years ago, relocating workforce from agriculture to industry, and continued in the 20th century, employing far fewer workers in industry and more in service occupations. These megatrends drastically changed the working and living conditions — connected with a strong reduction of the population in the countryside and the growth of cities.

At first glance there is clear evidence about the impact of this change on OSH: it means less heavy and dangerous work in agriculture and industry, more office-like work, and more human–human interaction (specifically in education, social work, health and care) instead of human–material or human–machine interaction. It has to be noted that even human–human interaction is more and more partly or fully supported by digital communication tools, replacing paper and face-to-face communication.

The **three-sector categorisation** (agriculture, industry, service) is mostly used to describe economic and societal changes at a very aggregated level. It has its **limitations** and can even lead to false presumptions if it is used to **describe working conditions**. Particularly 'service' sector is a too broad a term to draw conclusions on working conditions, that is, the simplified assumption that work in the service sector is nearly always office work. Work in the 'Service sector' includes transport and delivery, care and health work, education and social work, domestic work, cleaning work, maintenance and repair, retail, and of course a very large share of administrative office work, practically in all economic activities.

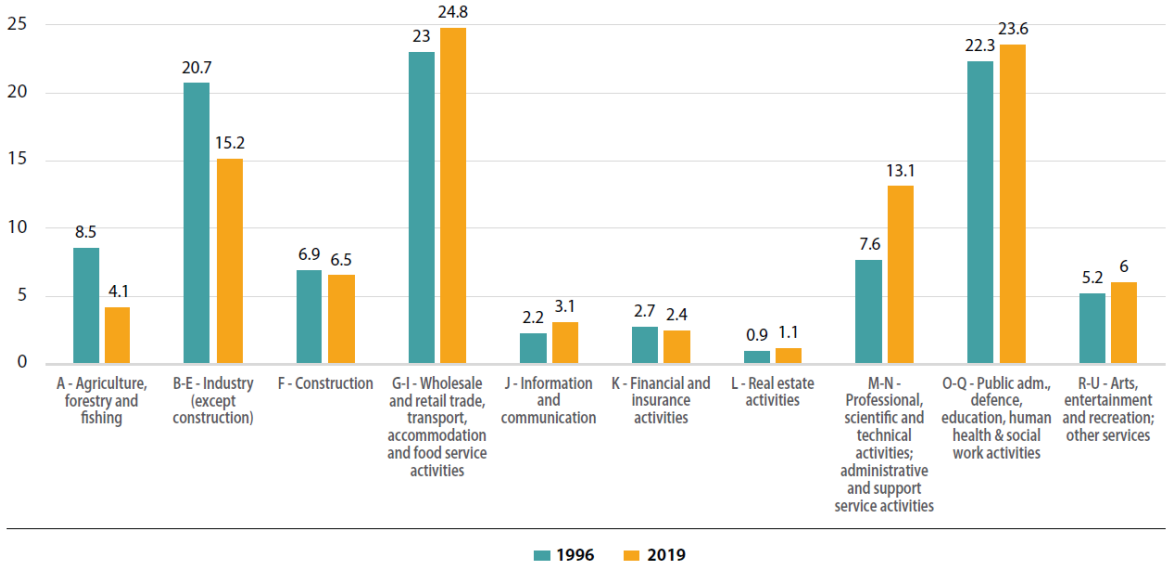
This three-sector system does not facilitate a realistic quantitative picture about working conditions. For example, statistically an accountant in a steel plant is counted as an employee in industry, whilst an employee of a subcontractor who does heavy manual repair work in the same steel plant is counted as a service worker.

In the same way, the construction sector does not fit well into this triple categorisation; statistical offices often separate it from industry in their classification systems.

However, **having these limitations and possible distortions** in mind, the sectoral categorisation system helps to broadly describe changes of the economic structure that obviously influence working conditions.

Even during the past three decades the trend from agriculture and industry to other service-dominated sectors continued in the EU, as the following Eurostat figure shows. The share of employees in agriculture went down from 8% to 4%, and also down in industry from 21% to 15%, construction remained quite stable between 6% and 7% whilst all the service sectors (except 'Financial services and insurance') gained a bigger share, particularly 'Professional, scientific and technical activities'.

Figure 37: Share of 10 main economic activities in EU total employment 1996 and 2019 (%), EU28 – Eurostat[266]



These changes in the size of the workforce in aggregated sectors contributed to the development of health and safety that we observed in the past 30 years, and the decrease in **accidents and traditionally recognised occupational diseases**.

These sectoral changes **also triggered a crucial extension of the focus of OSH**, adding to accidents and specific occupational diseases the work-related diseases, broadly extending the scope of occupational diseases. The relation between work-related risks and major disease groups came into focus. Most of these diseases groups are not covered by the spectrum of conventional occupational diseases, for example, most musculoskeletal and digestive diseases, cardiovascular and mental diseases. Work is a crucial element for health in life, and to neglect its impact would generate a less than complete picture of health risks.

These trends led to structural changes and adaptations in practices of OSH, **topics like work organisation and psychosocial risks** gained a much higher importance in the assessment of working conditions.[267]

In a wider context, the shift to service work also changed the **work performance measuring methods**. Performance measuring cannot be based anymore on simple output rates (measured in pieces of a product, or in physical quantities like cubic or square metres). **The output measurement methods shifted to the achievement of objectives, milestones, deadlines, measurable service outputs, client satisfaction** and other typical service-related performance indicators.

The change towards service sectors also goes along with a fast, large-scale shift in the provision of education and care **from families to professionals**. This means a growth of workforce in sectors with human–human interaction and the associated **emotional challenges**.[268] This is not the case only in education and care; in general there is a higher psychosocial burden in those occupations where work with **human beings as 'clients'** takes place, increasing the risks of emotional exhaustion and of difficult, inattentive or even aggressive clients.

Here it has to be mentioned that also **work in service sectors has its specific 'classic' safety and accident risks**, particularly in traffic and transport, maintenance and repair but also in sectors like health and care (lifting, infections, needles, etc.). And this is true also the other way around — **work in agriculture, construction or industry is definitely not free from psychosocial risk factors** and its impact on mental health, also this work relies on human–human interaction.

This **trend generates new and complex challenges for OSH policies and legislation**, and also for **practical OSH management in enterprises.** On the one hand, the level of safety and health prevention for the conventional types of work has to be kept high. On the other hand, the health risks caused by inadequate work organisation, psychosocial burden of different kinds and physical inactivity still need more awareness and require the implementation of partly new preventive approaches.

5.2 Technological developments – influence on OSH

During the past 20 years **significant technological developments and changes** have taken place in all sectors at nearly all workplaces. Literature related to the relation between technology development and OSH focuses on horizontal or **cross-cutting technologies** that influence all sectors, particularly automation and digitalisation as its main elements and drivers. Digitalisation facilitated the development of new services based solely on digital technologies. It has an enormous impact on practically all types of work. *Digital technologies now provide essential services to all sectors of our economy and society*.[269] The European Centre for the Development of Vocational Training (Cedefop) estimates that 7 of 10 workers need *'at least some fundamental ICT level to be able to perform their jobs.'*[270] These developments considerably influence the ways of interaction between humans and between humans and machines.

Beside such major cross-cutting technologies there are **numerous essential sector- and process-specific technological** developments that influence work in a sector or occupations. Technological developments are often based on the application of **several intertwined technologies**, for example, mechanical engineering, microelectronics, chemical engineering and optical technologies. The progress of effectiveness, speed and price of **transport technologies** might illustrate this. This progress was essential for the growth of international trade and the organisation and functioning of supply chains between countries and continents. This development needed the computerisation of the logistics but also progress in manufacturing of trains, trucks, ships and aircraft towards lower costs, higher speed, higher capacities and high reliability.

New material technologies (nanotechnologies, chemicals, plastics) have replaced classical materials (wood, stone, metals) and consequently influenced health and safety risks in many sectors. **Biotechnologies** have had much influence in sectors like agriculture, food processing and pharmaceutical production. **Technologies for renewable energy generation** facilitate the change from centralised large-size and plant-based energy generation to decentralised systems, that is, the shift from fossil fuels to renewable sources and to new storage systems, like the development of more effective batteries. Also the change towards a **circular economy and more recycling** requires technologies for the effective and safe reuse of materials and equipment.

At the same time — contrary or in parallel to a mainstream of technological developments — there is a **small but emerging societal trend of de-technologisation and de-globalisation**, that is, **niche trends** like 'Bio', 'Eco' and 'Regional', predominantly in agriculture and in food and cloth production. This trend is often caused by ethical and/or environmental considerations on certain types of products, for example, related to the consumption of meat or fish and the use of plastics-based products and fast-fashion clothes. This trend generates — on the producers' side — working conditions with partly distinct OSH requirements, that is, more safety risks in manual and craft work, and health risks typical for the handling of less treated materials and products, that is, more biological risks. A **similar development can be observed in human-centred sectors**: individual personal contacts are part of a service offer, mostly higher valued than standardised approaches or even a machine- or computer-supported advice or treatment.

Digitalisation and its impact on economy and work is a major topic in political and scientific discussions. Obviously the term 'Digitalisation'[271] covers such a broad array of technologies and developments that statements on their impact on society, economy and work can rarely be simple and straightforward.[272] Digitalisation includes technical issues like 5G coverage, widespread connectivity, IoT and big data, wearables, semiconductor capacities, edge and cloud computing, AI, data handling issues, for example, of medical records, mobile devices and online platforms, and it triggers economic and societal changes, for example, of business models, skills development, education and digital government.

Digital transformation is globally supported by governments using financial, political and legal measures. The European Commission launched in February 2020 the **European Digital Strategy 2020-2025**. This strategy aims to promote a new generation of digital technologies.

Concerning the **overall impact of digitalisation on work**, most researchers state a decrease of certain types of work and growth of others. Cedefop describes this as 'the great divide' and writes:

'Cedefop's European skills and jobs (ESJ) survey reveals that more than 7 in 10 adult employees in the EU need at least some fundamental ICT level to be able to perform their jobs. Yet, about one in three of those employees are at risk of digital skill gaps. At the same time, almost half of all employees in low-skilled occupations do not require ICT skills to do their work. Cedefop … notes that 'the digital divide is alive and well. A strikingly high share of the EU adult workforce is still employed in a semi-analogue world, at the same time that others are faced with technological obsolescence.'[273]

A statement of two researchers from the Massachusetts Institute of Technology shortly summarises this:

'Technologies such as payroll-processing and inventory-control software, factory automation, computer-controlled machining centers, and scheduling tools have replaced workers on the shop floor and in clerical tasks and rote information processing. By contrast, big data, analytics, and high-speed communications have enhanced the output of people with engineering, creative, and design skills and made them more valuable. The net effect has been to decrease the demand for low-skilled information workers while increasing the demand for highly skilled ones.'[274]

Digital technologies can enhance prevention at workplaces. They can help to separate workers from hazardous working situations, facilitate better and innovative ways of monitoring exposure, and might improve the quality of work by relieving workers from repetitive or routine tasks. Digital technologies may also create higher levels of autonomy and flexibility or facilitate the access of a more diverse workforce to the labour market, in particular vulnerable groups such as disabled people, ageing

workers and those with care duties at home. Digitalisation also offers opportunities for more effective OSH training, advanced workplace risk assessment, communication and OSH inspections.

Digital technologies can worsen the OSH situation at workplaces. Depending on how technologies are designed and implemented, on the organisational context and on the employment status, digitalisation may result in workers being more exposed to OSH risks such as ergonomic and psychosocial risks, with an increase in work-related stress, increasing performance pressure and work complexity, facilitating irregular working hours, reducing social interaction and support at work, blurred boundaries between work and private life, and new forms of dislocated work with unclear employment status. Technical concerns relate to aspects like safe interaction of workers with robots and semi-autonomous machines and vehicles. The extensive use of data has the potential to harm privacy interests. **Digitalisation can create abrupt (disruptive) and emerging changes at workplaces** and with that very different challenges for OSH.[275] Eurofound summarised the opportunities and risks of **ICT-based mobile work** in a table format.[276]

Table 27: Opportunities and risks of ICT-based mobile work – Eurofound

Opportunities	Risks
Potential transformation of work organisation	
Contribution to inclusive labour markets Addressing (regional) labour shortages Job creation and retention	Potential exclusion of certain groups from the labour market (for example, low-skilled workers, older people, place-bound occupations)
Flexibility and autonomy	Advanced monitoring and control Increased work intensity and stress
Improved work-life balance	'Limitless work' Potential expected 24/7 availability Long working hours, limited rest time Blurring spheres of work and private life
Productivity, costs, results-based remuneration	
Improved communication and collaboration	Information overload Conflicts due to a lack of coordination
Skills development (technical applications)	Social and professional isolation High demands for self-management and self-organisation
	Outsourcing of employer responsibilities (equipment, health and safety, data protection)

EU-OSHA observes particular risks for safety and health in:[277]

- low standards of OSH (particularly ergonomic) in mobile and home-based work,
- safety of robots, cobots and autonomous vehicles,
- platform work with low OSH standards,
- enhanced and detailed surveillance,
- permanent availability, and
- physical inactivity, permanent sitting and focusing on digital equipment.

EU-OSHA included in its ESENER 2019 survey several questions regarding **digitalisation and OSH** in enterprises. There is a great diversity when it comes to the types of digital technologies reported by the establishments. PCs at fixed workplaces (86% of surveyed establishments in the EU27) and laptops, tablets, smartphones or other mobile devices (77%) are frequently reported across all activity sectors and business size classes. Only 6% of surveyed establishments in the EU27 reported using none of the digital technologies.[278]

Table 28: Digitalisation and OSH discussed – ESENER 2019[279]

Digitalisation and impacts on OSH discussed	% Establishments
Need for continuous training to keep skills updated	77%
Prolonged sitting	65%
More flexibility in terms of place of work and working time	63%
Increased work intensity or time pressure	58%
Repetitive movements	58%
Information overload	52%
Blurring boundaries between work and private life	47%
Fear of job loss	21%

Actually, only 24% of surveyed establishments in ESENER 2019 reported discussing about the potential impact of digitalisation on the health and safety of workers. Of those 24% of all surveyed establishments, 77% discuss the need for continuous training to keep skills updated. The next major topics are prolonged sitting (65%) and the request for more flexibility for employees in terms of place of work and working time (63%).[280]

Some obvious **side effects** on working conditions require political actions. In response to the rapid development of online platform work in the EU, the European Commission started several activities on how to **protect people working through digital platforms**. The new Strategic Framework on OSH aims at adapting the OSH directives on Workplace minimum requirements and Digital screen equipment.

These fast and far-reaching changes by digitalisation have also triggered **ethical concerns**. The High-Level Expert Group of the EU Commission on Ethics adds, referring to the development of AI: *'In an AI context, freedom of the individual for instance requires mitigation of (in) direct illegitimate coercion, threats to mental autonomy and mental health, unjustified surveillance, deception and unfair manipulation.'*[281] In a report from 2022, EU-OSHA highlighted the possible consequences of AI for worker management.[282]

Major environmental changes and policies influence OSH. **The enhanced and accelerated introduction of environmental technologies is widely supported by national and EU policies.** *(Green deal[283] and circular economy.*[284]*)* Consequently, the number of workers in these sectors will increase and impact the working conditions of many workers. Sectors/enterprises dealing with sustainable technologies grow fast, for example, decentralised and carbon-free energy production, green products, waste and recycling, green mobility and transport, and energy saving buildings' renovation. These 'green jobs' have gained a relevant and sometimes essential share in several economic areas.[285]

Sectors like **construction and crafts** will profit significantly from this development. That would also mean that sector-typical OSH risks — accident risks — will 'return'. Also new risks will emerge, a circular economy approach[286] will pose additional **risks in recycling and waste treatment**, due to more handling of contaminated materials and probable exposure to more chemical contaminants and infectious biological agents.

EU-OSHA summarises: *'The new technologies or working processes associated with green jobs can lead to new hazards, which call for new combinations of skills to deal with them: the "old" OSH knowledge cannot simply be transferred to them. Installing a solar water heater, for example, involves combining the skills of a roofer, a plumber and an electrician.'*[287]

In addition, many of the new green technologies often require new skills and new processes and might **produce unprecedented OSH risks** — for example, fire and explosion from less environmentally harmful but less safe chemicals. However, at the same time, **green technologies support risk reduction at source**, due to principles such as limitation of hazardous chemicals and materials and

less environmentally critical processes (see for example, the principles of 'green engineering', like prevention instead of treatment of waste[288]).

Chemical technologies have ousted traditional materials and processes. The United Nations' (UNEP) 'Global Chemical Outlook'[289] documents a strong growth of chemical production between 1970 and 2010. The value of the global chemical production grew from US$171 billion in 1970, to approximately US$ 5.7 trillion in 2019, roughly 33 times more.[290] The EU had a share of $1.3 trillion or about 20% of the global value. In less than two decades between 2000 and 2017, the capacity doubled and grew from 1,186 million tons to 2,276 million tons.[291,292]

The reasons for this strong growth are: a) the **replacement of traditional materials** (wood, stone, iron and other metals, paper, natural fibres) by chemically based products (foremost plastics and multi-material products); b) **the replacement of traditional technologies by chemical processes** (e.g. gluing instead of screwing of connections in metal, two-component paints); c) the development of **new products** (e.g. electronic devices, new types of batteries, nano); and d) **new applications** (e.g. specific fertilisers and pesticides).

Approximately 300 million tons of synthetic chemicals were consumed in the EU in 2019, 223 million tons, or 74%, were regarded as hazardous to health.

Table 29: Production and consumption of chemicals by hazard class in the EU in 2019 – Eurostat[293]

HAZARD (Labels)	2021
Hazardous to health	214.3
Carcinogenic, mutagenic and reprotoxic (CMR) health hazard	39.9
Chronic toxic health hazard	25.4
Very toxic health hazard	59.2
Toxic health hazard	35.5
Harmful health hazard	54.5
All labels referring to: Hazardous to the environment	169.6
Hazardous and non-hazardous – Total	**278.9**

According to the detailed register data of the Swedish Chemicals Agency, 10 million tonnes of synthetic chemicals were used in Sweden in 2019 that were classified as hazardous to health and the environment (not counting petrol). That equals approximately 1 ton per citizen of such chemicals.[294]

The ESENER 2019 survey provides information about **sectors that reported a particularly high prevalence of dangerous substances**. The percentage of enterprises reporting handling or exposure to chemicals are: 50% in 'Manufacturing', 49% in 'Construction, waste management, and water and electricity supply', and 47% in 'Human health and social work activities'.[295]

The prevention of risks from the use of chemicals at workplaces is done according to extensive regulatory frameworks. The most relevant pieces of legislation at the EU level are the OSH Framework Directive, the Chemical Agents Directive, and the Carcinogens and Mutagens Directive. Legislation in other policy areas contributes to the reduction of risks from dangerous substances in workplaces, such as EU legislation on chemical substances and mixtures (CLP, the regulation on classification, labelling and packaging of chemicals, its predecessor directive was already issued in 1967; REACH the regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals from 2007; and also specific EU and international legislation on specific aspects such as chemicals in waste, storage and transport, in specific products like batteries and cars, in specific sectors like agriculture, in natural environments like in water and soil, and in consumer products like food, detergents and cosmetics).

Biological agents have always been a risk at workplaces in several sectors, particularly in health and care, in agriculture and the food industry, in laboratories, and in wastewater treatment, waste disposal and recycling. Also, climate change will raise the risks from biological agents in Europe, due to the expected warming that allows biological agents from tropical and subtropical regions to migrate to Europe.[296] An increasing resistance of bacteria towards antibiotic treatment is a particular risk in hospitals and care institutions.

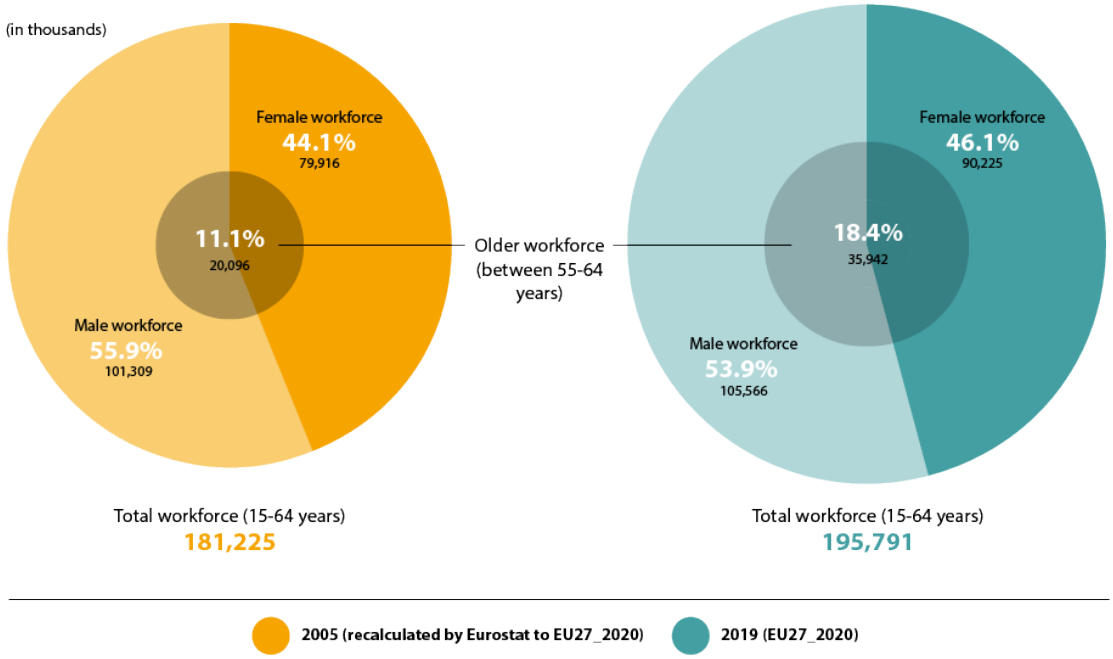
The **COVID-19 pandemic** made the public aware of the powerful impact of these risks, and also of the high risks of infections in some occupations. During the pandemic, the above-mentioned list of workplaces with well-known risks from biological agents was significantly extended; practically all workplaces with direct human–human communication were included, for example, workers in education, workers in public transport, sales and restaurant personnel and so on.

During the pandemic preventive measures for workplaces were introduced that **might change future prevention** practices towards biological agents, for example, the obligation to wear PPE might be applied for **many more worker groups and for more circumstances**, more rules for the organisation of personal contacts and communication at work have been developed and tested in practice, stronger ventilation might be implemented, and the measures might include a significantly higher use of disinfecting chemicals. The future development — be it regional or national outbreaks or worldwide pandemics — is unforeseeable. The connections between global societies due to international supply and transport chains and tourism will definitely increase the risk of future worldwide pandemics.

5.3 Workforce structure

The **workforce** was often set identical with employed workers under a permanent contract, on average mostly male, mainly national, and most of the skills were achieved during apprenticeships or studying. During the past three decades a rapid economic, technological and demographic development took place: the variety of contracts has grown, and the share of women and of an international workforce increased; moreover, the average age of the workforce is rapidly increasing; and technological developments require repeated and often permanent acquisition of new skills. All these developments have shattered traditional ideas and conceptions of working life.[297] This also has an impact on OSH.

Figure 38: Workforce structure, demography – Eurostat



In 2005, approximately 80 million women and 101 million men were employed in the EU. This was a rate of female workforce of 44.1%; in 2019, this rate went up to 46.1%, with 90 million women and 106 million men making up a total of 196 million workers. The employment rate of women between 15 and 64 years stood in 2019 at 67.9% and the employment rate of men at 78.9%.[298]

During the past 15 years the number of women in the Eurostat category 'Employed persons' (Employed persons = employees and employers including self-employed) grew by 12.9%. The number of female employees grew by 16.3% and the number of male employees by 7.8%.

Table 30: Development of male and female workforce in the EU27 between 2005 and 2019[299]

Eurostat, EU-27 (in millions, 15-64 years)	Q4 2005	Q4 2019	Development
Total			
Employed persons	181.2	195.8	Plus 8.1%
Employees	150.3	167.9	Plus 11.7%
Female			
Employed persons – female	79.9	90.2	Plus 12.9%
Employees – female	69.3	80.6	Plus 16.3%
Male			
Employed persons – male	101.3	105.6	Plus 4.2%
Employees – male	81	87.3	Plus 7.8%
Self-employed (with and without employees)			
Total	27.4	25.2	Minus 8.0%
Self-employed – female	8.2	8.5	Plus 3.7%
Self-employed – male	19.1	17.6	Minus 7.9%
Share of female employed persons	44.1%	46.1%	

Although female employment has grown faster than the men's rate, the employment rate for men is still 11% higher. Due to the much higher rate of part-time work — women 30%, men 9%[300] — the gender gap concerning participation in the labour market is higher when transforming the working time into 'full-time equivalents' (FTE). EIGE calculated a difference of 16%: *'The EU average FTE employment rate is 41% for women, compared to 57% for men.'*[301, 302]

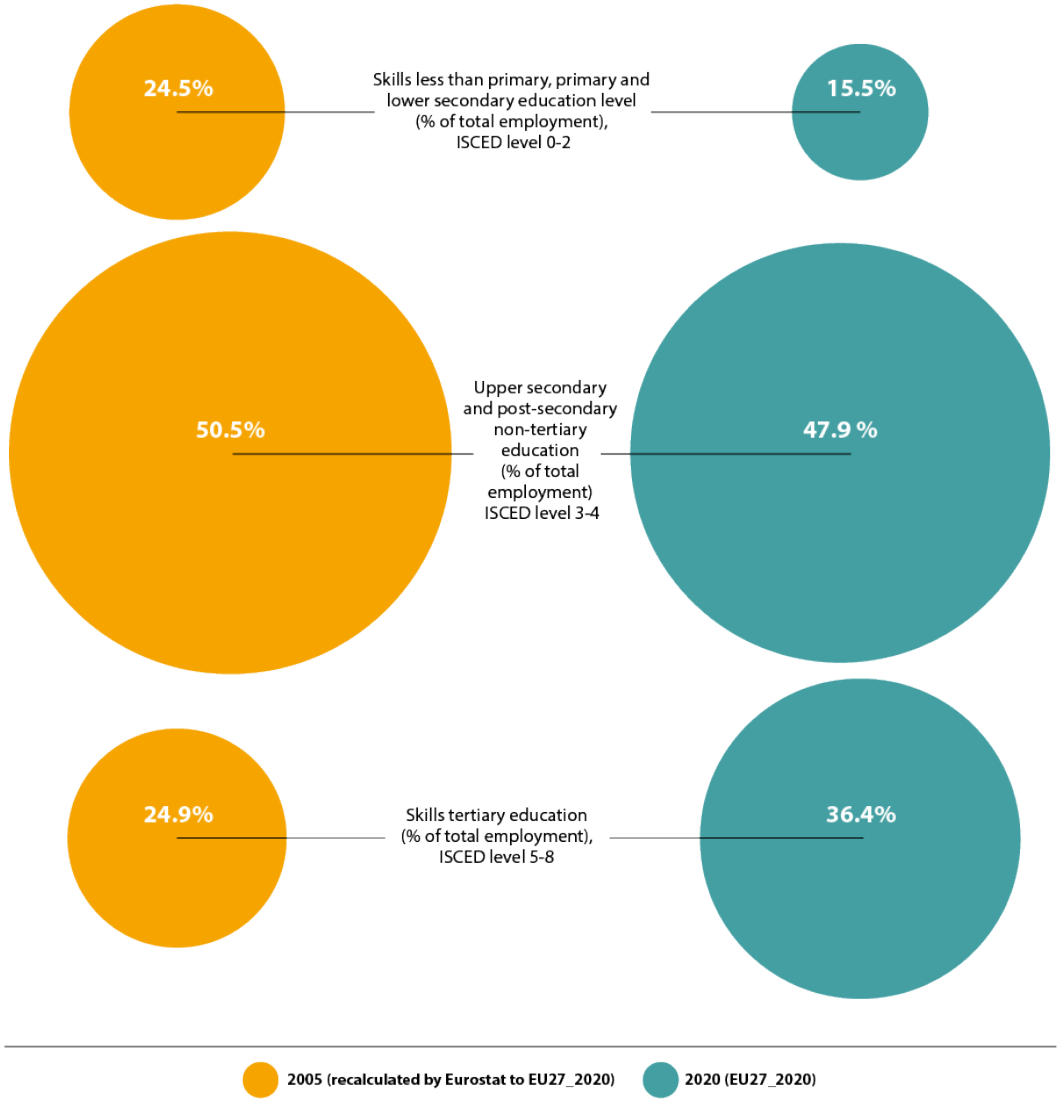
The **average age of the workforce has drastically changed** during the last 17 years. In 2005, the age class between 55 and 64 years represented 11.1% of all employed persons, and in 2019 already 18.4% of the workforce — a growth of 16 million employed persons. At the same time, the share of the age class between 15 and 39 years decreased from 49.6% to 41.6%, or 8.5 million. Already 5.1 million employed persons are older than 65 years, making up a share of 2.6% of the workforce.[303]

Table 31: Average age of the EU27 workforce[304]

Eurostat, EU-27 (in thousands)	Q4 2005	Q4 2019	Share of total 2005 (15-64)	Share of total 2019 / Q4	Development
Employed persons	181,225	195,791	100	100.0%	8.0%
Employed persons **15-39 years**	89,906	81,490	49.6%	41.6%	-9.4%
Employed persons **55-64 years**	20,096	35,942	11.1%	18.4%	78.9%
Employed persons **65 years and over**	2,971	5,135	1.6%	2.6%	72.8%

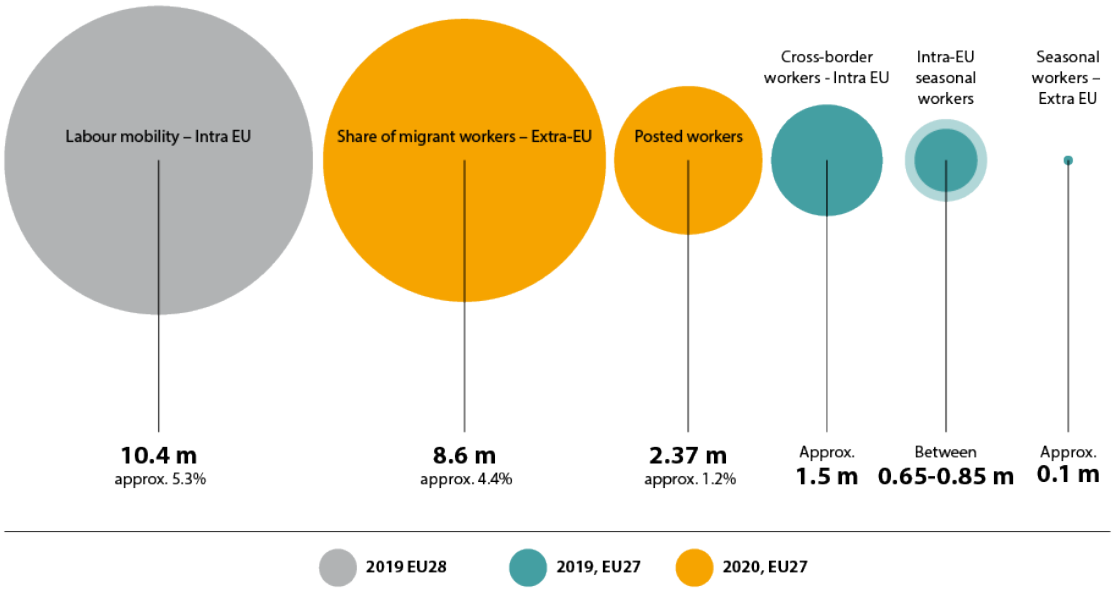
The development of **skill levels** shows the most significant changes in the period between 2005 and 2020. When comparing 2005 with 2020, for most occupations **higher skills** are required. In this period, the share of occupations requiring the three lowest education levels fell from 24.5% to 15.5%; the share of occupations that require a tertiary education grew from 24.9% to 36.4%.

Figure 39: Workforce structure, skill levels – Eurostat[305]



The **migrant and mobile workforce** in the EU27 also increased in the past two decades. The majority of migrants are intra-EU, that is, all workers who are born in a Member State other than the one where they currently work and reside; this number is estimated at 10.4 million (2019), based on LFS data.[306] Cross-border workers account for another 1.5 million[307] and posted workers for 2.4 million.[308] In 2020, 8.6 million extra-EU citizens (born outside the EU) were employed in the EU labour market, out of 196 million persons aged from 20 to 64, corresponding to 5.3% of the total.[309] The sum of all different categories of mobile extra- and intra-EU workers is roughly about 23 million, or about 12% of the EU workforce.

Figure 40: Workforce structure, mobility and migration – European Commission



Regarding OSH, it is important to consider that **migrants from non-EU countries are over-represented in certain sectors and occupations** like cleaners and helpers, personal services and care, building workers, mining, manufacturing, transport, food and agriculture. The next table shows the percentage of non-EU citizens in the workforce of certain occupations compared to the share of workforce of EU citizens in the same occupations.[310]

Table 32: Non-EU Migrants – over-represented in certain sectors and occupations in 2019

Sector	Share of the overall employment of non-EU citizens %	Share of the overall employment of EU citizens %
Accommodation and food service activities	11.4%	3.8%
Administrative support activities	7.1%	3.7%
Domestic work	6.5%	0.7%
Construction	8.6%	6.4%
Sector Occupational group	**Share of the overall employment of non-EU citizens %**	**Share of the overall employment of EU citizens %**
Cleaners and helpers	11.9%	3.1%
Personal service workers	9.0%	4.2%
Personal care workers	5.1%	2.9%
Building workers	5.8%	3.6%
Labourers in mining, construction, manufacturing and transport	5.6%	2.4%
Food preparation assistants	2.7%	0.5%
Agriculture and fishery labourers	2.6%	0.6%

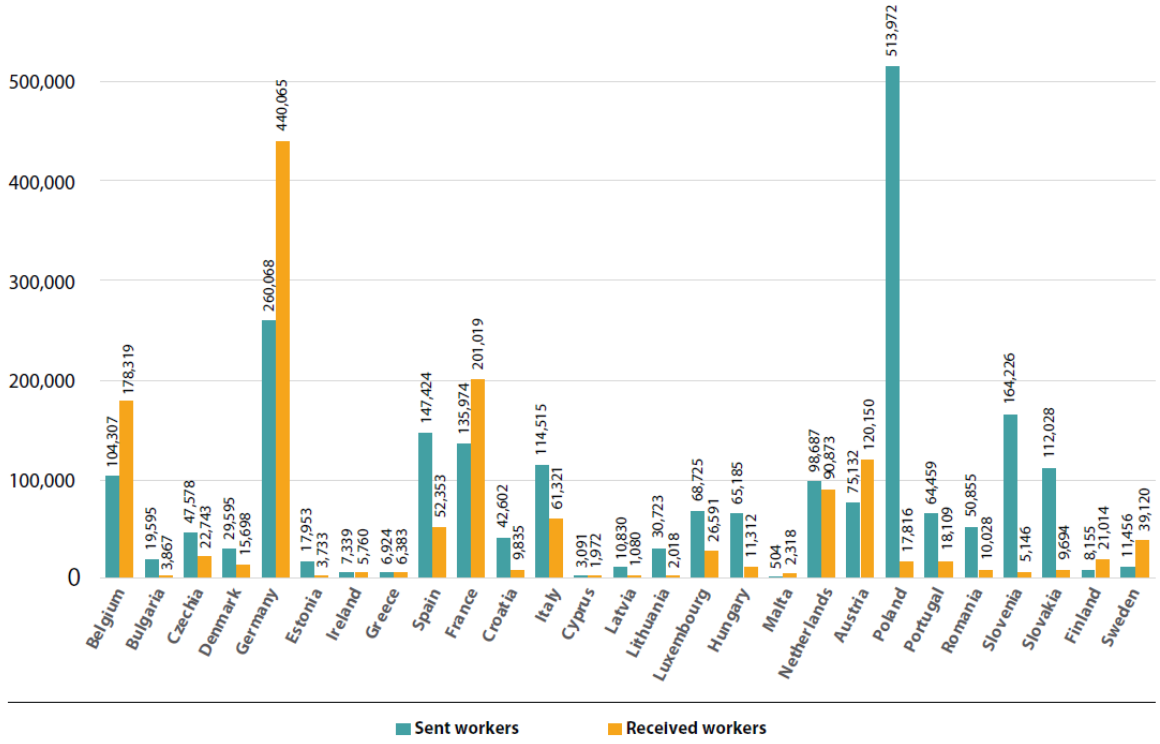
The **highest share of intra-EU and extra-EU workers per occupation** is among cleaners and helpers (37% in total, intra-EU 11%, extra-EU 25%), labourers in mining and construction (24% in total, intra-EU 7%, extra-EU 17%), stationary plant and machine operators (20% in total, intra-EU 6%, extra-EU 14%), and personal care workers (19% in total, intra-EU 5%, extra-EU 14%).[311]

The **occupations with a high share of migrant workforce are those with higher physical risks and lower expectations to do this job until 60 years old**. The common characteristic of these occupations is the well-known 3-D assignment: dirty, dangerous and demanding.[312]

Beside the occupation-related risks, specific health and safety issues might result from a lower level of language dominance; communication and instruction have to cope with different capacities to speak and understand. In a more diverse workforce other factors might differ, like awareness and traditions regarding aspects such as the importance of hierarchy, ways to communicate, perception of behaviour as aggression, harassment and discrimination. In general, a greater variety of the workforce poses wider challenges for prevention.

Posting of workers has similar implications for the organisation of OSH in enterprises.[313] Posting means that companies provide services in other EU Member States without having to establish themselves in the other countries. They send out employees to carry out the tasks required. The latest official data from 2020 estimated 2.3 million posted workers in the EU.[314]

Figure 41: Posted workers, receiving and sending countries in the EU[315]



Unambiguously, the data show that all eastern and southern European countries are senders (exception Malta). The central European countries Germany, France, Belgium and Austria and the two Nordic countries Sweden and Finland are the receivers. Some smaller countries like Denmark, Ireland and Luxembourg are exceptions, and the Netherlands has an equal amount of sent and received posted workers.

5.4 Globalisation and OSH

Globalisation is an **economic development accelerating during the past three decades**. Over the last decades, production and services have become less and less solely based on national pre-production or national service suppliers but instead on international supply chains.[316] **International supply chains** require logistics connections between countries and continents, harmonised technical standards, and, as far as possible, common legal rules and agreements, be it for services or materials and products. The development of such supply chains divides the necessary work related to a product or a service in parts, which might also mean **that the OSH risks might not be shared in a fair or equal way**. A fair divide is most probable between economies of similar levels of development, but a main part of **globalisation is trade between different levels of economic and technological development**.

A relevant part of outsourcing to less-developed countries **took place in sectors with high OSH risks**: mining, metallurgic processes, hazardous waste, basic chemicals and textiles. At the same time, EU enterprises 'import' health and safety risks by producing goods for export, for example, vehicles, machines, food or specialty chemicals. A **full assessment of the divide of OSH risks needs a case-by-case description**; a variety of different shares of risk is possible: there might take place reverse developments, for example, open-pit mining in a country will probably bear much lower risks than underground coal mining in the EU, and the risks inside the EU might increase due to (partly illegal) import of non-standard or even prohibited products and equipment into the EU (e.g. non certified machines or equipment, cooling agents), and the other way around: EU enterprises might produce and export products whose use is prohibited in the EU (e.g. pesticides). Regarding the **globalisation of**

services that do not require personal presence, digitalisation facilitates a massive global deployment of the workforce.

From an OSH point of view, it would be beneficial to investigate **the divide of OSH in the whole supply chain**, that is, leaving the restricted focus on OSH in the limited European share of the production chain. It would also generate a clearer picture of how the status of OSH in the EU would look after considering the import and export of risks.[317] The national or European OSH data simply cannot give the full picture in a globalised production setting.[318]

Approaches **promoting OSH at all workplaces** in these chains or networks can mitigate the negative impacts of the relocation of production and service processes with high OSH risks. Global enterprises, business federations, NGOs and governments support supply chain promotion; often it is a part of fair-trade agreements or actions. Approaches **promoting OSH at all workplaces** in these chains or networks can mitigate the negative impacts of the relocation of production and service processes with high OSH risks. Examples are certificates of business organisations, the Global Reporting Initiative topic Standard for Occupational Safety and Health,[319] and the UN Principles for Responsible Investment.[320] Also, national legislators are considering or discussing or have already agreed on supply chain legislations. In 2022, the European Commission proposed a supply chain law, called 'Corporate sustainability due diligence', and the expectation is that *'The new rules will ensure that businesses address adverse impacts of their actions, including in their value chains inside and outside Europe.'*[321]

Already in 2017 the EU issued a directive on several 'conflict minerals' (tin, tantalum and tungsten, their ores, and gold). Its functioning is described in the preamble as follows: *'… supply chain due diligence is an ongoing, proactive and reactive process through which economic operators monitor and administer their purchases and sales with a view to ensuring that they do not contribute to conflict or the adverse impacts thereof.'*[322]

Globalisation does not only refer to products and services but also to workforce that is working in other countries on the same or another continent, temporarily or seasonally, sometimes permanently. An exchange of workforce of a similar level of skills and employment conditions probably poses few risks regarding OSH. A relevant risk shift takes place when workers from low- or medium-income countries take over hard, dangerous and dirty work in high-income countries.

ICOH stated in its Centennial Declaration:

'The globalization process has not succeeded in equalising the conditions of work but in fact the opposite has occurred; the gaps are increasing. Poverty, inequality and under-development are closely associated with the poor safety, health and social conditions of work, as they are also linked with illiteracy, lack of education, poor access to health services and low or non-existent social protection.[323]

International organisations like the ILO, WHO and UN have also taken up **the task to promote OSH worldwide**. The ILO has established a system of conventions; their implementation is monitored in the signature states.[324] The ILO has issued and decided on nine 'Fundamental conventions' that have been signed by 92% of the ILO member states.[325] These fundamental conventions are:

1. Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87);
2. Right to Organise and Collective Bargaining Convention, 1949 (No. 98);
3. Forced Labour Convention, 1930 (No. 29) (and its 2014 Protocol);
4. Abolition of Forced Labour Convention, 1957 (No. 105);
5. Minimum Age Convention, 1973 (No. 138);
6. Worst Forms of Child Labour Convention, 1999 (No. 182);
7. Equal Remuneration Convention, 1951 (No. 100);
8. Discrimination (Employment and Occupation) Convention, 1958 (No. 111); and
9. (since 2022) Two conventions on Occupational Safety and Health, that is, C-155 Occupational Safety and Health Convention,[326] and C-187 Promotional Framework for OSH Convention.[327]

The ILO also promotes the **'Decent work' approach** to improve working conditions, covering aspects like fair income, social protection for families, better prospects for personal development and social integration, and equal opportunities and treatment. In the frame of this approach, the ILO has developed flagship programmes like *'Safety and Health for all'*[328] and the **'Global Action for Prevention on Occupational Safety and Health' (OSH-GAP)**, a programme to support and promote OSH globally.[329] Its priorities are:

- *legal, regulatory and adjudicative frameworks that address and integrate OSH, including core OSH laws and technical regulations;*
- *enforcement and compliance with OSH in workplaces, including public, private and non-governmental systems that operate independently or in concert;*
- *employer and worker competencies that are necessary to achieve and sustain OSH at global, national and enterprise levels;*
- *social dialogue that supports OSH;*
- *public and private financial resources for investment in OSH;*
- *occupational health services including public and private health services;*
- *employment injury insurance programmes that support prevention of OSH fatalities, injuries and illnesses;*
- *OSH professionals, institutions and networks;*
- *OSH indicators and implementation of effective methodologies for OSH data collection; and*
- *demand for the safety and health of workers and workplaces.*

The **International Social Security Association** (ISSA) developed the **Vision Zero initiative**.[330] ISSA promotes together with enterprises and many global OSH organisations this concept, aiming at the complete elimination of work accidents and occupational diseases.

The **UN** has developed a set of targets and indicators, **the Social Development Goals** (SDG).[331] Target 8 is dedicated to *'Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all'.* Sub targets are:

> *8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value*

> *8.7 Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms*
>
> *8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment*

The **WHO** is following a global approach towards **occupational health**. They summarised their base of evidence on global working conditions in some **key facts**:[332]

- *In many countries more than half of workers are employed in the informal sector with no social protection for seeking health care and lack of regulatory enforcement of occupational health and safety standards.*
- *Occupational health services to advise employers on improving working conditions and monitoring the health of workers cover mostly big companies in the formal sector and more than 85% of workers in small enterprises, informal sector, agriculture and migrants worldwide do not have any occupational health coverage.*
- *Work-related health problems result in an economic loss of 4–6% of GDP for most countries. The basic health services to prevent occupational and work-related diseases cost on average between US$ 18 and US$ 60 (purchasing power parity) per worker.*
- *About 70% of workers do not have any insurance to compensate them in case of occupational diseases and injuries.*
- *Research has demonstrated that workplace health initiatives can help reduce sick leave absenteeism by 27% and health-care costs for companies by 26%.*

Based on this evidence, the WHO Global Assembly agreed on a 'Worker health global plan of action' in 2007[333] (updated 2013) that included targets like better prevention at workplaces, that is, Objective 2: *to protect and promote health at the workplace.* The WHO has worked together with the ILO to estimate the burden of diseases from work and published the 'WHO/ILO joint estimates of the work-related burden of disease and injury'.

When looking at the work of global institutions during the past two to three decades — and for the ILO also much further back — many important **agreements, conventions, government actions and global business** programmes have been negotiated, agreed and issued. The objectives and necessary measures at a global level have been made much more concrete by these efforts. OSH and working conditions are on the agenda of these organisations, and general and concrete targets and indicators have been set. The **task is the implementation of these principles and programmes** in every region and country of the world in a way that it reaches all workplaces.

OSH Barometer – OSH Infrastructure – International organisations and international programmes
https://visualisation.osha.europa.eu/osh-barometer/osh-infrastructure/international-organisations
https://visualisation.osha.europa.eu/osh-barometer/osh-infrastructure/international-programmes

ESENER – Data visualisation
https://visualisation.osha.europa.eu/esener/en/survey/datavisualisation/2019

6 OSH legislation and OSH infrastructure in the EU

6.1 Foundation, legislation, compliance and supervision

The **ethical and economic importance of safe and healthy working conditions** led to an integration of this target in international conventions and agreements; it is also embedded in the treaties of the EU.

UN has included **'Safe and secure work environment'** as an indicator for **Goal 8** of their 17 global **'Sustainable Development Goals**' for 2030. Goal 8 aims to *'Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all'*.[334] It requests in its target 8.8 to *'Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.'*

The **Preamble to the Constitution**[335] **of the ILO** includes as an objective *'… the protection of the worker against sickness, disease and injury arising out of his employment ...'*. In 2022, the objective of a safe and healthy working environment became part of the 'Declaration on Fundamental Principles and Rights at Work', adding OSH to the existing four basic principles, that is, 1) freedom of association and right to collective bargaining, 2) the elimination of all forms of forced or compulsory labour, 3) the effective abolition of child labour, and 4) the elimination of discrimination. Between the year of the foundation in 1919 and today, the ILO agreed on more than 40 conventions and recommendations addressing OSH, be it either general provisions or provisions for specific groups and sectors or specific risks.[336]

The **EU and its predecessors** have enshrined health and safety of workers in their **founding treaties**. Already in 1951, it was stated in Article 3 of the European Coal and Steel Community (ECSC) Treaty that *'The institutions of the Community shall, within the limits of their respective powers, in the common interest … promote improved working conditions and an improved standard of living for the workers in each of the industries for which it is responsible …'*.[337] During the development of the European institutions and the EU from those years until today, references to working conditions and safety and health were always part of the treaties, and also in the latest Treaty of Lisbon from 2009.[338]

In **Article 151 of the Lisbon Treaty,** it is stated that *'The Union and the Member States, shall have as their objectives the promotion of employment, improved living and working conditions …'*. The areas of such promotion are set out in **Article 153**, where two bullet points refer to OSH: (a) *improvement in particular of the working environment to protect workers' health and safety; (b) working conditions.* In 2017, the European Commission launched an initiative to agree on the **'European Pilar of Social Rights'** (EPSR), comprising 20 key principles guiding the EU in the field of social policy.[339] These pillars were agreed by the Member States; **Principle 10 refers to a** '**Healthy, safe and well-adapted work environment** and data protection.'

These European and international agreements and treaties regard **safety and health** as essential for human development, a **basic human right**. The main reasoning is to eliminate or reduce as much as possible suffering, sickness, disability and death of workers. Often the reasoning refers to intertwined objectives, that is, to economic growth (UN), or to reduce the economic burden of incomplete health and safety at work, be it the burden for enterprises or the society as a whole, that is, by *'Promotion of employment'* (Lisbon Treaty) or by *'Prolongation of the participation in the labour market'* (EPSR) or *'Data protection'* (EPSR).

The EU treaties form the legal background for the development of specific EU legislation, related to working conditions in general and OSH in particular. In 1989, the EU agreed on the **Framework Directive**, a major step regarding OSH.[340] This directive introduced a distinguished preventive approach, based on a comprehensive risk assessment, as a dominant legal standard across all Member States. Its legal obligations prescribe several basic principles:

- the **responsibility of employers** for OSH, that is, *'the employer shall take the measures necessary for the safety and health protection of workers, including prevention of occupational risks and provision of information and training',*[341] and the **obligation of workers** '*to take care as far as possible of his own safety and health and that of other persons affected …'*;[342]
- the obligation to **evaluate all risks** (risk assessment);
- the preference of the **risk elimination at source** (combating the risk at source), a hierarchy of prevention measures, replacing the dangerous by the non- or the less dangerous;

- adapting the work to the individual but also **preference of collective solutions**;
- adaptation to **technical progress**;
- giving **adequate instructions**;
- **consultation obligations**, that is, worker participation; and
- **training requirements** for OSH practitioners and professionals in enterprises.

It directed the scope of the legislation **from prescribed worker protection rules to active preventive formation** of the work environment.[343] The Framework Directive does not refer to specific workplace risks, instead it lays down general principles to prevent, reduce or eliminate risks. Many pieces of previous EU legislation like the *Directive on the protection of workers from risks related to exposure to chemical, physical and biological agents at work* from 1980[344] and the *Directive on the protection of workers from noise* from 1986[345] were updated after 1989 to fully comply with the provisions of the Framework Directive.

Based on the principles of the Framework Directive, 24 individual OSH directives[346] lay down specific measures to cope with risks and exposures for: **workplaces and equipment** (work places, workplace equipment, explosive atmospheres, warning and safety signs, PPE, display screens), exposure to **chemical agents** (chemical agents at work, carcinogens and mutagens, occupational exposure limits), to **physical hazards** (ionising radiation, electromagnetic fields, artificial optical radiation, noise, vibrations) and to **biological agents** (biological agents at work), and **ergonomic risks** (handling of loads). Some of them deal with **sector-specific risks** (in construction, mineral extraction, fishing and healthcare) or specifically with **worker groups** (young workers, pregnant workers, temporary workers).

The chronological overview of the directives suggests that a **main phase of legislator activity lasted approximately 15 years, between 1989 and 2004**.[347]

Table 33: EU Directives on Occupational Safety and Health

Year of introduction / Major revisions	EU Directives on Occupational Safety and Health in chronological order
1983/1993/2009	Directive 2009/148/EC on the protection of workers from the risks related to exposure to asbestos at work **(Asbestos Directive)** (first asbestos directive in 1983)
1989	Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work **(Framework Directive)**
1989	Directive 89/654/EEC Minimum safety and health requirements for the workplace **(Workplace Directive)**
1989	Directive 89/656/EEC Minimum health and safety requirements for the use by workers of personal protective equipment at the workplace **(PPE Directive)**
1989/2009	2009/104/EC Minimum safety and health requirements for the use of work equipment by workers at work (codifying Directive 89/655/EEC and its subsequent amendments) **(Work Equipment Directive)**
1990	Directive 90/269/EEC on the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers **(Manual Handling Directive)**
1990	Directive 90/270/EEC on the minimum safety and health requirements for work with display screen equipment **(DSE Directive)**
1991	Directive 91/383/EEC Supplementing the measures to encourage improvements in the safety and health at work of workers with a fixed duration employment relationship or a temporary employment relationship **(Temporary Workers Directive)**
1992	Directive 92/29/EEC on the minimum safety and health requirements for improved medical treatment on board vessels **(Medical Treatment on Board Vessels)**
1992	Directive 92/57/EEC of 24 June 1992 on the implementation of minimum safety and health requirements at temporary or mobile construction sites **(Construction Directive)**
1992	Directive 92/58/EEC Minimum requirements for the provision of safety and/or health signs at work **(OSH Signs Directive)**
1992	Directive 92/85/EEC on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding **(Pregnant/ breastfeeding Workers Directive)**
1992	Directive 92/91/EEC concerning minimum requirements for improving the safety and health protection of workers in the mineral extracting industries through drilling **(Drilling Directive)**
1992	Directive 92/104/EEC on the minimum health and safety requirements for improving the safety and health protection of workers in surface and underground mineral extracting industries **(Mines and Quarries Directive)**
1993	Directive 93/103/EC concerning the minimum safety and health requirements for work on board fishing vessels **(Fishing Vessels Directive)**
1994	Directive 94/33/EC on the protection of young people at work **(Young people at Work Directive)**
1998	Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work **(Chemical Agents Directive)**
1999	Directive 1999/92/EC on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres **(ATEX Directive)**
2002	Directive 2002/44/EC on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration) **(Vibration Directive)**
2003	Directive 2003/10/EC on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise) **(Noise Directive)**
2004/2019	Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work **(Carcinogens or mutagens Directive)** (Several new or amended limit values for occupational exposure) *In 2022, reprotoxic substances were included and the directive name changed to:* Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens, mutagens or **reprotoxic substances** at work.
2004	Directive 2004/40/EC on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) **(EMF Directive)**
2004	Directive 2000/54/EC on the protection of workers from risks related to exposure to biological agents at work **(Biological Agents Directive)**
2006	Directive 2006/25/EC on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents **(Artificial optical radiation, AOR Directive)**

New directives or revisions and updates of directives were introduced for several reasons, that is, coverage of new technologies like artificial optical radiation (use of laser cutting, etc.), or new evidence, that is, after 2017 the Carcinogens and mutagens directive was extended several times, covering now many more substances. The revision of the directives on **Display screen equipment** (enormous technological developments since its introduction) and the revision of the **Directive on Minimum requirements at workplaces** (e.g. to better cover OSH at mobile work places outside the premises of the employer) is an objective of the EU Strategic Framework on Health and Safety at Work 2021-2027[348].

In the light of the changes in working conditions towards **physical inactivity and repetitive work** and the **higher psychosocial and emotional demands**, the European Commission and the Member States and stakeholders initiated several activities. Over the last 10 years, the European Commission made efforts to promote the approach that 'psychosocial risks and stress' are part of OSH and, as such, they are covered by the OSH Framework Directive. Some countries updated their legislation and explicitly included an obligation to include psychosocial risks in risk assessment, while others have developed extensive guidance for enterprises and/or labour inspections. Similar activities can be observed regarding MSDs.

The Machinery directive 2006/42/EC is only one example of a — very general — regulation of these two aspects at EU level:

*'Under the intended conditions of use, the **discomfort, fatigue and physical and psychological stress** faced by the operator must be reduced to the minimum possible, taking into account ergonomic principles such as:*

- *allowing for the variability of the operator's physical dimensions, strength and stamina,*
- *providing enough space for movements of the parts of the operator's body,*
- *avoiding a machine-determined work rate,*
- *avoiding monitoring that requires lengthy concentration,*
- *adapting the man/machinery interface to the foreseeable characteristics of the operators.'*[349]

EU directives and regulations in other policy areas influence OSH or contribute to better OSH, such as the Directive 2003/88/EC concerning certain aspects of the **organisation of working time**, and Directive 2019/1152 on **transparent and predictable working conditions** in the EU, the **Machinery directive** 2006/42/EC with some specific health and safety requirements, and also the **CE marking** of products as conforming with safety, health and environmental standards.

The quantitative and qualitative **degree of compliance and of implementation of the EU OSH directives** at workplace level is a constant topic in evaluation studies and expert meetings**.**

A **comprehensive evaluation of all EU OSH directives and their practical implementation** was commissioned by DG EMPL in 2012 and published in 2015, analysing the relevance of the directives, their effectiveness, and the level of the implementation or compliance, based on literature, studies in each Member State, expert interviews and surveys.[350,351]

The authors conclude on the **relevance of the EU OSH directives**:

'The evaluation shows very clearly that the EU OSH acquis is the reference frame for national OSH regulatory regimes. While the Member States have chosen various models for their legal implementation of the Directives' requirements, there is no doubt that the Directives' requirements form the core of the national systems in one way or the other. The significance of the Directives in setting the scene for OSH regulation in the EU is therefore very high.'

The authors also distinguish between the two major principles of legislative approaches in OSH, that is, either setting an objective and letting the actors define how this goal can be achieved **(goal-oriented approach)**, or prescribing also quite detailed measures to reach the objective **(prescriptive approach)**:[352]

'There seems to be a general view that the Framework Directive, with its orientation towards a goal-oriented approach to OSH (rather than prescriptive) successfully lays out a suitable template for managing workplace risks – but not in itself enough to ensure that all risks are dealt with sufficiently. One criticism of the goal-setting approach is that the absence of prescriptive intermediate goals makes

compliance harder to verify and, in the absence of that verification procedure, harder to enforce (especially in OSH cultures with a history of the prescriptive approach).'[353]

Regarding the **level of compliance with the legal goals or prescriptions**, the study authors assess it as 'moderate to good.' They see major differences depending on the topic and the size of the enterprises:

'However, the collected data shows that overall compliance with the OSH acquis across the EU and across establishment sizes is moderate to good. There is no indication that compliance is measurably higher in the public sector compared to the private sector. Yet, in reality, compliance varies significantly from directive to directive, from MS to MS and across establishment sizes.

Micro establishments: Cannot be assessed (limited evidence points to poor overall quantitative compliance)

- *10 to 19 employees: Poor overall quantitative compliance*
- *20 to 49 employees: Moderate overall quantitative compliance*
- *50 to 249 employees: Good overall quantitative compliance*
- *250 to 499 employees: Good overall quantitative compliance*
- *500+ employees: Very good overall quantitative compliance'.*[354]

In 2018, DG EMPL organised a peer review on 'The efficient transposition, implementation and enforcement of EU OSH legislation' for each EU Member State.[355] The overall conclusion is positive but refers to the difference **between formal (paper) compliance and 'real improvements'**:

'Although not uniform across employers (with evidence that smaller businesses in particular find some of the demands challenging and difficult to implement) indications are also that the transposed legislation is being implemented within workplaces. However, there are indications that the fact of implementation is not necessarily a true indicator of the quality of that action, with suggestions that "compliance" is to some extent a paper exercise and is not always reflected in real improvements in working environments.'

The authors of EU-OSHA's **'Supporting compliance' report**[356] note the same difference, using the terms **'substantive' versus 'rule compliance'**.[357] This report and underlying literature review have specifically analysed reasons and context for compliance and non-compliance. They analysed the influence of:

- social norms and social reporting strategies, and corporate social responsibility;
- economic incentives and the business case for OSH;
- the role of supply chain relations in supporting OSH;
- prevention services; and
- strategies and practices adopted by OSH regulators.

They conclude on a variety of aspects: *'During the last half-century, there has been a significant and well documented move away from prescriptive regulatory standards and efforts by national regulatory agencies to enforce them towards more principle-, performance- and process-based regulatory requirements …. This shift was originally informed by notions that traditional command and control strategies, however compromised by resource or governance, had achieved as much as they were likely to, and that different approaches were necessary to bring about the further improvements in OSH that were desired.*[358] (regarding reasons of non-compliance at enterprise level see also the chapter on 'Prevention Practices in Enterprises').

Not all worker groups, sectors or forms of work are equally covered by these directives. Since the first protective OSH legislations, **some important groups or sectors had exceptions from full application of OSH legislation**. Depending on the Member State, such exceptions are applied to self-employed and contracted work, military, public sector, mining, workers in the marine sector and offshore installations, family members, personal and household services, work in charitable organisations, volunteers in general, and domestic and mobile workplaces. In addition to these existing exemptions, we can observe in the last two to three decades an accelerating trend of erosion of the conventional employer–employee relation. Examples are outsourcing of work to contractors, often to self-employed, or platform work.

Obviously, **most informal, and** — in particular — **irregular and illegal types of work do not respect** legal OSH obligations — and at the same time legal monitoring obligations also fail. The EU Fundamental Rights Agency (FRA) published several case studies and examples in a series called 'Severe labour exploitation reports;[359] these studies provide an insight into most irregular working conditions.

Undeclared work is defined as paid and lawful (not criminal) activity but undeclared to public authorities. ('paid activities that are lawful as regards their nature but not declared to public authorities, taking into account the differences in the regulatory systems of Member States'.)

In 2018, the European Commission estimated the scale of **undeclared work** in the EU. According to this estimate, on average, 11.6% of total labour input in the private sector is undeclared, and undeclared work constitutes on average 16.4% of gross value added. The main sectors according to the Special Flash Eurobarometer from 2019[360] are personal services (childcare/elderly care/cleaning) followed by construction and hospitality services.[361] The 'European Platform tackling undeclared work' provides fact sheets about the type and quantity of undeclared work in all EU Member States.[362]

The compliance of enterprises with OSH regulations is **supervised by state institutions, mainly the Labour Inspectorates**.[363] At EU level, the SLIC developed common principles for their work. These common principles aim at harmonising their work and facilitate collaboration; they include planning and monitoring, inspectors' competencies and independence, prevention, protection, and assistance and guidance for inspectors, and internal and external communication.[364]

Practically all labour inspections in the EU Member States worked in the past two decades on **organisational and strategic measures to achieve an effective and broad impact**, and also to better adapt to new and emerging risks.[365] To enhance the level of implementation in terms of coverage and quality, many labour inspections developed **smart enforcement** and **supervision concepts**.[366]

On average, two million visits per year were made by labour inspectorates, in approximately 22 million businesses in the EU, in the decade 2010-2020, with a steady decline over the years.[367] .[368] Many enterprises that are regarded as low-risk establishments have never been inspected by a labour inspectorate. Often more than one inspection is done in large enterprises, for example, as a follow-up inspection; there might also be more than one annual inspection in enterprises with high risks. The labour inspection is also tasked to supervise enterprises with many separated sites or establishments, for example, construction companies and shops of supermarket chains. The visit of one headquarter or one shop cannot be regarded as a visit of a representative selection of enterprises' locations, which possibly show different levels of safety and health.

In the decade between 2000 and 2010, the development of the resources of labour inspections show a mixed picture, **some countries extended the capacities of labour inspections, others cut resources**.[369] For the period between 2010 and 2020, the European Trade Union Institute (ETUI) counted a decrease of labour inspectors and inspections in 20 of 27 Member States, a drop of 7% for inspectors and of 18% for inspections.[370] Again, the picture between Member States differs but, in general, budget or staff cuts dominate. ESENER findings show that there was a significant decline between 2014 and 2019 regarding the number of visits by Labour Inspectorates.[371]

Although labour inspections are at the core of supervision of working conditions, **other state authorities have similar or related tasks**, for example, regarding the control of undeclared work, checking minimum wages and social insurance contributions, and performing control of environmental or hygiene standards, of fire safety, or technical control of particularly dangerous production sites or equipment.

The **shift in working conditions towards psychosocial risks** generates new challenges for state supervision. SLIC recommends in its labour inspectors' guide for assessing the quality of risk assessments and risk management measures with regard to prevention of psychosocial risks:[372]

'When striving to prevent psychosocial risks, labour inspectors should take into account the fact that there is no single, across-the-board solution, and should recommend expert advice, for example, external OSH services, if needed for unusual or serious problems. A holistic approach is necessary in order to address psychosocial risks.'

Psychosocial risks at work were a topic in campaigns (EU-OSHA,[373] European Commission,[374] ILO,[375] WHO,[376]) in many national OSH strategies (see OSH Barometer[377]), or in guiding regulations, for

example, in Sweden.[378] Meanwhile, the spectrum of guidance developed regarding work-related psychosocial risks is very wide; it covers aspects such as job satisfaction (overall level of wellbeing), engagement, performance and work-related stress,[379] and also discrimination, harassment, aggression and violence.[380]

6.2 EU and national OSH strategies

The EU and many Member States **applied and apply strategic approaches**, based on EU or national evidence of the state of OSH. OSH strategies are a steering instrument to focus the activities of all actors on major recognised deficits of OSH infrastructures or processes.[381]

The newest **EU Strategic Framework on Health and Safety at Work 2021-2027** puts the focus on change, with the title *'Occupational safety and health in a changing world of work'*.[382] Consequently, the strategic framework focuses on three key objectives for these years:

- *anticipating and managing change in the new world of work brought about by the green, digital and demographic transitions;*
- *improving prevention of workplace accidents and illnesses;*
- *increasing preparedness for any potential future health crises.*

The proposed focus areas and actions are related to these three objectives. Under the first key objective there are actions like 'Modernising and simplifying EU OSH rules in the context of the green and digital transitions'; a special focus is on psychosocial and ergonomic risks. The second objective promotes a vision zero approach to work-related deaths, particularly referring to hazardous substances and cardiovascular diseases, the promotion of health at work and inclusive workplaces for all.[383]

The third objective responds to the impact of the pandemic situation in 2020 and 2021. It includes the development of emergency procedures for future similar situations ('Health crisis'). The Strategic Framework repeats and corroborates the value of research and data-based evidence by stating: *'Research and data collection, both at EU and national level, are a pre-condition for the prevention of work-related diseases and accidents. Scientific advice and the latest technological developments feed into OSH legislation and policy.'*

Also, many Member States have agreed on provision of better data as an objective in their national strategies.[384] The EU strategy often gives orientation for the development of national OSH strategies. Under the last strategy period, 24 of the 27 Member States had applied a strategy. Many national OSH strategies contained similar targets. EU-OSHA published an overview report on national strategies, and the OSH Barometer contains as one indicator a harmonised overview on the aspects of national strategies.[385]

OSH strategies are regarded as an important and innovative policy area, a chance for better collaboration, and also a very relevant joint national OSH activity. Those strategies help in priority setting and focused action on weaknesses. Strategies were often agreed in social dialogue processes, and many strategy actors also developed new and better monitoring instruments and indicators.[386] Labour inspections play an important or essential role in most of these strategies.[387]

OSH Barometer – Steering of OSH, National strategies:
https://visualisation.osha.europa.eu/osh-barometer/osh-steering/national-strategies

OSHWiki: Section 'OSH System at national level', descriptions of the OSH Systems of the EU Member States: https://oshwiki.eu/wiki/Category:OSH_systems_at_national_level

6.3 Guidance and support

Supervision is only one approach to implementing legislation. As mentioned, supervision by state authorities can only reach a small share of all enterprises, particularly not the many small ones and the self-employed. In addition to supervision and control, a broad variety of **prevention-supporting activities** has been developed during the past decades.[388]

The authors of EU-OSHA's 'Supporting compliance' reports state a strong increase in 'compliance promotion strategies'. They write: *'The regulatory changes have been matched in more recent times by an increasingly diverse set of compliance promotion strategies. Not only has public regulation sought to engage and encourage duty holders in the pursuit of forms of regulated self-regulation, but … the discourse on regulation itself has sought a far broader understanding of its meaning and the role of the private and public regulatory actors and processes potentially involved in both defining and securing compliance.'*[389]

One important type of means are **guidance and support tools** for enterprises and workers to extend the reach and impact of legislation. Labour inspectorates and other state institutions produce these tools either themselves or in collaboration with social partners or professional organisations.

Proactive research and preventive guidelines, particularly in situations of new risks, have become a quite usual preventive activity (e.g. on nanotechnology, or on some developments in digitalisation). For very complex regulations, like REACH, national institutions installed helpdesks. European institutions also publish such guidance documents for EU-wide use, for example, the guidance on health and safety in agriculture,[390] the guidance regarding the implementation of the Machinery directive,[391] the guidance documents of EU-OSHA on COVID-19[392] and the European Commission guidance documents on seasonal workers and COVID-19.[393] Practically all EU and international OSH institutions published guidance documents on how to identify and reduce psychosocial risk at workplaces.[394]

A large amount of **OSH guidance** already exists in different formats,[395] starting with classical written guidance documents, increasingly complemented by audio-visual and interactive tools. EU-OSHA covers a large variety of workplaces with its digital risk assessment tool OiRA (Online interactive Risk

Assessment).[396] Many good examples of support for micro and small enterprises (MSEs) are available as identified in the comprehensive EU-OSHA reports on OSH in MSEs.[397]

Often, guidance documents show the difference between good practice in prevention and risky practices, for example, the SLIC guidance on measures against exposure to respirable crystalline silica at construction sites.[398] There are many of these good or best practice examples in literature, but there is rarely a **quantitative estimate of the occurrence of good** (or moderate) **versus poor practice before and after** the publication and promotion of such guidance documents, which would be crucial to estimate the impact of guidance and tools.

Often the support of a proper implementation is done by European national, sectoral and regional employers' and workers' associations. They contribute to supervision and implementation by consultation or participation in steering committees and so on. Some of them produce specific OSH information or guidance for their members, adapted to the main topics of the organisation.[399] They participate in the development of national strategic approaches or OSH campaigns. In all EU Member States there exist fora for social dialogue at regional, sectoral or national level (overview in OSHWiki articles on OSH national systems[400]). At EU level more than 40 sectoral Social Dialogue Committees and a cross-industry social dialogue committee is working on topics of EU-wide relevance.[401]

In the frame of social dialogue, employer federations and trade unions agree on the regulation of **working conditions in collective agreements** without intervention or close reference to state regulations, for example, on working time or telework rules. The Eurofound 'Database of wages, working time and collective disputes' provides an EU-wide overview on such agreements.[402]

In some countries, **employers' and workers' associations are governing widely independent OSH institutions** (e.g. Austrian AUVA or German Berufsgenossenschaften) that act in the frame of state regulation but with quite considerable independent decision power.[403] In some cases they dispose of significant resources and are major players for some areas, like training of OSH professionals, or compensation of occupational diseases. They can even implement financial incentives to initiate better OSH practices.[404]

Management systems and policies contribute to better prevention; they include ethical considerations (corporate responsibility programmes, sustainability and environmental reports), or quality objectives (quality management) particularly in global and large companies. Most of them cover all aspects of the business activities and **OSH is one of these aspects**. Well known are the standards of the International Organisation for Standardization (ISO), namely ISO 9001, Quality management systems, ISO 14001 Environmental management systems - Requirements with guidance for use, and ISO 31000, Risk management - Principles and guidelines.[405]

If the OSH aspects in such systems are not sufficiently covered, enterprises can introduce **specific OSH management** systems. ISO published the global standard ISO 45.000-2018 *Occupational health and safety management systems - Requirements with guidance for use* developed by ISO. According to ISO, these systems have the following function:
'OH&S management controls the conditions and factors that affect, or could affect, the health and safety of workers (including temporary workers and contractor personnel), visitors, or any other person in the workplace, to avoid their ill health and/or injury.'[406]

Enterprises can also use other OSH management standards. At international level, the ILO published in 2001 'Guidelines on occupational safety and health management systems'.[407] In EU Member States there exist several systems that target specific sectors or SMEs, for example, scorecard systems.[408] Critics of OSH management systems refer to the risk of a focus on 'paper compliance'.[409]

6.4 Prevention practices in enterprises

It is widely acknowledged that in practically every regulated area there is a **difference between the legal prescription and the practice**. Several data sources and background reports are useful to understand these differences in OSH.[410] The most comprehensive overview on OSH practices in enterprises is done by EU-OSHA with its large survey ESENER.[411] This survey provides information on how European workplaces are managing OSH in practice.

In terms of the overall EU27 average scores, the **most common reason** reported for taking preventive action was **'fulfilment of legal obligations'** (85% in 2014, 88% in 2019), followed by 'meeting the expectations of employees or their representatives' (79% in 2014 and 81% in 2019), and **'avoiding fines or sanctions from the labour inspectorate'** (77% in 2014 and 79% in 2019). This latter point is interesting considering that ESENER 2019 reported a general decline in the number of establishments inspected, suggesting that fear of penalties is a sustainable driver.

The **complexity of legal obligations** is still reported to be a major difficulty to address OSH by 41% of establishments in the EU27 (2019). The country breakdown shows a very diverse picture though, the highest shares being reported in Belgium and France (52% of establishments), as opposed to Latvia (14%), Lithuania (15%) and Finland (16%). While most factors report a slight drop in their respective shares between 2014 and 2019, a lack of time or staff shows an increase from 27% to 33% being reported as a barrier to OSH management in 15 out of the 19 sectors (becoming the second most reported factor). This is particularly the case among establishments in the Netherlands (39%), Luxembourg (36%) and Malta (33%).

Lack of awareness among staff is regarded by 18% as a major difficulty and by 35% as a minor difficulty, in total 53%. When looking at size classes, minor and major difficulties are observed for 47% (size class 5-9), 55% (size class 10-49), 65% (size class 50-249) and 71% in enterprises with above 250 employees. Compared to size class differences, the differences between sectors are small, and all are quite close to the average.

Lack of awareness among management is mentioned by 36% (EU27), while 12% see it as a major difficulty and 24% as a minor difficulty. These differences between enterprise sizes quite remarkable: for the largest enterprises (50-249 and above 250), the percentages are the highest, about 44% and 49%; the other two size classes range at or under the average of 36%. The differences between sectors are practically negligible.

It is somewhat surprising that a lack of awareness among management and staff seems to increase with establishment size.

The preparation of a **document on health and safety responsibilities** and procedures, which ideally should be made available to employees, is clearly reported by a vast majority of surveyed establishments in the EU27 (89% in both 2014 and 2019).

Consistent with the findings in 2014, a total of 75% of establishments interviewed in the EU27 in ESENER 2019 indicate that they **carry out risk assessments regularly**. As expected, there is a positive correlation with establishment size. Several national studies show much fewer enterprises carrying out risk assessments, for example, only 50% in Germany, and SMEs even less.[412] Moreover, only a small percentage of companies carry out workplace risk assessments that will not only meet the essential procedural requirements but also take into consideration new and emerging risks in a comprehensive manner.[413]

Particularly difficult is the assessment of the **quality of risk assessments**. A complete quality assessment would require specific knowledge of several aspects: of the specific topic, of the — real — situation at the workplaces in an enterprise, and of the expected reduction of these risks by the proposed or recommended risk mitigation measures. This has rarely been done. Moreover, even inside one enterprise the **quality of a risk assessment might differ depending on the topic**, for example, between 'easier' topics as 'correct provision of warning signals' or 'adequate temperatures', and more complex topics like psychosocial, musculoskeletal, or chemical and biological risks.[414]

If **a risk assessment is conducted just for compliance purposes**, and not used appropriately for the successful management of OSH and reduction of accidents and occupational diseases, the risk assessment may lose its dynamic nature, and findings may be neither implemented nor communicated appropriately to employees.

The **types of risks included in risk assessments** are related to the risk profiles of different sectors, for example, it is likely that risk assessments in heavy industries and manual occupations focus more on safety risks. However, while sectoral risk profiles will naturally bias the identification of risks, smaller establishments seem to have **less of a focus on MSDs or psychosocial risk factors**, which would suggest that they are less well recognised or understood, in particular for MSEs.[415] Establishments also report that psychosocial risk factors are more difficult to manage than other OSH risks, while as business size grows, so does the proportion of respondents who perceive psychosocial risks as more difficult to manage than other OSH risks.[416]

ESENER 2019 shows that a **reluctance to talk openly** about these issues seems to be the main difficulty for addressing psychosocial risks (60% of establishments in the EU27). This, as with all the other difficulties considered (lack of awareness among staff/management and lack of expertise or specialist support), is reported in all enterprise sizes but more frequently as establishment size grows.

Specifically, among those establishments that report having to deal with difficult customers, patients or pupils, 51% of those employing 20 or more workers report having a procedure in place to deal with possible cases of threats, abuse or assaults by clients, patients or other external persons. This share rises to 74% among establishments in human health and social work activities.

The development of concrete outputs such as measures to better manage risks that can result in **musculoskeletal diseases** has actually seen a decline between 2014 and 2019, as follows:

- 85% to 77% on the measure of 'provision of equipment to help with the lifting or moving of loads or other physical heavy work';[417]
- 73% to 67% concerning 'provision of ergonomic equipment'; and
- 66% to 60% regarding 'encouraging regular breaks for people in uncomfortable or static postures including prolonged sitting'.[418]

The use of external **sources of information** to support with OSH management is relatively common across the EU27, however, the type of organisational expertise received varies quite significantly by country, although, the most common source identified was 'contracted OSH experts' (64%), suggesting that establishments prefer to receive advice from private sources. This was followed by insurance providers (45%), which in some countries, such as Germany (84%), forms a core element of the OSH management organisational system.

Further to this, slightly under two-thirds of establishments in the EU27 (62%) report using the services of an **external provider** to support them in their health and safety tasks, the shares being highest among establishments in Slovenia (86%) and Portugal (85%). Turning to external providers appears to be associated positively with establishment size while the sector breakdown reveals that it is the most frequent among establishments in manufacturing (72%).

ESENER 2019 demonstrates that the use of **health and safety services** reveals occupational health doctors (76%), generalists on health and safety (61%), and experts for accident prevention (52%) to be the most frequently used. Focusing on psychosocial risks, the use of a psychologist is reported by only 19% of establishments in the EU27, however significant differences can be observed between different countries. For example, in Finland the practice was indicated as widespread (from 60% to 71%), where a strong voluntary emphasis on managing mental health issues is places by national legislation.[419]

Concerning **forms of employee representation**, a health and safety representative was the most frequently reported figure: 57% of establishments in the EU27, slightly higher than in 2014. By sector, the shares were highest among establishments in electricity, gas, steam and air conditioning (71%), education (67%), and mining and quarrying (67%). As expected, these findings are largely driven by establishment size.[420]

ESENER 2019 asked establishments about the **appointment of the health and safety representatives** and the findings reveal a very diverse picture across countries, in reflection of the different national frameworks. More than half (52%) of establishments in the EU27 report having the health and safety representative selected by the employer, the highest shares corresponding to Germany and the Czech Republic (83% of establishments), as opposed to Sweden, Finland and Italy (12%). On the other hand, substantially less than half of the surveyed establishments (38%) indicated that health and safety representatives are elected by the employees, the shares being highest in Finland and Italy (80%) and Sweden (75%).

This reveals two different philosophies: in the first group of Member States, the employer selects an employee who has — or gets via training — a particular specialist knowledge in OSH, a representation of employees is not crucial for their selection, and the term 'safety representatives' is less adequate for this group than 'OSH professional' or 'OSH practitioner'. In the second group of countries, the representation of workers' interest in OSH has priority, self-evidently these elected employees also have the right to specialist training in OSH. Mixed systems also exist.

As in the past, there are significant differences when it comes to the share of establishments where **risk assessments are mainly conducted by internal staff**. The country ranking changes significantly, being topped by Sweden (85% of establishments, up from 66% in 2014) and Denmark (80%, up from 76%). The lowest shares are found in Slovenia (10%), Spain (10%) and Hungary (14%). While this does not conclude anything about the quality of these risk assessments in principle, in some countries there may be a legal obligation to contract OSH services for such tasks, and under the assumption that those in charge of the work are in the best position to control the risks, all enterprises should be able to carry out a basic risk assessment with their own staff only.

A clear **majority of team leaders and line managers** in the EU27 **receive training on OSH**, although the trend has not advanced much (slightly over 70% of workplaces in the EU27). Moreover, there are notable differences in the extent of this practice between countries, suggesting different levels of prioritisation in mandating training for persons with OSH responsibilities. Unfortunately, the share of respondents in the ESENER 2019 survey who have undergone OSH training declined slightly, from 71% in 2014 to 65% in 2019. ESENER is designed to collect information from the 'persons most knowledge-able about OSH in the establishment', suggesting that training for persons with key responsibilities is decreasing slightly.

6.5 Conclusions

Comprehensive EU legislation and its national transposition form the frame of OSH for enterprises and are the base for national legislations and governmental approaches and actions in all Member States. According to many studies in different countries, sectors and enterprise sizes, legislation is the key driver for preventive actions in enterprises. Moreover, the evaluations of EU OSH legislation show that the EU Directives are the *'reference frame for national OSH regulatory regimes'.*

The major critical issue is the **effective and qualitatively substantive implementation of the legislation** — as opposed to 'paper' compliance, that is, the preventive quality of risk reduction measures at the workplace. Evaluations, expert reviews and surveys, analysing the practical implementation in Member States and the practice in enterprises (DG EMPL, EU-OSHA's supporting compliance reports, ESENER, SLIC evaluations), provide evidence about the current situation, the strength and weaknesses of implementation, and compliance. EU and national reports show a high variety of enterprise practices and governmental actions. Examples from stakeholders, professionals and practitioners demonstrate best, good, moderate and also bad practices, depending on company culture, size, sector and work task.

The **trend is clearly towards a higher awareness and towards a wider coverage of a broader spectrum of risks**. Support towards preventive measures is not only achieved by legislation but also by stakeholder support of multiple kinds, be it **interactive support tools, classical guidance documents, management systems** or **European product standards**. They all help to better cope with the complexity of risks and the selection of adequate preventive measures.

However, the current data situation is still too diverse and the implementation of OSH legislation and guidance too different to assign a **harmonised statement — or a kind of composite indicator — for effective implementation of legislation or standards**, be it for Member States or for sectors or types of workplaces in the EU27. The quantity of risk assessments and preventive measures can be roughly estimated, based on ESENER and national surveys, but the quality of these risk assessments and the subsequent preventive risk reduction measures can only be assessed on a granular case-by-case level.

This difficulty to assess a **kind of general prevention level** of a Member State, a sector or an occupation is the reason why 'outcomes' have such a relevance as quantitative indicators. These indicators allow — although mostly being lagging indicators — an assessment on a highly aggregated level, like EU Member States, sectors or types of occupations.

OSH Barometer – Steering of OSH Infrastructure, Enforcement Capacity (responsibility of Labour Inspectorates and similar state institutions, their powers, the scope of their work and their strategic planning)**:**
https://visualisation.osha.europa.eu/osh-barometer/osh-infrastructure/enforcement-capacity/establishments-inspected

ESENER – Data visualisation:
https://visualisation.osha.europa.eu/esener/en/survey/datavisualisation/2019

7 Methodological approaches, available data and research questions

7.1 The need for a detailed OSH information base

Describing the **state of OSH** in the EU **requires reliable data**. Many national and European OSH institutions and research institutes contribute to this data generation, covering a broad array of topics.[421]

A reliable overview of the state of OSH is not an easy task, although the current information base is already broad: **obligatory statistical data**,[422] **EU-wide surveys**,[423] **and comprehensive reports and research on facts and figures, on policies, capacities and actions**, provided by OSH institutions, agencies, universities and research institutes, professional organisations and international organisations (e.g. ILO, WHO and OECD). The EU sources range from quantitative datasets, for example, Eurostat statistics and large EU-wide surveys (e.g. ESENER,[424] EWCS,[425] LFS,[426] Flash Eurobarometer[427]), to detailed background reports on risks, OSH systems and infrastructures (e.g. by EU-OSHA, Eurofound, etc.) and evaluations and assessments of the level of implementation of OSH directives (e.g. by DG EMPL and by SLIC or surveys facilitated by the National Labour Inspectorates[428]).

The council Regulation (EC) No 2062/94 establishing EU-OSHA, mentions that: *'the Agency's role shall be to […] collect and disseminate technical, scientific and economic information…'*.[429] In addition, the **EU OSH Strategy 2002 to 2006**[430] defined such work in a better information base explicitly as a major task of EU-OSHA: *'The European Agency for Health and Safety at Work: - will set up a "risk observatory", based on examples of good practice collected from firms or specific branches of activity; - will organise exchanges of experience and information by way of the systematic collection of data, with the support of Eurostat.'* Several publications from different periods document this approach.[431]

The need for better information and data is well known, as the **EU Strategy 2007 to 2012** underlined: *'to better identify and assess potential risks by doing more research, exchanging knowledge and applying results in practice; - to develop monitoring tools to track progress; ….*[432] The **EU Strategic Framework on Health and Safety at Work 2014-2020** defined seven key objectives, where key objective 6 requests better data: *'Improving statistical data collection to have better evidence and developing monitoring tools'.* [433]

The most recent **EU Strategic Framework on Health and Safety at Work 2021-2027** puts the focus on changes, with the title *'Occupational safety and health in a changing world of work'*.[434] It emphasises the value of science-based evidence by stating: *'Research and data collection, both at EU and national level, are a pre-condition for the prevention of work-related diseases and accidents. Scientific advice and the latest technological developments feed into OSH legislation and policy.'*

These objectives show that good — and often more and better — evidence and monitoring tools are needed to understand all aspects of safety and health at work — as a pre-condition for priority setting and effective preventive actions. Consequently, in their national OSH strategies, a good number of Member States have agreed on provision of better data as a major target.[435]

One example for such a monitoring exercise is EU-OSHA's series of foresight studies, for example, on emerging risks in the healthcare sector, including home and community care, emerging accident and electricity risks in renewable energy jobs, cost of work-related stress and psychosocial risks, and also shorter expert discussion papers, for example, on topics like nanotechnologies, robotics, 3D printing and use of performance-enhancing drugs in working life.[436]

7.2 Quantitative data on OSH

Quantitative data are the core of this report, although the authors are aware that quantitative data finally gain their value by a **well-considered qualitative description**, including an **analytical interpretation of the reasons and context**. Analysis aims to find answers to questions like: Why is this trend as it is, what are the reasons? Which data are available and which data do we not have but would like to? What do the data tell us about the need for action?

Eurostat is a major source of OSH-related statistics. First and foremost, Eurostat is responsible for the ESAW.[437] In addition, approximately every six to eight years it adds an ad hoc module on OSH to its permanent LFS (1999, 2007, 2013, 2020).[438]

Eurofound[439] contributes substantially to the evidence on the state of OSH by its research on working conditions and industrial relations. The EWCS[440] is based on interviews with more than 40,000 workers (2015) in all EU Member States. The interviewees respond to questions on the quality of their work, including health and safety issues (every five years). It started in 1991[441] and is repeated every five years. Unfortunately, the EWCS 2020 had to be cancelled due to the pandemic situation. In 2021 it was conducted as a phone survey with a different approach, so the comparability of the results with previous surveys will be limited.

EU-OSHA conducts every five years a similarly large survey on the practical management of OSH in enterprises, called The 'European Survey of Enterprises on New and Emerging Risks - How European workplaces manage safety and health' (ESENER).[442] Interviewees are those managers or staff members who are responsible for, or most closely associated with OSH, or familiar with OSH. This survey provides detailed information about OSH practices in enterprises covering more than 30 European countries. The ESENER methodology substantially changed between 2009 and 2014; in this report, trend descriptions are limited to the comparable surveys of 2014 and 2019.

The Flash Eurobarometer is a large opinion poll on a large variety of topics related to EU policies and daily life in all EU Member States. In 1992 and 1996, two polls on Europeans and Health and Safety at Work gave some insights about the situation at that time.[443] In 1997 and 2014, the poll questions were dedicated to working conditions,[444] in 2018 the poll dealt with 'Work Life Balance'[445] and in 2020 with 'Undeclared work'.[446]

The text box below contains some major survey data to illustrate the type of provided data, their development and the methodological changes.

Survey figures from 1995 and 20 years later in 2014/2015 (1995 based on EWCS 2, 2015 based on EWCS 6 and on the Flash Eurobarometer 2014)

1995: 29% of European workers think that their **health could be affected by work** (EWCS 2 Summary, p. 2)
2015: 23% of European workers think that their **health could be affected by work, minus 6%** (EWCS 6)

1995: 23% were absent from work due to **a work-related health problem** (EWCS 2 Full Report, p. 290)
2015: 45% were at least once absent from work due to a **work-related health problem** during the last 12 months, **plus 22%** (EWCS 6, EWCS data visualisation). Response to **How many days were you absent from work for health reasons in the last 12 months**? In the Flash Eurobarometer 2014 data (p. 75) 7% less, that is, 38% of the workers responded that they had an absence due to a health problem **related to their work.**

1995: 13% had **10 and more days of absence** (7% between 10 and 19 days, 6% more than 20 days (EWCS 2 Full Report, p. 289)
2015: 28% had **more than five days of absence** due to a health problem (EWCS 6 Overview Report, p. 112) Not fully comparable due to change of category

1992: 14% consider a work accident a risk in their workplace (Eurobarometer 1992, Europeans and Health and Safety at Work, Synopsis). The question was skipped in 1995 due to the development of ESAW.
2014: 6%/10% consider a work accident a risk in their workplace (Euro Flash Barometer 2014, p. 71 — 6% in the last 12 months — and 10% during 'last experience of work', p. 73. **This is 8%/4% less compared to the Eurobarometer 1992**.

Many governments, that is, their statistical institutes or the national or federal OSH institutes of EU Member States, perform national surveys or enquiries on working conditions and analyse data from different sources.[447] Furthermore, data are collected at a national level from the National Labour Inspectorates, though in many cases they are not publicly available.

Also, universities, research institutes and professional associations, for example, the International Association of Labour Inspection (IALI),[448] publish data on the national OSH situation, sometimes in a comparative perspective.

In **areas closely related to OSH**, for example, in the fields of public health, pension and social insurance developments, industrial relations, labour law, aspects of OSH are often touched upon. This research is focused on data and analyses on the development of contract types, of wages, working times, and social insurance systems and similar, which are closely connected to OSH.[449] Others cover the relation between working and living conditions, including aspects like living styles, mobility, housing, childcare, elderly care.

Particularly during the last decade, publicly available **dashboards and data collections** have been developed in many OSH-related areas. To mention some **provided by EU institutions**: the Cedefop Skills Panorama on the development of skill requirements and actual skills at European enterprises and work places,[450] the EIGE Gender Equality Index,[451] the ECHA databases on workplace exposure scenarios of chemical substances,[452] the ECDC dashboards on communicable diseases,[453] EMSA on safe work in the marine sector,[454] the FRA reports on severe labour exploitation of migrants and survey on violence against women,[455] and the European Monitoring Centre for Drugs and Drug Addiction on the use of traditional and modern drugs at work places.[456] The European Commission Directorate-General for Health and Food Safety (DG SANTE) provides indicators and data on health status and health systems.[457] Although the core objectives of the data collections and analysis of these institutions do not specifically include work, working conditions or OSH, many of their results shed a light on particular aspects of health and safety at workplaces.

Many national surveys and statistical evaluations add to this, often with more detail and closely related to the national economic and political infrastructure and its working conditions legislation. The different national situations to which the institutes refer to and the different methodologies that the national institutions use make it hard to impossible to compare countries based on these national data.[458] However, the differences seem to be minor if the questions in European or national surveys are very similar.

'Second, when the surveys do include similar questions, the responses seem to be similar across surveys. This was illustrated with a question on overall satisfaction with the working conditions and/or overall job satisfaction. Such a question is included in the EWCS as well as the German BIBB/BAuA survey and the NWCS in the Netherlands. It was shown that findings from the national surveys are very similar to findings from the EWCS, which indicates that, at least for this question, methodological differences between the surveys do not lead to different findings. While this implies that the integration of the datasets is in theory possible, the problem remains that the national surveys share few questions that are exactly the same, in addition to the methodological challenges highlighted above'.[459]

Also, **international institutions** provide information that covers in some cases all but often only a selection of EU Member States. These are, for example, the OECD, which publishes overarching, general and country reports on economic and sectoral developments, and on infrastructures of the health system. International organisations like the ILO and its data collections and 'National profiles on occupational safety and health'[460] contribute to the richness of data. The WHO and its Regional Office for Europe provide global, regional (large groups of countries) and national data in its 'Global Health Observatory'.[461] Both the UN organisations are first of all committed to a global approach, but they also publish specific country profiles or specific data for countries or regions.

Despite these many data collections, there are still important data and research deficits that leave room for less unambiguous and more speculative interpretations of the state of OSH.[462] The reporting of working conditions in official statistics (administrative data, registry-based data) and voluntary surveys cannot cover all aspects of OSH at workplaces. The accuracy of statistics and surveys fades as more informal and irregular working conditions are prevalent. Work at the edges of legality is surely not a good base for the willingness to respond realistically in interviews or to provide reliable statistical data. Other issues add to this, for example, low participation of migrants in voluntary surveys is reported by many survey providers.[463]

These **types of less formalised work** have gained more and more importance in social reality and research. There are some prominent examples of EU-wide overviews. The 'European Platform for

tackling undeclared work' provides fact sheets of the type and quantity of undeclared work in all EU Member States;[464] Eurofound published several reports on platform work,[465] and the FRA had a series of publications and fact sheets on severe cases of exploitation, particularly of migrant workforces.[466] Also, the creation of the European Labour Authority (ELA)[467] is partly a consequence of the **often irregular working conditions of mobile, posted, contracted or seasonal workers** who leave their country to work in the EU or in another European country. ELA particularly aims to mitigate such critical issues related to labour mobility and social security coordination between countries.

In this report, the quantitative data and the interpretation of the developments will cover — in an ideal case — **the period 2005 to 2020**. In 2004, a major extension of the EU took place, from 15 to 25 Member States. If it is not possible to cover the whole period, the analysis is limited to the maximum possible period. If comparability is high, for a very few selected data a further look back to the 1990s was taken.

Moreover, there can be **major comparability difficulties** caused by the change of methodological approaches, geographical coverage and other context factors during the last 10 to 30 years. Major challenges for comparative assessments of EU-wide harmonised data collections from different years were:

- The EU went through **several enlargement processes**, expanded from EU-12 to EU-15 in 1994, expanded from EU-15 to EU-25 in 2004, to EU27 in 2007 and to EU28 in 2013, and from 2020 on — due to the departure of the United Kingdom — the EU consists of 27 Member States. In statistical publications the identifier EU27_2020 is often used to distinguish this period from the EU27 phase between 2008 and 2012, before Croatia joined and the EU27 became EU28.
- **Methodologies of data collection changed**, questions in surveys were abandoned or changed, and sample sizes or structures changed, for example, the given period in survey questions changed. One example is from the EWCS: the time categories for health-related absence from work changed from 'between 10 and 20 days' to absence of 'more than 15 days'.
- Important **structural decisions were taken in the sector of economic statistics**, like the change of the statistical composition and the coding of economic sectors, NACE Code 1, Revision 1 (NACE 1.1) was applied until 2007, and from 2008 NACE Code 2 is applied.
- The survey providers use(d) for **occupation and educational attainment different categories** and aggregations levels, for example, ESEG, ISCED or ISCO.
- Some important categories and definitions are **not fully harmonised** in statistics, for example, the definition of 'manual worker' or of 'migration status'.[468]

7.3 Qualitative data and research

Quantitative data gain importance by a comprehensive description of the reasons behind these data and their development, **by interpretation and analysis**. Such analytical explanations are elaborated by (roughly categorised): the providers of the quantitative data themselves, in addition by scientists at universities and governmental institutions, by European, national or regional governmental organisations, by business federations and trade unions, by professional associations and by international organisations.

This analytical work covers a large variety of topics like detailed studies and reports on **risks, exposures and outcomes**, on the development and application of **effective technical and organisational preventive measures**, on preventive **OSH systems and infrastructures**, for example, evaluations and assessments of the level of implementation of OSH directives, and finally on the **societal, economic and legal frame and context** of OSH.

There is **no strict separation between the following four types for research categories**. For example, the EU-OSHA study 'Analysis of the determinants of workplace occupational safety and health practice in a selection of EU Member States'[469] includes an analysis of the systems and infrastructures as well as of the framework and context influence. To fully cover understanding and support of OSH prevention in workplaces, all these types of research are needed.

Research on risks, exposures and outcomes including future developments

This type of data and research deals with the **description and analysis of risks and exposures and health outcomes** (there are basically three outcomes: 1) work accidents, 2) diseases, and 3) wellbeing / job satisfaction / overall perception of health at work), and their interlinkage. Risk identification and exposure assessment relates to several types of risks and exposures: mechanical, physical, chemical or biological risks, including those risks caused by the circumstances at workplaces (e.g. those technical basics listed in the Directive on minimum safety and health requirements for the workplace[470]), and risks caused by the work organisation, including aspects like work intensity and time pressure, poor communication and misunderstanding, harassment and discrimination and work with clients and customers. All these topics are subjects of a wider field of different sciences, ranging from engineering and natural sciences to psychology and sociology to several medical disciplines.[471]

Similar methodological considerations were also essential for EU-OSHA to initiate a **worker survey on workplace exposures to carcinogens and occupational cancer** (2020 to 2024).[472] Reliable and publicly available exposure data are rare for many typical daily work situations. It is for this reason that EU-OSHA has chosen an approach that relies on an expert system, that is, it connects the description of workplaces and work tasks to exposure estimates of probable occurrence of and exposure to certain carcinogenic substances.

A specific section of this research is the **foresight on the development of risks** at workplaces. Major trends are analysed regarding their impact on OSH; these can be trends like digitalisation including aspects like robotics, AI virtual work environments, globalisation including aspects like OSH in supply chains or migration, green transformation including aspects like circular economy, demographic changes with aspects like ageing, and public health developments like diseases related to prolonged sitting.[473]

Research on effective technical and organisational preventive measures

Based on these predominantly ‘diagnostical findings’, an often separated strain is the development of preventive measures. Engineering and natural sciences mainly deal with the development of **preventive technical measures** to avoid accidents and limit health-impairing impacts. This technical OSH research includes the development or improvement of preventive technologies, of safe and healthy products and processes at workplaces, a regulation, a practical guidance or standard setting.

Social sciences (organisational sociology, occupational psychology and similar) are active in developing **preventive measures for organisational risk factors**. They develop **best practice models and contribute to** guidance and standards, as well as background data and evidence for legislation regulations and good practices of awareness raising and intervention.

OSH systems and infrastructures

The **preventive effectiveness** of OSH systems and infrastructures in enterprises and at state level is another major research field. These studies often focus on qualitative assessment, for example, the assessment of the **performance and effectiveness of such systems and infrastructures** (e.g. DG EMPL, IALI[474]). They often cover not only enterprises (employers and workers) and the government but also the wider OSH infrastructure, for example, professional associations and research institutes.

Research about prevention practices and processes in enterprises[475] covers **aspects like awareness raising, supporting and hindering factors to initiate preventive activities**,[476] the impact of guidance and instructions for workers, training and education of OSH professionals, including concrete regulations of their functions and responsibilities in enterprises, their dependencies and relations to the management and to workers, and the role of legislation and state-based systems for prevention in enterprises, or the quality of risk reduction measures.

Research on the societal, economic and legal frame and context

The development of society, be it economically, legally or culturally, influences OSH. These studies also cover the impact of OSH on society, for example, costs of work-related diseases for society,[477] or the relations between work (or occupation) and socioeconomic status.

This influence of such **context developments on OSH is described** in specific studies, for example, on types and levels of implementation of legislation,[478] on social insurance developments, the influence of globalisation on supply chains and services, the ageing workforce, the ageing of the society causing the approach to care for elderly people as long as possible at their homes, and development in related policy fields like public health. It is mainly a field for humanities such as economy, sociology or law.[479]

Meanwhile, a **stronger connection between OSH and other policy and research fields** has emerged. OSH research extended its frame and objectives to **ethical considerations**, for example, regarding research on corporate social responsibility or on working conditions in the supply chain.[480] Moreover, **environmental policies** influence safety and health at workplaces, for example, regarding the use of safe but environmentally harmful chemicals, emissions from enterprises to air, soil and water, and energy consumption. **Public health institutions** provide research results about the connection between work and personal lifestyles, be it smoking or physical inactivity, adaptation of workplaces, and return to work programmes in collaboration with **social security** or **professional** and **non-profit organisations**.

7.4 Data and research – major evidence difficulties at EU level

A precise and — in some cases **even an approximate — assessment of the state of OSH** is by far not an easy task.[481] Often, different explanations and reasons for similar developments are given, diverging or opposite developments in some countries are not well explained, and finally we can observe — for the same topic or situation — also a highly positive and highly negative assessment of the state of OSH in general or of several aspects, simply because there are no data that all stakeholders accept as reliable. **One example might be the level of compliance:** estimates of the number of breaches of OSH legislation and the responsibility for these breaches will often differ between employers and workers.

As mentioned already, several groups are **hard-to-reach** in surveys or other types of research, for example, **migrants, seasonal and posted workers due to language issues** and **'cultural' and contract insecurity,** and **workers in irregular circumstances,** but also **workers with a legal exemption from several OSH regulations**, for example, self-employed, often military and police and some parts of the public sector. Literature and analysis adds to these 'old-hard-to-reach' groups of workers the **'new-hard-to-reach'**, which are mainly characterised by new types of contracts, a less clear employer / employee role, and/or mobile and remote work.[482]

There surely is also a bias of responses regarding **socially not-at-all or not-well-accepted** topics like undeclared work or personal behaviour, for example, taking cognitive or performance-enhancing drugs at work.

Some structural factors make an unambiguous and accurate assessment of the state of OSH in the EU particularly difficult:

1) the **variety** of OSH systems and infrastructures in EU Member States and its impact on (harmonised) EU-wide data collection and research approaches;
2) the **issues** related to the use (or even new development) of **reliable and measurable indicators**, the methodological differences between different survey and research approaches;
3) the assessment of the **effectiveness of preventive actions and the evaluation of the quality and quantity of outcomes, injuries and diseases**; and
4) the **continuous development** and **structural changes** of working conditions and the social, economic and technological context of OSH.

7.4.1 Variety of OSH systems

In the EU Member States there exists a considerable **variety of working conditions** and related prevention and monitoring systems, as well as a variety of OSH traditions, OSH cultures regarding risk awareness and preventive safety measures, different types of responsibilities of state institutions, and a variety of social dialogue schemes between employers' and workers' associations.

Moreover, practically all EU OSH legislation is **issued as European Directive, not as European Regulation**. These directives set minimum standards that allow Member States to specify many details related to their national situation. In addition, in many fields already existing national legislation was aligned in different ways with EU OSH directives.

Consequently, the understanding and assessment of OSH at an EU level causes methodological problems, for example, regarding the **methods of data collection, the application of indicators, harmonisation of monitoring approaches, and of terminology, recognition of work-related diseases, comparison of different infrastructures, and even the technical measurement standards.**

It is not easy to apply data and research generation methodologies that are on one side well harmonised and on the other side give room to understand the functioning and value of different systems and infrastructures. Some trends seem to be general and obvious, and some Member States or some sectors or enterprises can experience no trend at all in this direction, or even the contrary development. Structural developments can differ significantly between countries. Of relevance seems to be the intra-EU exchange of workforce, based on ongoing changes in production chains. The main flow of the workforce takes place — roughly described — from eastern and southern Europe to central, western and northern Europe.[483]

Example: Working conditions – contrary trend developments in EU Member States

'The magnitude – and sometimes the direction – of these sectoral changes varies from one country cluster to another. An increase in physical routine tasks in a few sectors, and a decline in cognitive tasks in the other services sector can be observed in Eastern countries. These changes are partly linked to a reorganisation of the value chain within Europe, which saw a reallocation of routine tasks from western European countries.'

Eurofound, 2020: Working conditions in sectors, p. 41

7.4.2 Reliable and measurable indicators

Several indicators are used to **assess and estimate the quality and effectiveness of the preventive systems and processes**. Not only the EU but also other countries have introduced such indicator-based monitoring systems, for example, Norway,[484] South Korea,[485] Japan,[486] Taiwan,[487] Singapore,[488] United States,[489] Canada,[490] Australia[491] and New Zealand.[492]

The responsible institutions or authorities in these countries often developed several types of indicator, for example, indicators for implementation of protective legislation, for system effectiveness as well as for health outcomes. International organisations have also developed such monitoring indicators, for example, the ILO,[493] the ILO in its OSH country profiles,[494] the WHO[495] and the UN[496] (see textbox).

United Nations, Sustainable Development Goals – Indicators for Target 8.8
Target 8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment
Indicator 8.8.1: Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status
Indicator 8.8.2: Level of national compliance of labour rights (freedom of association and collective bargaining) based on ILO textual sources and national legislation, by sex and migrant status

Eurostat has developed under the lead of UNECE a framework to assess the quality of employment in its multiple facets.[497] Eurostat describes this framework as set of 68 indicators[498] on seven dimensions *'that address employment quality from the perspective of the employed person. Its design also facilitates international comparisons.'*[499] OSH is covered under the section 'Safety' and is based on four indicators and includes two outcome and two risk indicators: 1) Fatal occupational injuries / Number of fatal accidents at work (excluding traffic accidents); 2) Non-fatal occupational injuries / Number of non-fatal accidents at work; 3) Exposure to physical health risk factors; and 4) Exposure to mental health risk factors. Eurostat implements the OSH parts of this framework by its ESAW and by the OSH-related ad hoc modules to the LFS, called 'Accidents at work and other work-related health problems' (surveys in 2007, 2013 and 2020).

For more detailed monitoring at EU level, DG EMPL/ACSH and EU-OSHA developed a structural model that uses four groupings: **Generic information** on the basics of the OSH systems and on major context factors like age or sectoral structure, main policies for the **Steering of OSH**, an overview on relevant **Working conditions and Prevention**, and **Outcomes**, that is, accidents, diseases and wellbeing, and some elements of the **OSH infrastructure and monitoring capacity**. Currently, the OSH Barometer works with 16 quantitative and qualitative indicators in these four groupings. Some of these indicators are purely descriptive, like the short descriptions of OSH authorities, OSH institutions or OSH-related surveys, and others allow qualitative comparisons of structures and policies, for example, the indicator on 'National strategies' or 'Social dialogue'. Many indicators, for example, on working conditions or work accidents, are based on quantitative data from surveys and statistics. These indicators allow a comparison between sectors, occupations, types of enterprises, countries, for example.

CHAPTERS	INDICATORS
Generic information	Indicator: **OSH authorities** (descriptive)
	Indicator: **Economic and sector profile** (quantitative)
	Indicator: **Workforce profile** (quantitative)
Steering of OSH	
	Indicator: **Regulation** (descriptive)
	Indicator: **National strategies** (descriptive)
	Indicator: **Social dialogue** (descriptive, composite indicator)
Working conditions and prevention	
	Indicator: **Working conditions** (quantitative)
	Indicator: **Prevention in companies** (quantitative)
	Indicator: **Worker involvement** (quantitative)
	Indicator: **OSH culture and health awareness** (quantitative)
Accidents, diseases and wellbeing	
	Indicator: **Work accidents** (quantitative)
	Indicator: **Work-related diseases** (quantitative)
	Indicator: **Health perception of workers** (quantitative)

OSH infrastructure and monitoring capacity

Indicator: **Enforcement capacity** (descriptive)

Indicator: **OSH statistics and surveys** (descriptive)

Indicator: **International organisations / programmes** (descriptive)

During this development, other indicators were discussed but **excluded due to complexity, necessary granularity** and **likely required effort**, for example, compensation and insurance systems (of work accidents and diseases), preventive capacities and services in and outside enterprises, training and education capacities for OSH practitioners and professionals, OSH research capacities, OSH networks, major guidance and support offers for enterprises.

7.4.3 Relationship between preventive actions and outcomes

It can be **difficult to demonstrate a causal relationship between working conditions and health and safety outcomes**, (outcomes = accidents including traffic and near-accidents, work-related diseases or the level of wellbeing), that is, a reliable cause-effect relationship. Generally, in the field of safety such a relation can be much easier identified (accidents ► injuries) than in the field of health, in almost all cases an injury is an immediate consequence of an accident at work.

Scientists and practitioners have also often determined **clear connections between prevention actions and outcomes**, also between **certain exposures** and **recognised occupational diseases**, and between types and **quality of safety instructions and the occurrence of accidents**.[500]

Still, there exist many **less visible and statistically hard-to-detect relations between working conditions, preventive actions and accidents, and health and workplace wellbeing**, and very specific research and knowledge is needed to describe and analyse them more in detail. Most important are the confounding context factors, for example, the reduction of work accidents in a sector might be strongly influenced by context developments, for example, economically induced sector shifts, or important technological changes.[501] In addition, health and wellbeing are influenced by other aspects of working conditions, like working time or contractual security.

Moreover, due to effective preventive work, **extreme exposures at work** that in the past often led to a recognised occupational disease **have been mitigated**, reduced or even eliminated by preventive measures and/or technological changes. Some examples are very loud noise, specific permanent tiring postures, very heavy loads, extreme dust and fume exposure, and reduction or elimination of well-studied highly toxic chemical substances. In short, preventive measures — in particular if legally required — contributed to an overall reduction of the number of workers exposed to extremely 'unhealthy' workplace exposures.

7.4.4 On the way to better evidence – major data, research gaps and open questions

This report used EU-OSHA reports, foresight studies and reviews, and several EU-wide surveys and statistics on working conditions, namely ESENER, EWCS, Eurostat's statistical data, the Eurostat LFS and its Ad hoc modules, the Flash Eurobarometer, academic reviews, and data and reports from EU institutions or EU agencies like DG EMPL, DG SANTE, Eurofound, EIGE, FRA, Cedefop, ECHA and from international organisations like the ILO, WHO, OECD, ICOH, UN and UNEP. These statistics, surveys and reports **mostly apply a harmonised EU-wide or international approach** to make the situation in different countries comparable.

Many more **national statistics and surveys on working conditions exist**, often with a higher level of detail, but they are rarely used for a comparative view, due to the inevitable methodological differences. Costly research work would be needed to cover all relevant national studies and monitoring data in all EU languages and conclude from these overviews on the situation in the EU27.

Some important questions remain at the end of such a report:

- The **quality of statistics and surveys fades the more irregular are the working** conditions being studied. Which research methods are adequate for a clearer and more reliable evidence base on these working conditions? It might require research methods different from those used today, for example, more investigative case studies; it might also be helpful to evaluate the **existing national working conditions surveys or statistics** under this aspect.
- **Fading employer–employee relations.** There are special research efforts necessary to study the application of OSH regulations of work with weak or no employer–employee relations, for example, for the self-employed and new forms of employment.
- **Surveys usually suffer a participation bias, for example, for the migrant workforce.** The low participation rate of migrants can contribute to a particular underestimation regarding their often unfavourable working conditions.
- **Workers in manual occupations** report **better health than administrative workers** but **less expectations to do the job until being 60 years old**. What are the reasons behind this? Is it the healthy worker effect, strong occupation-related differences regarding the perception of health and the expression of health problems?[502,503]
- High work intensity is a major cause for low wellbeing and high psychosocial risks. Survey data suggest that **work intensification stopped after 2005**. What might be the reasons? Are the current indicators not specific enough to measure developments of work intensity? Has since then the major burden of intensification been put on other types of workers, for example, subcontracted or self-employed, temporary and seasonal workers, or on workers in the global supply chain?
- How much evidence is there that **dangerous work has been increasingly contracted out to small and medium-size enterprises and the self-employed**? Are there sufficiently detailed data on whether a larger share of service and client-related work at atypical times or work requiring long working hours has been taken over by self-employed or subcontractors?
- The **influence of enterprise size** is often difficult to explain. In several aspects, the SMEs perform better, and in other important aspects worse. What might be the reason for this?
- **How is it possible to overcome the 'prevention gap' that in general exists between mobile and stationary workplaces?** Can the solutions be technical or must there be organisational and legal measures, for example, a limitation of the prolonged use of ergonomically inadequate equipment like mobile phones?
- Impact of **international and global supply chains on OSH: Does it improve or worsen the working conditions in the EU?** Research could try to estimate the risk-reducing impact of the shift of some high-risk productions to enterprises outside the EU, for example, mining, base chemicals, recycling and so on (export of risks), and to estimate the OSH impact of EU export production, for example, vehicles, specialty chemicals, machines for risks at work inside the EU (import of risks).
- It would also be a big step forward if research could achieve an agreed **standard value or a standard range** (as reliable as possible) for the **attributable fraction of work** to widespread diseases, that is, cardiovascular diseases, mental and behavioural disorders, musculoskeletal diseases and cancer.
- **Compliance** with and impact of legislation. Currently, there are data on the percentage of enterprises with a risk assessment but very limited information about the **quality of these risk assessments and of implemented risk management and reduction measures**. Previous studies indicate that in many cases the risk assessment is conducted by an enterprise just to comply with legal obligations (paper compliance). A possible approach could be an **anonymous evaluation of the quality of a representative share** of risk assessments.

References and notes

[1] OSH Barometer data visualisation tool: https://visualisation.osha.europa.eu/osh-barometer

[2] Methodological remark: Many workers in the service sectors have similar physically demanding work like workers in manufacturing, construction and agriculture. The statistical assignment of enterprises of a certain type to the service sectors and the sectors industry/construction/agriculture is a too rough approach to describe and analyse working conditions, particularly if more detailed data on working conditions are available. For that reason, when talking about health outcomes, in this report often more informative categories are used, for example, managerial jobs (LFS, Eurostat terminology), or high-, medium- and low-skilled clerical work (EWCS), or high-skilled manual and low-skilled manual work (Eurostat), independent on the sector where this work is performed.

[3] EU-OSHA – European Agency for Safety and Health at Work: Third European Survey of Enterprises on New and Emerging Risks (ESENER 3), ESENER Data visualisation, section 'Comparisons 2014-2019'; for 'Prolonged sitting' value from 'Data visualisation 2019' not from 'Comparisons'.
[4] Some of the very first OSH regulations on psychosocial risks at workplaces were issued by Denmark in the early 1980s, dealing with monotony at work, stress, risk of violence at work and risks of working alone.
[5] Psychosocial risks are regarded as reason, and mental health/disease as consequence or outcome of these risks.

[6] OSHWiki, 2022: Psychosocial issues – the changing world of work; OSHWiki, 2022: Psychosocial risks and workers health

[7] EU-OSHA, 2007: Expert forecast on emerging psychosocial risks related to occupational safety and health
[8] Eurofound, 2017: Sixth European Working Conditions Survey – Overview report (2017 Update) (p. 48). Raw data for 2015: Eurofound: European Working Conditions Survey - Data Visualisation; Data for 2005: Eurofound: Fourth European Working Conditions Survey
[9] EU-OSHA: ESENER Data visualisation, Comparisons 2014-2019.
[10] Due to the change of possible response items, the data for the three surveys cannot be compared; the number of mental risk factors increased from three in 2007 and 2013 to eight in 2020.
[11] Eurostat, 2021: EU labour force survey 2020 module on accidents at work and other work-related health problems : assessment report : 2021 edition

[12] Eurostat: Persons reporting exposure to risk factors that can adversely affect mental well-being by sex, age and factor, data here and explanatory metadata here
[13] It has to be noted that in 2007 and 2013 the interviews were done face-to-face. In 2020 the interviews were conducted either face-to-face or by phone, depending on the public health measures in each country. The responses were influenced by work under conditions of the pandemic.

[14] Eurostat: Persons reporting exposure to risk factors that can adversely affect mental well-being by sex, age and educational attainment level

[15] Rigó et al., 2021: Work stress on rise? Comparative analysis of trends in work stressors using the European working conditions survey
[16] WHO/ILO, 2021: WHO/ILO joint estimates of the work-related burden of disease and injury, 2000–2016: Global monitoring report (p. 35ff).

[17] Eurostat provide data for the periods before and after the NACE revision in 2008. ***Data for 2019:*** *Average number of usual weekly hours of work in main job, by sex, professional status, full-time/part-time and economic activity (from 2008 onwards, NACE Rev. 2), here Filter: Full-time, 15-64 years, all NACE sectors.* ***Data for 2006:*** *Average number of usual weekly hours of work in main job, by sex, professional status, full-time/part-time and economic activity (1998-2008, NACE Rev. 1.1), here*

[18] Eurostat, 2018: How many hours do Europeans work per week? Average number of usual weekly hours of work in main job, by sex, professional status, full-time/part-time and economic activity (from 2008 onwards, NACE Rev. 2) - hours[lfsa_ewhun2], here

[19] Mean duration of commuting time one-way between work and home by sex and age (source: Eurofound), Here

[20] Eurostat definition: The atypical work distinguishes between "evening or night work", "Saturday or Sunday working", and "shift work". Data for 2020 are available but indicate a strong reduction of atypical working times, the reason is probably that sectors with a high rate of atypical working times like tourism, transport, entertainment, hotels and restaurants could not work as in previous years, and also production lines in industry, often shift work, were stopped.

[21] Eurostat: Ad hoc module 2019 on work organisation and working time arrangements. Employment at an atypical working time (time period start with 2011), here and here

[22] Eurostat Data for 2019: Average number of usual weekly hours of work in main job, by sex, professional status, full-time/part-time and economic activity (from 2008 onwards, NACE Rev. 2). here Filter: Employees, Full-time, All NACE, EU27 2019 Q4.
Eurostat Data for 2006: Average number of usual weekly hours of work in main job, by sex, professional status, full-time/part-time and economic activity (1998-2008, NACE Rev. 1.1), here Filter: Employees, Full-time, All NACE, EU27 2019 Q4.
[23] Eurostat definition of atypical work: The atypical work distinguishes between “evening or night work”, “Saturday or Sunday working”, and “shift work”.
[24] All data were retried from tables in: Labour market > Employment and unemployment (Labour force survey) M > LFS series - detailed annual survey results M > Population in employment working during unsocial hours - LFS series
[25] Eurostat: Employed persons working at nights as a percentage of the total employment, by sex, age and professional status (%)
[26] Eurostat: Employed persons working on Sundays as a percentage of the total employment, by sex, age and professional status (%)
[27] Fiz Perez et al., 2019: Shift and night work management in European companies
[28] OSHWiki, 2022: Psychosocial issues – the changing world of work
[29] Eurofound, 2003: Time and work: Work intensity
Eurofound, 2009: Working conditions in the European Union: Working time and work intensity
[30] Eurofound, 2017: Sixth European Working Conditions Survey – Overview report (2017 Update) (p. 48).

[31] ESENER addresses the person in an enterprise responsible for or closest to the topic of OSH; the EWCS is a worker survey. In addition, the response options were different from the EWCS. Two options in ESENER, ‘Yes’ or ‘No’, compared to three options in the EWCS: ‘(Almost) all of the time’, ‘Between ¼ and ¾ of the time’, ‘(Almost) never’.

[32] EU-OSHA: Third European Survey of Enterprises on New and Emerging Risks (ESENER 3), ESENER Data visualisation, section ‘Comparisons 2014-2019’, section ‘Psychosocial risk factors present in the establishment’, ‘Pressure due to time constraints’.
[33] Ibid., Section ‘Psychosocial risk factors present in the establishment’, ‘Long or irregular working hours’.
[34] Ibid., Section ‘Psychosocial risk factors present in the establishment’, The exact question was: ‘Please tell me for each of the following risks whether or not it is present in the establishment?‘ ‘Pressure due to time constraints’. Response option: Time pressure.
[35] Ibid., Section ‘Psychosocial risk factors present in the establishment’, The exact question was: ‘Please tell me for each of the following risks whether or not it is present in the establishment?‘ ‘Pressure due to time constraints’. Response option: Time pressure.
[36] EU-OSHA: Third European Survey of Enterprises on New and Emerging Risks (ESENER 3), ESENER Data visualisation, section ‘Comparisons 2014-2019’, section ‘Psychosocial risk factors present in the establishment’, The exact question was: ‘Please tell me for each of the following risks whether or not it is present in the establishment?‘ ‘Pressure due to time constraints’. Response option: Time pressure.

[37] Eurostat, 2019: Persons in employment by frequency of working under time pressure, educational attainment level and professional status, 20-64 years, percentages calculated from numerical data

[38] Kelliher & Anderson, 2010: Doing more with less? Flexible working practices and the intensification of work
[39] Piaska, 2018: Scheduled to work hard: The relationship between non-standard working hours and work intensity among European workers (2005–2015)
[40] See also the overview in: EU-OSHA, OSHWiki, Guyot, S: Psychosocial issues – the changing world of work, here
[41] Newer literature: James & Walters, 2022: Work and Health: 50 Years of regulatory failure.
[42] Davis & Kim, 2015: Financialization of the Economy
[43] Ethics & Compliance Initiative, 2020: Global Business Ethics Survey Report. Pressure in the Workplace: Possible Risk Factors and Those at Risk
[44] Johnstone et al., 2005: Statutory Occupational Health and Safety Workplace Arrangements for the Modern Labour Market

[45] Lorenz & Valeyre, 2005: Organisational Innovation, Human Resource Management and Labour Market Structure: A comparison of the EU-15

[46] Directive 2003/88/EC of 4 November 2003 concerning certain aspects of the organisation of working time

[47] Adăscăliței et al., 2021: The intensification of work in Europe: A multilevel analysis

[48] EU-OSHA, 2002: Report - New forms of contractual relationships and the implications for occupational safety and health (p. 7).

[49] Eurofound, 2011: Impact of subcontracting on working conditions

[50] Koranyi et al., 2018: Precarious employment and occupational accidents and injuries – a systematic review
[51] ILO Indicator description: Occupational injuries
[52] See the diagrams and country data in the OSH Barometer under: https://visualisation.osha.europa.eu/osh-barometer/
[53] Tynes et al., 2017: Physical working conditions as covered in European monitoring questionnaires
[54] EU-OSHA: Third European Survey of Enterprises on New and Emerging Risks (ESENER 3) – first findings, 2019, p. 3 and ESENER Data visualisation, section 'Comparisons 2014-2019', section 'Risk factors present in the establishment', Export data
[55] EU-OSHA calculations based on EWCS raw data.
[56] Eurostat, LFS Ad hoc modules: Persons reporting exposure to risk factors that can adversely affect physical health by sex, age and factor
[57] In the LFS-survey the respondents had to decide which of 11 possible risk factors is the most 'serious one'. Quote: *'Eurostat proposed to implement the exposure to risk factors for physical health at work by using one question that strictly reflects the variable or twelve questions asking for the presence of any of the eleven risk factors and then ask for the most serious one.'*
In the EWCS and ESENER all reported risk factors were registered.

[58] EU-OSHA, 2020: Work-related musculoskeletal disorders: why are they still so prevalent? Evidence from a literature review

[59] EU-OSHA, 2020: Work-related musculoskeletal disorders: why are they still so prevalent? Evidence from a literature review

[60] OSHWiki, 2020: Musculoskeletal disorders and prolonged static sitting
[61] EU-OSHA, 2010: Maintenance and Occupational Safety and Health: a statistical picture
[62] Marin-Garcia et al., 2020: Changes in the Association between European Workers' Employment Conditions and Employee Well-Being in 2005, 2010 and 2015 (p. 9).
[63] Balogh et al., 2021: Non-standard employment and mortality in Belgian workers: A census-based investigation

[64] Gallagher & Underhill, 2012: Managing work health and safety: recent developments and future directions (p. 238).
My Business, n.d.: WHAT IS A 'PERSON CONDUCTING A BUSINESS OR UNDERTAKING'?

[65] Employment by sex, age and professional status (1 000), quarterly data, Eurostat employment types;
Employment and activity - LFS adjusted series - historical data (1989-2020), Total employment, annual data, here
Part-time: here and here
Temporary: here and here
Contract with a limited duration, 15-64 years, here
[66] Eurostat definitions: EU Labour Force Survey - Methodology

[67] OECD, 2019: Pensions at a Glance 2019, OECD and G20 Indicators
Quote: *'Non-standard work is frequent among workers over 65 and women Non-standard work is common among older workers. While overall employment rates decrease at older ages, the share of non-standard work is particularly high among workers over 65: only about 15% of workers between 65 and 74 are in standard employment, against more than 60% at ages 55-64 and 25-54 (Figure 2.2, Panel A)'* (p. 70).

[68] Eurofound, 2021: Seasonal worker
'A seasonal worker is defined in Article 3(b) of Directive 2014/36/EU on the conditions of entry and stay of third-country nationals for the purpose of employment as 'a third-country national who retains his or her principal place of residence in a third country and stays legally and temporarily in the territory of a Member State to carry out an activity dependent on the passing of the seasons, under one or more fixed-term work contracts concluded directly between that third-country national and the employer established in that Member State.' European Parliament and the Council: Directive 2014/36/EU of 26 February 2014 on the conditions of entry and stay of third-country nationals for the purpose of employment as seasonal workers.
[69] Action Plan EU: Seasonal workers are a group of mobile workers who retain their main place of residence in their home country and move temporarily to another Member State to carry out an activity dependent on the passing of the seasons, here
Article 2.1. *'This Directive shall apply to third-country nationals who reside outside the territory of the Member*

States and who apply to be admitted, or who have been admitted under the terms of this Directive, to the territory of a Member State for the purpose of employment as seasonal workers.' here (p. 6).
Molinero Gerbeau & González Ferrer, 2018: EU DIRECTIVE ON SEASONAL WORKERS
These data are partly unreliable, to quote: *'Member States can decide what they consider as "seasonal workers" because there is no common definition and numerical instrument allowing to evaluate the same phenomenon making data on EU's seasonal workers incomparable within countries. The Polish case is very illustrative of the deficiencies of the actual European statistical system where, for instance, real data on seasonal workers for certain countries coexist with data on the number of Declarations received under the Polish Declaration System that are just intentions to hire foreigners, but not effective work or residence permits.'* (p. 4)
Definition of seasonal worker in DIRECTIVE 2014/36/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the conditions of entry and stay of third-country nationals for the purpose of employment as seasonal workers.
[70] De Wispelaere et al., 2022: Posted workers in the European Union - Facts and figures
[71] European Commission, 2020: COVID-19: Guidelines of the Commission on seasonal workers in the EU. Factsheet on practical examples and best practices
[72] OECD, 2019: Pensions at a Glance 2019, OECD and G20 Indicators (p. 67).
[73] OECD, 2019: Pensions at a Glance 2019, OECD and G20 Indicators (p. 69).
[74] OECD, 2019: The Sharing and Gig Economy: Effective Taxation of Platform Sellers: Forum on Tax Administration or Employment outlook.

[75] Eurofound, 2020: New forms of employment: 2020 Update

[76] A first approach to use administrative data: Balogh et al., 2021: Non-standard employment and mortality in Belgian workers: A census-based investigation
[77] Please note that the working conditions of important groups of non-standard work could not sufficiently be covered in this chapter, e.g. for seasonal workers, migrant workers, second jobs of students, employees and pensioners, and self-employed. The main reason for this is that quantitative EU-wide data on the OSH situations of these groups are rare or not reliable due to missing statistics or surveys. There are numerous qualitative reviews and case studies about these groups, and a detailed description would go beyond the frame of this report.

[78] Directive 89/654/EEC concerning the minimum safety and health requirements for the workplace excludes five types of work, to quote: *'This Directive shall not apply to: (a) means of transport used outside the undertaking and /or the establishment, or workplaces inside means of transport; (b) temporary or mobile work sites; …'.*

[79] Directive 90/270/EEC of 29 May 1990 on the minimum safety and health requirements for work with display screen equipment (fifth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC), here

[80] EU-OSHA's maintenance campaign revealed that maintenance and repair work has an accident risks far over average. EU-OSHA, 2010: Safe maintenance in practice (p. 10): *'Occupational accidents during maintenance work are numerous. Based on the data from several European countries, it is estimated that 10-15% of fatal accidents at work, and 15-20% of all accidents, are connected with maintenance*.'
[81] No statistical data available for EU.
[82] Persons in employment by main place of work, frequency of working at other locations and working from home, LFS Ad hoc module: Work at home, percentage of Employed persons
[83] Eurostat: Working from home in the EU
[84] LFS Ad hoc module Work at home, percentage of Employed persons and LFS regular data collection Employed persons working from home as a percentage of the total employment
[85] EU-OSHA, 2021: Home-based teleworking and preventive occupational safety and health measures in European workplaces: evidence from ESENER-3
[86] Employed persons working from home as a percentage of the total employment, by sex, age and professional status (%), here
[87] There are more workers who spend most of their working time in private homes, e.g. technicians for maintenance and repair of technical systems like heating water supply or electricity, or gardeners. According to the ILO definition of domestic work they are not regarded as such. Care at home can be borderline if the care is mainly done for a few persons in a few homes.
[88] C189 European Alliance, 2021: Step up efforts towards decent work for domestic workers in the EU: 10th Anniversary of ILO Domestic Workers Convention, 2011 (No. 189)
See there in the introductory chapter the difficulties to achieve reliable figures. For more info: ILO, 2021: Making decent work a reality for domestic workers: Progress and prospects ten years after the adoption of the Domestic Workers Convention, 2011 (No. 189)
[89] EU-OSHA, 2020: Well-being at work in the service voucher sector in Belgium

[90] Eurofound, 2020: Long-term care workforce: Employment and working conditions
Eurostat: National accounts employment data by industry (up to NACE A*64): Growth from 7.4 million in 2008 to 9.5 million in 2019, here Filter [Q87_Q88] Residential care activities and social work activities without accommodation.

[91] LTC definition by the Social Protection Committee and European Commission, 2014: Adequate social protection for long–term care needs in an ageing society (p. 11): *'a range of services and assistance for people who, as a result of mental and/or physical frailty and/or disability over an extended period of time, depend on help with daily living activities and/or are in need of some permanent nursing care. The daily living activities for which help is needed may be the self-care activities that a person must perform every day (Activities of Daily Living, or ADLs, such as bathing, dressing, eating, getting in and out of bed or a chair, moving around, using the toilet, and controlling bladder and bowel functions) or may be related to independent living (Instrumental Activities of Daily Living, or IADLs, such as preparing meals, managing money, shopping for groceries or personal items, performing light or heavy housework, and using a telephone).'*
[92] Eurofound, 2020: Long-term care workforce: Employment and working conditions (p. 27).
[93] Eurofound, 2020: New forms of employment: 2020 Update (p. 9).
[94] See for example the KOMNET Helpdesks https://www.komnet.nrw.de/
[95] European Commission, 1996: Guidance on risk assessment at work (Directive 89/391/EEC)
[96] Besamusca & Steinmetz, 2019: Vulnerable groups in European data sets. An inventory of the measurement of vulnerable groups in 27 data sets covering the European area. They write (p. 5): *'A further challenge with respect to vulnerability and employment vulnerability is the question to which level it applies. To individuals and/or groups (with particular characteristics which increases the vulnerability risk), a situation (in which a person/group finds themselves which increase the vulnerability risk, like for instance precarious work), or whether this is a more universal concept which applies to all people as human beings, as everybody could become at one point in time 'vulnerable' and depending upon the state for our well-being (Fineman, 2008).'*
[97] OSHWiki, 2022: Groups at risk
EU-OSHA, 2003: Gender issues in safety and health at work. A Review
[98] European Parliament, 2011: Occupational health and safety risks for the most vulnerable workers, Study
Fasani & Mazza, 2020: A Vulnerable Workforce: Migrant Workers in the COVID-19 Pandemic (p. 1).
[99] Browse Gender Statistics | Gender Statistics Database | European Institute for Gender Equality (europa.eu)

[100] In the technical area of OSH, female workforce was often not taken as standard, concerning equipment, machinery or PPE: the standards were aligned and designed for standard men.

[101] EU-OSHA, 2007: Report - OSH in figures: Young workers - Facts and figures
[102] EU-OSHA: Women and safety and health at work
[103] EU-OSHA: Women at Work: An Introduction
[104] Eurostat: Accidents at work by sex and severity (NACE Rev. 2 activity Total), here
Eurostat: Persons reporting a work-related health problem by sex, age and country of birth, here
[105] Eurostat: Time spent, participation time and participation rate in the main activity by sex and educational attainment level, here
[106] EU-OSHA, 2016: The ageing workforce: Implications for occupational safety and health - a research review – Executive Summary (pp. 4-5).
[107] EU-OSHA, Themes Ageing & OSH: OSH management in the context of an ageing workforce
[108] Andersen et al., 2020: Barriers and opportunities for prolonging working life across different occupational groups: the SeniorWorkingLife study
[109] Eurostat: Accidents at work by sex, age and severity (NACE Rev. 2 activity A, C-N), here
[110] Eurostat: Non-fatal accidents at work by NACE Rev. 2 activity and age, here
[111] European Parliament, 2011: Occupational health and safety risks for the most vulnerable workers, Study (p. 29).
[112] EU-OSHA, 2018: Management of psychosocial risks in European workplaces : evidence from the second European survey of enterprises on new and emerging risks (ESENER-2)
[113] EU-OSHA, 2018: Foresight on new and emerging occupational safety and health risks associated with digitalisation by 2025
[114] Wellbeing is often measured as composite indicator covering several aspects of work, for example, in the WHO-5 Well-Being index.
[115] Incidence rate = number of work accidents per 100,000 workers. The number of EU Member States changed significantly in 1995 from (EU-12 to EU-15) and 2004 (from EU-15 to EU-25). That is the reason why we use here the incidence rate from ESAW as indicator and not the total number.

[116] Eurostat: Statistics in focus, Theme 3-16/2001: Accidents at work in the EU 1998-1999 (p. 2).

[117] Eurostat, Accidents at work by sex and severity (Sector A, C-N, NACE Rev. 2, EU27). Only incidence rates for these selected sectors can be compared, because Eurostat did not calculate / publish an incidence rate for all sectors in 1998 but for Sector A and D to K, NACE 1.1). The incidence rate for all sectors is a little bit lower in 2019 (1,603) because the other sectors have lower accident risks. That would also have been the case in 1994.

[118] Eurostat: Accidents at work by sex and severity (NACE Rev. 2 activity Total).
[119] Eurostat: Statistics in focus, Theme 3-16/2001: Accidents at work in the EU 1998-1999 (p. 3).

[120] Eurostat: Fatal Accidents at work by NACE Rev. 2 activity (HSW_N2_02), filter for sectors Sector A, C-N, NACE 2.

[121] Eurostat: Accidents at work by sex and severity (NACE Rev. 2 activity Total).

[122] Eurostat: Non-fatal accidents at work by NACE Rev. 2 activity and sex

[123] Eurostat: Fatal Accidents at work by NACE Rev. 2 activity; Fatal Accidents at work: Mining and quarrying
[124] Rees, 2016: Comparing European and American Health & Safety Laws – 'Pre-1970, there were approximately 14,000 worker fatalities a year, according to the Occupational Health and Safety Administration (OSHA). By 2010, the workforce had doubled, but fatalities were down to just 4,500 – a workplace fatality rate reduction of 66 percent. Worker injuries and illnesses were also down from 10.9 incidents per 100 workers in 1972 to 3.2 per 100 in 2014.'
[125] WHO/ILO, 2021: WHO/ILO joint estimates of the work-related burden of disease and injury, 2000–2016: Global monitoring report (p. 18).
[126] Source of the picture: here (copyrighted).
[127] Eurostat: Accidents at work, by specific physical activity and economic activity, EU, 2019 (% share).

[128] Eurostat: Businesses in the mining and quarrying sector
[129] European Commission: Textiles and clothing in the EU
[130] European Parliament, 2014: Briefing – Workers' conditions in the textile and clothing sector: just an Asian affair?
[131] Eurostat: National accounts employment data by industry (up to NACE A*64), Filter for years and sector 'Agriculture, forestry and fishing', here
[132] World Bank: Employment in agriculture (% of total employment) (modelled ILO estimate) https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?end=2018&most_recent_year_desc=true&start=1991&type=shaded&view=chart
[133] United Nations – e-Waste coalition: Global E-waste Monitor 2017
[134] For example: OSH system at national level - France
[135] Eurostat, 2013: European Statistics on Accidents at Work (ESAW) - Summary methodology - 2013 edition (p. 5).
[136] Eurostat: Non-fatal accidents at work by NACE Rev. 2 activity and sex, A recalculation of the total number of accidents for the EU27 to the years 1994 to 1998 is not possible, mainly due to the many enlargements of the EU.
[137] Eurostat, Statistics in focus, Theme 3 – 16/2001: Accidents at work in the EU 1998-1999 (p. 4), here
[138] Data for 1998 for the Sectors A and D to K, NACE Rev. 1.1, EU-15, for 2019 for Sectors A, C-N, NACE Rev. 2, EU27. Only incidence rates for these selected sectors can be compared because Eurostat did not provide an incidence rate for all sectors in 1998 but for the sectors A and D to K, NACE 1.1.
[139] In total the incidence rate decreased from 4,089 to 1,713; the difference is 2,376. The reduction between 1998 and 2010 amounts to 2,068, and between 2010 and 2019 it sums up to 308. That means that 87% of the reduction was achieved in the first period and 13% in the second period.
[140] Eurostat: Non-fatal accidents at work by NACE Rev. 2 activity and sex, Filter Sectors, A, C-N
[141] Eurostat: Accidents at work statistics – Incident rates
[142] Eurostat: Non-fatal accidents at work by NACE Rev. 2 activity and sex, Filter: Time frequency: Annual; Unit of measure: Incidence rate; Classification of economic activities - NACE Rev. 2; Sex: Total.
[143] EU-OSHA, 2010: A review of methods used across Europe to estimate work-related accidents and illnesses among the self-employed
[144] EU-OSHA, 2010: A review of methods used across Europe to estimate work-related accidents and illnesses among the self-employed (p. 7).
[145] Eurostat, 2013: European Statistics on Accidents at Work - Summary methodology - 2013 edition (p. 6): *'Article 2 of the ESAW Regulation covers the provision of data on persons who had an accident at work during the reference period and states that if the victim is self-employed, a family worker or a student, providing data is voluntary.'*

[146] Eurostat: Non-fatal accidents at work by NACE Rev. 2 activity and sex

[147] In 2019, there were 3.141 million non-fatal accidents that resulted in at least four calendar days of absence from work and 3,408 fatal accidents in the EU27, a ratio of approximately 922 non-fatal accidents for every fatal accident, here
[148] Kurppa, 2015: Severe Under-reporting of Work Injuries in Many Countries of the Baltic Sea Region: An exploratory semi-quantitative study – 'What goes unreported goes unfixed' (p. 20 ff).

[149] Eurostat: Non-fatal accidents at work by NACE Rev. 2 activity and sex; Eurostat: Fatal Accidents at work by NACE Rev. 2 activity

[150] Detailed studies from hospitals in Denmark show that even a large share of serious work accidents (25%) resulting in amputations and fractions are not registered, see: LO Denmark, 2012: Underrapportering af arbejdsulykker Table 14; and the Danish Working Environment Authority published a report concluding a total of 50% in underreporting, here
[151] Kurppa, 2015: Severe Under-reporting of Work Injuries in Many Countries of the Baltic Sea Region: An exploratory semi-quantitative study – 'What goes unreported goes unfixed' (p. 20ff).
[152] LFS Ad hoc module: Accidents at work and other work-related health problems (2020, 2013 and 2007)
[153] Eurostat: EU labour force survey 2020 module on accidents at work and other work-related health problems : assessment report : 2021 edition. The exact question is (p. 47): *'Thinking of the year before [last day of reference week], have you had any accident at work? Accidents outside working hours and accidents during the journey from home to work or from work to home are excluded. However, accidents during a journey in the course of work are included.'*
[154] Eurostat, Statistics in focus, Theme 3 – 16/2001: Accidents at work in the EU 1998-1999, here
[155] ISCO-Groups: 1. Managers, 2. Professionals, 3. Technicians and Associate Professionals, 4. Clerical Support Workers, 5. Services and Sales Workers, 6. Skilled Agricultural, Forestry and Fishery Workers, 7. Craft and Related Trades Workers, 8. Plant and Machine Operators and Assemblers, 9. Elementary Occupations, 0. Armed Forces Occupations.

[156] Eurostat: Persons reporting an accident at work by sex, age and occupation

[157] Eurostat, 2021: Self-reported accidents at work - key statistics

[158] Ibid.

[159] Agilis, 2015: Final statistical report on the quality assessment and statistical analysis of the 2013 Labour Force Survey ad hoc module (p. 45)

[160] Eurostat, 2013: European Statistics on Accidents at Work (ESAW) - Summary methodology - 2013 edition (p. 6).
[161] Fatal work accidents are seen as a more reliable data source than non-fatal accidents.
[162] Eurostat: Fatal accidents at work by NACE Rev. 2 activity, Filter: Incidence rate.

[163] The OSH Barometer shows the ESAW data from Eurostat's Fatal accidents in a column diagram showing the incidence rate per 100,000 workers for two periods, here

[164] Communication from the Commission to the European Parliament, the Council, the European Economic And Social Committee and the Committee of Regions on the practical implementation of the provisions of the Health and Safety at Work Directives 89/391 (Framework), 89/654 (Workplaces), 89/655 (Work Equipment), 89/656 (Personal Protective Equipment), 90/269 (Manual Handling of Loads) and 90/270 (Display Screen Equipment), here (p. 15).
[165] European Commission, 2009: Causes and circumstances of accidents at work in the EU (p. 101 and Table A1.6. p. 130).

[166] ESAW Data for 2019: Eurostat, Accidents at work by sex, age and severity (NACE Rev. 2 activity A, C-N).
[167] In publications about this topic, we find similar coefficients. Eurogip calculates for France (2016) 514 fatal accidents and 34,202 cases with permanent disability, this is a coefficient of 66 (Eurogip, 2018: Statistical review of occupational injuries - France 2016 data). Calculating a similar coefficient for Germany in 2018 leads to a coefficient of 27 based on the relation of 497 fatal accidents to 13,550 recognised permanent handicaps that are compensated by an occupational pension (DGUV, 2021: Geschäfts- und Rechnungsergebnisse der gewerblichen Berufsgenossenschaften und Unfallversicherungsträger der öffentlichen Hand 2020, *Anhang* 1, p. 164). Jørgensen calculates based on Eurostat data from 2009 and 2010 a coefficient of fatal accidents to disabled people of 18, and when she calculates the coefficient between fatal and 'most serious non-fatal injuries' of more than three months, the coefficient is 41. Jørgensen, 2015: Serious work accidents and their causes - An analysis of data from Eurostat
[168] EU-OSHA, 2019: The value of occupational safety and health and the societal costs of work-related injuries and diseases (Table A4b, pp. 112-113).

[169] 'Presence' means according to the Eurostat ESAW methodology 2013: *'Presence of the victim or of a third person in itself creating a danger for oneself and possibly others'* (p. 28).
[170] European Commission, 2009: Causes and circumstances of accidents at work in the EU (p. 106).
[171] The DIFR is defined as the total number of reported disabling and fatal injuries per 1 million hours worked. See: Government of Canada, 2021: 2019 Annual Report - Occupational Injuries amongst Employees Under Federal Jurisdiction (9.39 per 1 million hours worked).
[172] Safe Work Australia, 2021: Comparative performance monitoring report 23rd edition (p. 12ff) (3.6 claims per 1,000 employees).
[173] Franco, 2012: Bernardino Ramazzini and women workers' health in the second half of the XVIIth century
[174] Ramazzini, 1713: De morbis artificum diatriba (p. 199ff). Latin original text: *'Infortunium ergo, quod huiusmodi Artificibus ex suis opificiis, praeter vitae sedentaria incommoda, est Myopia, affectus nempe oculorum satis notus, cum scilicet visibilia oculis propius admovere necesse est.'*
[175] EU-OSHA, 2019: The value of occupational safety and health and the societal costs of work-related injuries and diseases
[176] ILO Encyclopaedia: Work-related Diseases and Occupational Diseases: The ILO International List
[177] European Commission, 2013: Report on the current situation in relation to occupational diseases' systems in EU Member States and EFTA/EEA countries, in particular relative to Commission Recommendation 2003/670/EC concerning the European Schedule of Occupational Diseases and gathering of data on relevant related aspects, here

[178] Examples from national recognition schemes: Arbetsmiljöstatistik Rapport 2021:01. Arbetsskador 2020 Occupational accidents and work-related diseases; Germany: DGUV, 2021: DGUV, 2021: Geschäfts- und Rechnungsergebnisse der gewerblichen Berufsgenossenschaften und Unfallversicherungsträger der öffentlichen Hand 2020

[179] Eurostat (Statistics explained): Occupational diseases statistics
[180] Eurostat: European occupational diseases statistics (EODS) and EU index of occupational diseases (2013=100) – experimental statistics
[181] European Federation of Building and Woodworkers (EFBWW), 2013: Asbestos-related occupational diseases in Central and East European Countries (p. 11).
[182] See for example, the ILO List of Occupational Diseases Recommendation R194, revised 2010.

[183] European Commission, 2018: Scientific Committee on Health, Environmental and Emerging Risks SCHEER - Statement on emerging health and environmental issues, here see pp. 9-10. The SCHEER refers to this article: Holden et al, 2016: Global Prevalence of Myopia and High Myopia and Temporal Trends from 2000 through 2050

[184] European Commission, 2022: https://ec.europa.eu/social/main.jsp?langId=en&catId=89&furtherNews=yes&newsId=10463
[185] EU-OSHA, 2021: Executive summary - Musculoskeletal disorders: association with psychosocial risk factors at work

[186] *Eurostat: Life expectancy by age and sex, here*
[187] OECD/European Union, 2020: Health at a Glance: Europe 2020: State of Health in the EU Cycle (p. 112, p. 116).
[188] OECD/European Union, 2022: Health at a Glance: Europe 2022: State of Health in the EU Cycle (p. 87ff).
[189] Eurostat: Life expectancy by age and sex
[190] Eurostat: Life expectancy by age and sex

[191] OECD/European Union, 2020: Health at a Glance: Europe 2020: State of Health in the EU Cycle (p. 120).

[192] OECD/European Union, 2022: Health at a Glance: Europe 2022: State of Health in the EU Cycle (p. 95ff).
[193] Joumard et al., 2008: Health Status Determinants: Lifestyle, Environment, Health Care Resources and Efficiency
[194] Mazeikaite et al., 2021: What Drives CrossCountry Health Inequality in the EU? Unpacking the Role of Socioeconomic Factors
[195] Eurofound, 2017: European Quality of Life Survey 2016 - Overview Report
[196] Eurostat: Self-perceived health by sex, age and income quintile
[197] Eurofound, 2017: European Quality of Life Survey 2016 - Overview Report (p. 18).
[198] Eurostat's 'Morbidity Task Force' is working on this: Archive:Morbidity statistics methodology pilot studies – examples, here; and, Eurostat: Morbidity statistics in the EU - Report on pilot studies - 2014 edition, here
[199] Pace & Buchow, 2014: Morbidity Statistics in the EU – key results from pilot studies in sixteen Member States
[200] More detailed country data are available in the Eurostat section on Health in the European Union – facts and figures Country Health Profiles, here
[201] European Commission: European Core Health Indicators

[202] Mazeikaite et al., 2021: What Drives CrossCountry Health Inequality in the EU? Unpacking the Role of Socioeconomic Factors

[203] Eurostat: LFS 2020 Ad hoc module, here

[204] *Eurostat: Persons reporting a work-related health problem by sex, age and occupation, here*

[205] Murray & Lopez, 1996: The Global burden of disease : a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020, here

Update: GBD 2017 Risk Factor Collaborators, 2018: Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017, here

[206] European Burden of Disease Network
[207] WHO definition: *'One DALY represents the loss of the equivalent of one year of full health. DALYs for a disease or health condition are the sum of the years of life lost to due to premature mortality (YLLs) and the years lived with a disability (YLDs) due to prevalent cases of the disease or health condition in a population.'* here

[208] Murray & Lopez, 1996:. The Global burden of disease : a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020, here

[209] IHME/GDB: GDB Compare - Vizhub, Visualisation of global health data, here

[210] Takala et al., 2017: Comparative Analysis of the Burden of Injury and Illness at Work in Selected Countries and Regions
Ezzati et al., 2004: Comparative quantification of health risks: global and regional burden of disease attributable to selected major risk factors
Nelson et al., 2005: The global burden of selected occupational disease and injury risks: Methodology and summary

[211] WHO: Protecting workers' health, Key facts
[212] Pneumoconiosis: a group of lung diseases resulting from inhalation of particles of industrial substances, particularly inorganic dusts.

[213] IHME (Institute for Health Metrics and Evaluation) (2016). Rethinking development and health: http://ghdx.healthdata.org/gbd-results-tool?params=gbd-api-2016-permalink/7193a516026f9a7df17cf73ea9ce3a5d *Findings from the Global Burden of Disease Study.* Seattle, WA: IHME. IHME Database.

[214] WHO/ILO, 2021: WHO/ILO joint estimates of the work-related burden of disease and injury, 2000–2016: Global monitoring report
[215] Ibid., pp. 55-56.
[216] WHO/ILO, 2021: WHO/ILO joint estimates of the work-related burden of disease and injury, 2000–2016: Global monitoring report (p. 18).
[217] The figures of the working age population of 16 years and above are based on EU-OSHA calculations of data provided by the United Nations World Population Prospects database: United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Online Edition. Rev. 1., File POP/1-1: Total population (both sexes combined) by region, subregion and country, annually for 1950-2100 (thousands), here
[218] WHO, Occupational Burden of Disease Application, https://who-ilo-joint-estimates.shinyapps.io/OccupationalBurdenOfDisease/ and EU-OSHA calculations
[219] International Commission on Occupational Health (ICOH) data based on new and until today unpublished calculations: Takala et al.: Comparative Global Estimates on the Work-related Burden of Accidents and Diseases (preprint)
[220] WHO, Occupational Burden of Disease Application, https://who-ilo-joint-estimates.shinyapps.io/OccupationalBurdenOfDisease/ and EU-OSHA calculations
[221] WHO/ILO, 2021: WHO/ILO joint estimates of the work-related burden of disease and injury, 2000–2016: Global monitoring report (pp. 55-56).
[222] WHO applied for the global estimates as reference the population with an age above 15 years. At EU level, 16 years — probably even older — is the minimum age to start work or an apprenticeship.
[223] WHO, Occupational Burden of Disease Application, https://who-ilo-joint-estimates.shinyapps.io/OccupationalBurdenOfDisease/ and EU-OSHA calculations

[224] Pega et al., 2022: Global, regional and national burden of disease attributable to 19 selected occupational risk factors for 183 countries, 2000–2016: A systematic analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury, here
[225] Kauppinen et al., 1998: Occupational exposure to carcinogens in the European Union in 1990-1993: international information system on occupational exposure to carcinogens, here
CAREX Canada
Fevotte et al., 2011: Matgéné: A Program to Develop Job-Exposure Matrices in the General Population in France
Mannetje et al., 2011: Developing a general population job-exposure matrix in the absence of sufficient exposure monitoring data

[226] YLDs = years lived with disability, together with YLLs = years of life lost, it composes the DALY (DALY = YLL + YLD).

[227] GBD 2019 Mental Disorders Collaborators, 2022: Global, regional, and national burden of 12 mental disorders in 204 countries and territories, 1990–2019: a systematic analysis from the Global Burden of Disease Study 2019, here
[228] WHO: Mental disorders, Key facts and
IHME: Global Health Data Exchange (GHDx), here
[229] OECD, 2015: Sick on the Job?: Myths and Realities about Mental Health and Work
[230] OECD/European Union, 2018: Health at a Glance: Europe 2018: State of Health in the EU Cycle
[231] Andlin-Sobocki et al., 2005: Cost of disorders of the brain in Europe

[232] Niedhammer et al.; 2021: Update of the fractions of cardiovascular diseases and mental disorders attributable to psychosocial work factors in Europe, here

[233] Norder et al., 2017: Beyond return to work from sickness absence due to mental disorders: 5-year longitudinal study of employment status among production workers, here
[234] Leka & Jain, 2017: EU Compass for Action on Mental Health and Well-Being - Mental Health in the Workplace in Europe
[235] Musculoskeletal disorders refer to backache and/or muscular pains in shoulders, neck, upper limbs and/or lower limbs (hips, legs, knees, feet, etc.). In the medical systematic it is the IC 10 group of diseases: Diseases of the musculoskeletal system and connective tissue.
[236] EU-OSHA, 2019: Work-related musculoskeletal disorders: prevalence, costs and demographics in the EU
[237] Graveling, 2018: Ergonomics and Musculoskeletal Disorders (MSDs) in the Workplace. A Forensic and Epidemiological Analysis
[238] Da Costa & Viera, 2010: Risk factors for work-related musculoskeletal disorders: a systematic review of recent longitudinal studies, here
[239] EU-OSHA, 2020: Work-related musculoskeletal disorders: why are they still so prevalent? Evidence from a literature review (p. 15).
[240] EU-OSHA, 2019: Summary - Work-related musculoskeletal disorders: prevalence, costs and demographics in the EU (p. 8).
[241] EU-OSHA, 2019: Work-related musculoskeletal disorders: prevalence, costs and demographics in the EU
[242] Ibid., p. 174ff.

[243] Eurofound, 2007: Fourth European Working Conditions Survey (2005) (p. 77).

[244] United Nations Economic Commission for Europe (UNECE), 2015: Handbook on measuring quality of employment: A statistical framework, here

[245] Quinlan & Bohle, 2013: Re-invigorating industrial relations as a field of study: Changes at work, substantive working conditions and the case of OHS, here (p. 8).

[246] The percentages of responses to this question in the European Working Conditions Survey (EWCS, 2015) are displayed. Each bar shows the percentages of the four possible responses for each EU Member State, the average for the EU Member States, and the responses for Switzerland and Norway. Responses are displayed for the question below: How satisfied are you with working conditions in your main paid job? Answer options were: Not at all satisfied; Not very satisfied; Satisfied; Very satisfied. See here

[247] Flash Eurobarometer 398, 2014, p 2, https://www.cesi.org/wp-content/uploads/2014/04/fl_398_sum_en.pdf . The displayed Flash Eurobarometer data refer to the 'working population', with two subgroups A (employees and manual workers), and B (self-employed). In the Flash Eurobarometer sample these two groups are separated from three further groups forming the 'Not working' population These groups are: subgroups: students, retired, looking for a job.
[248] Ibid., p. 58.
[249] Eurofound, 2007: Fourth European Working Conditions Survey (2005) (pp. 77-81).

[250] Eurofound, 2007: Fourth European Working Conditions Survey (2005) (p. 80).
[251] The ISCED levels 2011 are: ISCED 0: Early childhood education ('less than primary' for educational attainment); ISCED 1: Primary education; ISCED 2: Lower secondary education; ISCED 3: Upper secondary education; ISCED 4: Post-secondary non-tertiary education; ISCED 5: Short-cycle tertiary education; ISCED 6: Bachelor's or equivalent level; ISCED 7: Master's or equivalent level; ISCED 8: Doctoral or equivalent level.
[252] Eurofound, 2015: Sixth European Working Conditions Survey (EWCS 2015), Data visualisation The exact survey question is: 'Does your work affect your health?' The percentages in the text are the percentages of the response option: 'Yes, mainly negatively'. Data need to be checked a second time, the EWCS data visualisation does not work
[253] Eurofound, 2006: Fifteen Years of Working Conditions in the EU: Charting the Trends (p. 6); EU-OSHA calculations based on EWCS raw data.
[254] Average of country values, no weighing according to size of populations per country. EU-OSHA calculations based on EWCS raw data.
[255] Eurostat: Persons reporting a work-related health problem by sex, age and educational attainment level, here
[256] Ibid.

[257] Eurostat: Persons reporting a work-related health problem by sex, age and NACE Rev. 2 activity, here

[258] Eurofound mentions the following reasons: *'In line with the findings from the analysis of the job quality indices, multivariate analysis shows that workers are likely to be less optimistic regarding the sustainability of their work if they are exposed to any of the following adverse working conditions: work intensity, shift work (particularly daily split shifts), night work, fear of losing their job, unfair treatment, and bullying or harassment (Figure 123)'.* Sixth European Working Conditions Survey – Overview report (2017 Update) (p. 122).

These same factors also apply equally to the older age cohort (aged 56 or over) who were asked about their perceived ability to be doing their current job in five years' time. EWCS 2015, Overview report (p. 122).

[259] Eurostat: Persons reporting a work-related health problem resulting in time off work by period off, here, Filter: 1 month or over, and 3 months or over. The question on the period off work is part of a set of questions on work-related health problems, about the 'most serious health problem caused or made worse by work'. The question about the period of work is exactly: *'Thinking of the year before [last day of reference week], for how long were you off work because of your health problem in this period?'*
[260] Ibid., the value for Finland is from 2013, 2020 data are not provided'
[261] Ibid., Filter 6 months or over.
[262] Eurostat: Self-reported work-related health problems and risk factors - key statistics, here

[263] Eurofound: European Working Conditions Survey 6 (EWCS 6), 2015, the exact question was: *'Do you think you will be able to do your current job or a similar one until you are 60 years old?'*: Eurofound 2017: Sixth European Working Conditions Survey – Overview report (2017 Update) (p. 48).
[264] Andersen et al., 2020: Barriers and opportunities for prolonging working life across different occupational groups: the SeniorWorkingLife study
[265] Definition: 'Administrative' and 'manual' work is used throughout the report as a — quite colloquial — placeholder to characterise the difference between two major types of work; it is only one of several options. International and European institutions developed categories with several levels of aggregation or granularity that are applied based on context and the objectives of the analysis. Eurostat uses the European Socio-Economic Groups (ESEG) or the International Standard Classification of Occupations (ISCO), EU agencies often use the UNESCO International Standard Classification of Education (ISCED) that describes not the occupation but the level of skills and education on an aggregated level, and in many international studies and reports the ILO International Standard Classification of Occupations (ISCO) is used.
[266] Eurostat: Which sector is the main employer in the EU Member States? Data source: Employment by A*10 industry breakdowns
[267] The development of questions in the ESENER and EWCS surveys between 2005 and 2015 (EWCS) and 2009 and 2019 (ESENER) show this development: Questions on industry-related exposures were reduced and questions on the impact of work organisation and psychosocial risks extended.
[268] Dixon, 2012: "Emotion": The History of a Keyword in Crisis
Dixon writes: *'The word "emotion" has named a psychological category and a subject for systematic enquiry only since the 19th century. Before then, relevant mental states were categorised variously as "appetites," "passions," "affections," or "sentiments." The word "emotion" has existed in English since the 17th century, originating as a translation of the French émotion, meaning a physical disturbance.'*
[269] European Parliament, 2019: EU policies – Delivering for citizens: Digital transformation
[270] Cedefop, 2016: The great divide: Digitalisation and digital skill gaps in the EU workforce

[271] Terminology: Digitalisation refers to enabling or improving processes by leveraging digital technologies and digitised data. Digitisation refers to creating a digital representation of physical objects or attributes, for example, a scan replaces a paper document. Digital Transformation is business transformation enabled by digitalisation. See: *What is Digitization, Digitalization, and Digital Transformation?*

[272] European Commission Staff Working Document: *Accompanying the document* Proposal for a Decision of the European Parliament and of the Council establishing the 2030 Policy Programme "Path to the Digital Decade" {COM(2021) 574 final}, here
[273] Cedefop, 2016: The great divide: Digitalisation and digital skill gaps in the EU workforce
[274] Bernstein & Raman, 2015: The Great Decoupling: An Interview with Erik Brynjolfsson and Andrew McAfee
[275] Eurofound, 2021: The digital age: Implications of automation, digitisation and platforms for work and employment
[276] Ibid.
[277] EU-OSHA, 2019: Digitalisation and occupational safety and health (OSH) - An EU-OSHA research programme
[278] EU-OSHA: ESENER Data visualisation 2019 Digital technologies at work.

[279] EU-OSHA: ESENER Data visualisation 2019 Digital technologies at work; Discussion on the impact of such technologies on health and safety.

[280] Ibid.
[281] Independent High-Level Expert Group on Artificial Intelligence set up by the European Commission, 2019: Ethics Guidelines for Trustworthy AI
[282] EU-OSHA, 2022: Artificial intelligence for worker management: an overview
[283] European Commission: A European Green Deal
[284] Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions: A new Circular Economy Action Plan: For a cleaner and more competitive Europe. 11.03.2020 COM(2020) 98 final, here
[285] EU-OSHA, 2013: Green jobs and occupational safety and health: Foresight on new and emerging risks associated with new technologies by 2020

[286] EU-OSHA, 2021: What will the circular economy (CE) mean for occupational safety and health (OSH)? An overview of four foresight scenarios.

[287] EU-OSHA, Emerging risks: Workers' safety and health in green jobs
[288] United States Environmental Protection Agency: Green Engineering
[289] United Nations Environmental Programme (UNEP): Global Chemicals Outlook
[290] CEFIC, Facts and figures: Chemical Industry Contributes $5.7 Trillion to Global GDP and Supports 120 Million Jobs, New Report Shows, here
[291] UNEP, 2019: Global Chemicals Outlook II - From Legacies to Innovative Solutions: Implementing the 2030 Agenda for Sustainable Development (p. 27).
[292] Naidu et al., 2021: Chemical pollution: A growing peril and potential catastrophic risk to humanity
[293] Eurostat: Production and consumption of chemicals by hazard class, here
[294] Statistics Sweden SCB: Environmental accounts – Chemical indicators 2019
[295] EU-OSHA: ESENER Data visualisation 2019 Risk factors present in the establishment – Chemical or biological substances.
[296] OSHWiki: Climate change - Impact on Occupational Safety and Health.
[297] Pace advanced from intergenerational conception (children live and work like their parents) to a generational conception (children work in a different occupation, compared to their parents but have one main job all their life), to intragenerational conceptions (several changes during lifetime), according to: Rosa, 2013: Social acceleration – A new theory of modernity.
[298] Eurostat: Employment and activity by sex, age and citizenship (%) - annual data, here

[299] Eurostat: Employment by sex, age and professional status, here, Filter for age class: 15-64 years.

[300] *Eurostat: Full-time and part-time employment by sex, age and educational attainment level (1 000), here*
[301] European Union | Work | 2019 | Gender Equality Index | European Institute for Gender Equality (europa.eu)
[302] European Institute for Gender Equality (EIGE), 2020: Beijing + 25: the fifth review of the implementation of the Beijing Platform for Action in the EU Member States
[303] Eurostat: Employment by sex, age and professional status, here
[304] Ibid.
[305] Eurostat: Skill levels, here
[306] European Commission, 2021: Annual Report on Intra-EU Labour Mobility 2020 (p. 13).
[307] European Commission, 2021: Annual Report on Intra-EU Labour Mobility 2020 (p. 14).
[308] European Commission, 2022: Annual report on intra-EU labour mobility 2021 (p. 108, table 'Numbers of PD

A1 forms issued for postings of workers by EU27 countries, 2011-2020')
Eurostat: EU citizens living in another Member State - statistical overview, here
European Commission, 2019: Towards Fair Labour Mobility: Revision of EU Posting of Workers Rules, 2019

[309] The statistics distinguish between many different categories of migrants, for example, inside EU, from non-EU-countries, first generation, second generation, seasonal temporary, permanent status, etc. More information here

[310] Ibid.

[311] Fasani & Mazza, 2020: Immigrant Key Workers: Their Contribution to Europe's COVID-19 Response (p. 8).
[312] Sometimes 'difficult' or 'demeaning' instead of 'demanding'. Taken from the Japanese: kitanai, kiken, kitsui

[313] Danaj et al., 2020: Labour Mobility and OSH Vulnerability of Posted Workers: The Cases of Austria and the Slovak Republic

[314] European Commission, 2022: Annual report on intra-EU labour mobility 2021 (p. 108, table 'Numbers of PD A1 forms issued for postings of workers by EU27 countries, 2011-2020').
[315] European Parliament, 2017: Posted workers: better protection and fair conditions for all

[316] It is hardly foreseeable how far the experience of interrupted supply chains during the COVID-19 pandemic will contribute to a de-globalisation and reduction of international supply chain dependency.

[317] Such methodologies exist for the environmental field, well-known is the 'ecological footprint'.

[318] Eurofound and the ILO have jointly produced a pilot report on worldwide working conditions to achieve a better evidence base for actions and policies, see: Eurofound & ILO, 2019: Working conditions in a global perspective

[319] See: https://www.globalreporting.org/ or UN-PRI (UN Principles of responsible investment) https://www.unpri.org/
[320] United Nations, Global Compact, here
[321] European Commission: Corporate sustainability due diligence

[322] Regulation (EU) 2017/821 of the European Parliament and of the Council of 17 May 2017 laying down supply chain due diligence obligations for Union importers of tin, tantalum and tungsten, their ores, and gold originating from conflict-affected and high-risk areas, here
[323] Centennial Declaration of the International Commission on Occupational Health, ICOH

[324] ILO: Monitoring Compliance with International Labour Standards The key role of the ILO Committee of Experts on the Application of Conventions and Recommendations, here

[325] ILO: Conventions and Recommendations
[326] ILO : Convention C-155
[327] ILO : Convention C-187

[328] ILO: Safety and health at work

[329] ILO: Health and Safety at the Workplace

[330] International Social Security Association (ISSA): Vison Zero Overview, Section Companies, here
[331] United Nations, Social Development Goals (SDGs), Goal 8, here and here
[332] WHO: Protecting workers' health, Key facts

[333] WHO, 2013: WHO Global Plan of Action on Workers' Health (2008-2017): baseline for implementation: global country survey 2008/2009: executive summary and survey findings, here
[334] United Nations, SDGs, Goal 8, here and here
[335] ILO Constitution
[336] ILO: Conventions and Recommendations
[337] Treaty Establishing the European Coal and Steel Community and Annexes I-III, PARIS, 18 APRIL 1951, Article 3e
(DRAFT ENGLISH TEXT), here
[338] Consolidated Version of the Treaty on the Functioning of the European Union Official Journal of the European Union, C 326/47, 6.10.2012, Article 151 and Article 153, here
[339] The European Parliament, the Council and the Commission: The European Pillar of Social Rights in 20 principles, here
[340] EU-OSHA, 2021: Directive 89/391/EEC – OSH "Framework Directive" of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work - "Framework Directive", here
[341] Ibid., Framework Directive – Section 2 Employers' obligations.
[342] Ibid., Framework Directive – Section 3 Workers' obligations.

[343] Gagliardi et al., 2012: Occupational safety and health in Europe: lessons from the past, challenges and opportunities for the future
[344] Directive 80/1107/EEC, Council Directive of 27 November 1980 on the protection of workers from risks related to exposure to chemical, physical and biological agents at work, here
[345] Directive 86/188/EEC, Council Directive of 12 May 1986 in the protection of workers from the risks related to exposure to noise at work, here
[346] An overview on these directives can be found here
[347] See for reasons from a trade union point of view: Vogel, 2015: The machinery of occupational safety and health policy in the European Union. History, institutions, actors, here
[348] COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS: EU strategic framework on health and safety at work 2021-2027: Occupational safety and health in a changing world of work, {SWD(2021) 148 final} - {SWD(2021) 149 final, Brussels, 28.6.2021, here
[349] European Commission, 2019: Guide to application of the Machinery Directive 2006/42/EC, Edition 2.2 (p. 174).

[350] Regarding other sources: The authors of the DG EMPL Evaluation did not consider the National Implementation Reports (due every five years by each Member State on each directive) as relevant for their study: *'In this context, one relevant conclusion is that the attempt to map the findings of the National Implementation Reports has yielded no result. The reporting requirements of the National Implementation Reports have proven to be formulated too broadly to facilitate quantifications of the replies across MSs or to allow for comparability.*'
For this Status Report, SLIC evaluations of the labour inspection systems in Member States were not taken into account, because most of them are confidential.

[351] DG Employment, Social Affairs and Inclusion, 2015: Evaluation of the Practical Implementation of the EU Occupational Safety and Health (OSH) Directives in EU Member States (p. 89).

[352] Ibid., p. 105. See also p. 89: *'The Directives represent a mix of a goal-oriented approach – strongly expressed in the Framework Directive, but also mirrored in the individual Directives – and a prescriptive approach – which is, for instance, seen in the very detailed and specific requirements included in the annexes of some Directives.*

[353] Ibid., p. 67.
[354] Ibid., p. 94.
[355] Graveling, 2018: Transposition, implementation and enforcement of EU OSH legislation - Thematic Discussion Paper
[356] EU-OSHA, 2021: Summary - Improving compliance with occupational safety and health regulations: an overarching review (p. 4).
[357] The authors explain the difference between 'substantive and rule compliance as follows: *'... "substantive compliance", which requires compliance with the collective goals underpinning the regulatory scheme (better OSH practice); and "rule compliance", which envisages compliance with the content of legal standards only*' (p. 11).
[358] EU-OSHA, 2021: Improving compliance with occupational safety and health regulations: an overarching review (p. 43).
[359] Fundamental Rights Agency (FRA), here, section on Trafficking and labour exploitation

[360] Special Eurobarometer 498: Undeclared Work in the European Union

[361] European Commission, Directorate-General for Employment, Social Affairs and Inclusion et al., 2018: An evaluation of the scale of undeclared work in the European Union and its structural determinants : estimates using the labour input method, here

[362] ELA: European Platform tackling undeclared work

[363] The OSH Barometer contains a special section on enforcement capacities, here
[364] SLIC, 2015: Common Principles for Labour Inspection in Relation to Health and Safety In the Workplace
[365] Cardiff University et al., 2011: Contract to assess the potential impact of emerging trends and risks on labour inspection methodologies in the domain of occupational health and safety,
European Federation of Public Service Unions (EPSU), 2012: A mapping report on Labour Inspection Services in 15 European countries (p. 13ff).

[366] The Nordic countries (Denmark, Finland, Iceland, Norway and Sweden) are particularly active in this area. They have summarised the current challenges for labour inspections and supervision in general, giving extensive and detailed recommendations; Nordic Future of Work Group, 2020: Work today and in the future : Perspectives on Occupational Safety and Health challenges and opportunities for the Nordic labour inspectorates, here
BAuA, 2020: Scientific workshop on the future of smart and effective labour inspection, 3 November 2020, here

[367] ETUC, 2021: Huge fall in labour inspections raises Covid risk
ETUC observed in the same period a fall of 0.5 million inspections. Quote: *'New ETUC research reveals that safety inspections have been cut by a fifth since 2010, falling from 2.2 million annual visits to 1.7 million.'*
[368] Eurostat: Annual enterprise statistics by size class for special aggregates of activities (NACE Rev. 2), here
21.2 million businesses have between 0 and 9 employees.
[369] EPSU, 2012: A mapping report on Labour Inspection Services in 15 European countries (p. 15ff).
[370] ETUC, 2021: Huge fall in labour inspections raises Covid risk
[371] European Agency for Safety and Health at Work, ESENER 2019, Question: Whether establishments have been visited by inspectorates in the last three years (% establishments by country ESENER 2019 and 2014, here
[372] SLIC, 2018: Labour inspectors' guide for assessing the quality of risk assessments and risk management measures with regard to prevention of psychosocial risks, No-Binding Publication for EU Labour Inspectors, here
[373] EU-OSHA: E-guide to managing stress and psychosocial risks
EU-OSHA, 2018: "Healthy workers, thriving companies - a practical guide to wellbeing at work"
ISO, 2021: ISO 45003 Occupational health and safety management - Psychological health and safety at work - Guidelines for managing psychosocial risks, here
[374] European Commission, 2018: Promoting mental health in the workplace. Guidance to implementing a comprehensive approach
[375] ILO, 2012: Stress Prevention at Work Checkpoints. Practical improvements for stress prevention in the workplace
ILO, 2021: Violence and harassment in the world of work: A guide on Convention No. 190 and Recommendation No. 206
[376] WHO, 2008: PRIMA-EF : guidance on the European framework for psychosocial risk management : a resource for employer and worker representatives
[377] OSH Barometer, section Steering of OSH, National strategies, Activities, here
[378] Arbetsmiljöverket, 2015: Organisatorisk och social arbetsmiljö (AFS 2015:4), föreskrifter (Organisational and social work environment, Ordinance).

[379] The European Commission (2002) defined stress as the pattern of emotional, cognitive, behavioural and physiological reactions to adverse and noxious aspects of work content, work organisation and work environment.

European Commission, Directorate-General for Employment, Social Affairs and Inclusion, 2000: Guidance on work-related stress – Spice of life or kiss of death?

[380] See the OSHWiki article on Psychosocial issues
[381] OSHWiki provides in its articles on 'OSH System at national level' for the EU Member States a chapter on the 'National strategy', here
[382] COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS: EU strategic framework on health and safety at work 2021-2027: Occupational safety and health in a changing world of work, {SWD(2021) 148 final} - {SWD(2021) 149 final, Brussels, 28.6.2021, here
[383] OSHWiki: EU OSH Strategic framework

[384] EU-OSHA, 2019: National Strategies in the field of Occupational Safety and Health in the EU
[385] The OSHWiki articles 'OSH System at national level' (https://oshwiki.eu/wiki/Category:OSH_systems_at_national_level) contain a chapter on the 'National Strategy', mostly updated to the newest strategy. in the OSH Barometer see the Section National Strategies
[386] European Agency for Safety and Health at Work, 2019: National Strategies in the field of Occupational Safety and Health in the EU, p 9, https://osha.europa.eu/en/file/108414/download?token=2yF1UnxW
[387] The OSH Barometer contains a special section dedicated to National OSH Strategies: https://visualisation.osha.europa.eu/osh-barometer/osh-steering/national-strategies

[388] One of the many schemes for the characterisation of national OSH-policies and practical implementation was developed in the Nordic Council of Ministers publication: Suikkanen, A., & Kunnari, M. 2008: Principles and concepts in Nordic occupational safety and health policies: dimensions of strategic thinking and approaches. Nordic Council of Ministers.
It distinguishes between eight categories of state actions: punitive / supervising / regulative / legislative / incentivising / consultative / informative / networking / collaborating / awareness raising / knowledge enhancing (from training to research)

[389] European Agency for Safety and Health at Work, 2021: Improving compliance with occupational safety and health regulations: an overarching review- Report Executive summary, European Risk Observatory Report, p43
[390] European Commission, DG EMPL: A non–binding guide to best practice with a view to improving the application of related directives on protecting health and safety of workers in agriculture, livestock farming,

horticulture and forestry, Luxembourg: Publications Office of the European Union, 2012, ISBN 978-92-79-22673-1, doi:10.2767/53801
[391] European Commission Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs Industrial Transformation and Advanced Value Chains, Advanced Engineering and Manufacturing Systems*: Guide to application of the Machinery Directive 2006/42/EC,* Edition 2.2 – October 2019, p174 (Machinery directive annex 1, 1.1.6, Official Journal of the European Union, L157/37
[392] EU-OSHA: COVID-19: Back to the workplace - Adapting workplaces and protecting workers, 2020, https://osha.europa.eu/en/publications/covid-19-back-workplace-adapting-workplaces-and-protecting-workers
[393] European Commission: Guidelines of the Commission on seasonal workers in the EU Factsheet on practical examples and best practices, 2020
[394] European Agency for Safety and Health at Work: E-guide to managing stress and psychosocial risks; https://osha.europa.eu/en/tools-and-resources/e-guides/e-guide-managing-stress-and-psychosocial-risks
European Agency for Safety and Health at Work, 2020: Healthy workers, thriving companies - a practical guide to wellbeing at work, 2018. https://osha.europa.eu/en/publications/healthy-workers-thriving-companies-practical-guide-wellbeing-work
ISO 2021: ISO 45003 Occupational health and safety management - Psychological health and safety at work - Guidelines for managing psychosocial risks. https://www.iso.org/standard/64283.html
EU Commission, 2018: Promoting mental health in the workplace. Guidance to implementing a comprehensive approach. https://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=8098&furtherPubs=yes
ILO – International Labour Organization, Stress Prevention at Work Checkpoints. Practical improvements for stress prevention in the workplace, 2012. https://www.ilo.org/global/publications/books/WCMS_168053/lang--en/index.htm
ILO – International Labour Organization, 2021: Violence and harassment in the world of work: A guide on Convention No. 190 and Recommendation No. 206, 2021. https://www.ilo.org/global/topics/violence-harassment/resources/WCMS_814507/lang--en/index.htm
WHO - World Health Organization, PRIMA-EF, 2008: Guidance on the European framework for psychosocial risk management : a resource for employer and worker representatives, https://apps.who.int/iris/handle/10665/43966
Senior Labour Inspectors Committee (SLIC), 2018: Labour inspectors' guide for assessing the quality of risk assessments and risk management measures with regard to prevention of psychosocial risks, here
[395] Two EU-OSHA databases present several hundred guidance documents on Dangerous Substances https://osha.europa.eu/en/themes/dangerous-substances/practical-tools-dangerous-substances and Musculoskeletal Disorders (MSD): https://osha.europa.eu/en/themes/musculoskeletal-disorders/practical-tools-musculoskeletal-disorders
[396] Examples of such tools and database are: EU-OSHA's Online Interactive Risk Assessment tool (OIRA) with more than 250 tools and more than 180,000 risk assessments https://osha.europa.eu/en/tools-and-resources/oira
[397] See the series of EU-OSHA reports on 'Safety and health in micro and small enterprises in the EU: https://osha.europa.eu/en/themes/safety-and-health-micro-and-small-enterprises
Descriptions of the good examples are available at: https://osha.europa.eu/en/tools-and-publications/publications/safety-andhealth-micro-and-small-enterprises-eu-policy-practice/view
[398] European Commission / Senior Labour inspectors committee: Guidance for National Labour Inspectors on addressing risks from worker exposure to respirable crystalline silica (RCS) on construction sites, October 2016
[399] Two of many examples: SME United, (Employers Federation) https://www.smeunited.eu/policies/policies/employment/health-safety , EFBWW European Federation of Building and Woodworkers (Trade Union), https://efbww.eu/activities/occupational-health-and-safety
[400] OSHWiki: Section 'OSH System at national level', descriptions of the social dialogue in each EU Member State https://oshwiki.eu/wiki/Category:OSH_systems_at_national_level
[401] DG Employment: Website on 'Social Dialogue', https://ec.europa.eu/social/main.jsp?catId=329&langId=en
[402] Eurofound 'Database of wages, working time and collective disputes', see: https://www.eurofound.europa.eu/data/database-of-wages-working-time-and-collective-disputes
[403] E.g.: Prevent (Sweden), DGUV (Germany) AUVA (Austria), see for all EU Member Stress the OSHWiki article on 'OSH-systems at national level' https://oshwiki.eu/wiki/Category:OSH_systems_at_national_level
[404] European Agency for Safety and Health at Work, 2021: Improving compliance with occupational safety and health regulations: an overarching review - Executive summary, https://osha.europa.eu/en/publications/summary-improving-compliance-occupational-safety-and-health-regulations-overarching
European Agency for Safety and Health at Work, 2021: Improving compliance with occupational safety and health regulations: an overarching review, Literature review; Chapter 3: Societal norms, social reporting, corporate social responsibility and support for securing compliance, https://osha.europa.eu/en/publications/literature-review-improving-compliance-occupational-safety-and-health-regulations-0
Podgorski, D., 2015: Measuring operational performance of OSH management systems – A demonstration of AHP-based selection of leading key performance indicators, in Safety Science, Vol. 73, March 2015, p146-166, https://doi.org/10.1016/j.ssci.2014.11.018

[405] Short descriptions are available on the ISO website, the complete ISO standards are priced. **ISO 9001**, **ISO 14001** and I**ISO 31000**, n
[406] ISO Committee TC 183*: Occupational health and safety management systems*
https://committee.iso.org/home/tc283
[407] ILO, 2009: Guidelines on occupational safety and health management systems (Second Edition) https://www.ilo.org/safework/info/standards-and-instruments/WCMS_107727/lang--en/index.htm
[408] Köper B, Möller K, Zwetsloot G., 2009: The Occupational Safety and Health Scorecard – a business case example for strategic management, Scand J Work Environ Health 2009;35(6):413-420, doi:10.5271/sjweh.1361
[409] Hutchinson, B., Dekler, S. Rae, A., 2022: Writing plans instead of eliminating risks: How can written safety artefacts reduce safety?, https://www.sciencedirect.com/science/article/abs/pii/S0925753522000789?via%3Dihub
[410] European Agency for Safety and Health at Work, 2013: Analysis of the determinants of workplace occupational safety and health practice in a selection of EU Member States, European Risk Observatory, Luxembourg: Publications Office of the European Union, doi:10.2802/558
[411] European Agency for Safety and Health at Work: Overview page on ESENER https://osha.europa.eu/en/facts-and-figures/esener, Data visualisation of ESENER data: https://visualisation.osha.europa.eu/esener/en
Its third wave, interviewing more than 45,00 establishments across all business, size classes and activity sectors in 33 countries, was completed in 2019 and provides comparable results with the 2014 wave.
[412] Schmitt, B., Hammer, A.:2015: Für welche betrieblichen Kontexte ist der Prozess der Gefährdungsbeurteilung anschlussfähig? WSI-Mitteilungen, 68(3): 202-211; https://www.wsi.de/de/wsi-mitteilungen-fuer-welche-betrieblichen-kontexte-ist-der-prozess-der-gefaehrdungsbeurteilung-13201.htm

[413] Beck and Lenhardt, 2019; Lenhardt and Beck, 2016; Baldock et al., 2006: Influences on Small-Firm Compliance-Related Behaviour: The Case of Workplace Health and Safety, in: Environment and Planning C: Politica and space https://doi.org/10.1068/c0564 ;

[414] Kooperationsstelle Hamburg et. al.. 2010: Contract to analyse and evaluate the impact of the practical implementation in the workplace of national measures implementing Directive 98/24/EC on Chemical Agents Final Report, Ch. 5 on Risk assessment. The percentage of adequate risk assessments in Member States varies between 10% and 50%, https://ec.europa.eu/social/BlobServlet?docId=10152&langId=en

[415] Lippel, K., Quinlan, M., 2011: Psychosocial hazards in the workplace: Challenges for regulators, Labour Inspectors and Worker representatives, Safety Science: Vol. 49, Issue 4, 2011, https://www.sciencedirect.com/journal/safety-science/vol/49/issue/4
[416] EU-OSHA: ESENER 2019 What does it tell us about safety and health in Europe's workplaces? https://osha.europa.eu/en/publications/esener-2019-policy-brief
[417] Base: All establishments undertaking lifting or moving people or heavy loads
[418] Base: All establishments undertaking repetitive hand or arm movements
[419] EU-OSHA: Third European Survey of Enterprises on New and Emerging Risks (ESENER 2019): Overview Report How European workplaces manage safety and health. Available at: https://osha.europa.eu/en/publications/esener-2019-overview-report-how-european-workplaces-manage-safety-and-health
[420] Sørensen O. H., Hasle P, Bach E., 2007: Working in Small Enterprises: Is There a Special Risk?" Safety Science 45, p 1044 – 1059, 10.1016/j.ssci.2006.09.005
[421] Occupational safety and health related research takes a place in all types of scientific disciplines in engineering and natural sciences, in medicine, in economic and social sciences and humanities.
[422] Eurostat collects data on an obligatory basis, e.g. the European statistics on work accidents (ESAW) or the data from the Labour Force Survey (LFS). Some countries conduct surveys on working conditions with obligatory participation (e.g. France).
[423] The Horizon-project INGRID2 provides an overview and offers searchable databases on research sources related to working conditions. (https://www.ingridportal.eu/en) : Supporting expertise in inclusive growth, e-portal 'Dataset on Working conditions',

[424] European Agency for Safety and Health at Work: ESENER (European Survey of Enterprises on New and Emerging Risks). How European workplaces manage safety and health, https://visualisation.osha.europa.eu/esener#!/en
[425] Eurofound, EWCS (European Working conditions survey)
[426] Employment and unemployment (LFS) - Overview: https://ec.europa.eu/eurostat/web/lfs/overview

[427] E.g. Flash Eurobarometer 398: Working conditions, 2014
https://ec.europa.eu/commfrontoffice/publicopinion/flash/fl_398_en.pdf

[428] https://ec.europa.eu/social/main.jsp?catId=148&intPageId=685

[429] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31994R2062
[430] Communication from the Commission - Adapting to change in work and society: a new Community strategy on health and safety at work 2002-2006 /COM/2002/0118 final
[431] European Commission Brussels, 31.5.2013 SWD (2013) 202 final COMMISSION STAFF WORKING DOCUMENT Evaluation of the European Strategy 2007-2012 on health and safety at work
[432] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Improving quality and productivity at work: Community strategy 2007-2012 on health and safety at work {SEC(2007) 214} {SEC(2007) 215} {SEC(2007) 216}
[433] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on an EU Strategic Framework on Health and Safety at Work 2014-2020, Brussels, 6.6.2014 COM (2014) 332 final
[434] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: EU strategic framework on health and safety at work 2021-2027: Occupational safety and health in a changing world of work, {SWD(2021) 148 final} - {SWD(2021) 149 final, Brussels, 28.6.2021
[435] European Agency for Safety and Health at Work, 2019: National Strategies in the field of Occupational Safety and Health in the EU, 2019, https://osha.europa.eu/en/safety-and-health-legislation/osh-strategies
[436] See as overview: https://osha.europa.eu/en/emerging-risks, examples e.g. EU-OSHA, 2014: Current and emerging issues in the healthcare sector, including home and community care, European Risk Observatory report, European Risk Observatory Report;
EU-OSHA, 2014: Green jobs, new risks? New and emerging risks to occupational safety and health in the electricity sectors, Workshop for European Sectoral Social Dialogue Committee Electricity'; EU OSHA 2019: A Review on the Future of Work: Performance Enhancing Drugs
[437] Eurostat: Accident at work statistics
[438] OSH related LFS Ad hoc modules were: 1999 - Accidents at work and occupational diseases; 2007 - Work related accidents, health problems and hazardous exposure; 2013 Accidents at work and other work-related health problems; 2020 - Accidents at work- and work-related health problems.
[439] Eurofound Website: https://www.eurofound.europa.eu/about-eurofound
[440]Eurofound, European Working Conditions Survey
[441] Eurofound, First European Survey on the Work Environment 1991-1992
https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef9211en.pdf
[442] European Agency for Safety and Health at Work, ESENER, https://visualisation.osha.europa.eu/esener#!/en
[443] Europeans and Health and Safety at Work, June 1992, https://europa.eu/eurobarometer/surveys/detail/113 ; Europeans and Health and Safety at Work, August 1996 https://europa.eu/eurobarometer/surveys/detail/158
[444] Eurobarometer: Working Conditions in Europe, June 1997, https://europa.eu/eurobarometer/surveys/detail/151 Eurobarometer: Working Conditions, April 2014, https://europa.eu/eurobarometer/surveys/detail/2044
[445] Eurobarometer: Work-Life Balance, October 2018, https://europa.eu/eurobarometer/surveys/detail/2185
[446] Eurobarometer: Undeclared work in the European Union, February 2020
https://europa.eu/eurobarometer/surveys/detail/2250
[447] The Horizon-project INGRID2 offers links to searchable databases on surveys related to working conditions. https://www.ingridportal.eu/en Supporting expertise in inclusive growth, e-portal 'Dataset on Working conditions',
[448] e.g.: International Benchmarking on Occupational Safety and Health (OSH) Regulation, revised version 2018, http://www.iali-aiit.org/ ,
[449] The Horizon-project INGRID2 also provides an overview on these types of databases (https://www.ingridportal.eu/en)
[450] European Centre for the Development of Vocational Training CEDEFOP (https://www.cedefop.europa.eu/) Skills Panorama: https://skillspanorama.cedefop.europa.eu/en
[451] European Institute for Gender Equality EIGE (https://eige.europa.eu/) Gender Statistics Database, Work and Labour market, https://eige.europa.eu/gender-statistics/dgs, Gender Equality Index, e.g. index of digitalisation in the world of work (2020)
[452] European Chemical Agency ECHA (https://echa.europa.eu/home) Exposure scenario examples

[453] European Centre for Disease Prevention and Control, https://www.ecdc.europa.eu/en
[454] European Maritime Safety Agency EMSA (http://www.emsa.europa.eu/), Section on Safety and Security http://www.emsa.europa.eu/we-do/safety.html
[455] Fundamental Rights Agency FRA, https://fra.europa.eu/en, Section on 'Trafficking and labour exploitation, e.g the report from June 2021 titled: Protecting migrants in an irregular situation from labour exploitation – Role of the Employers Sanctions Directive
[456] European Monitoring Centre for Drugs and Drug Addiction EMCDDA (https://www.emcdda.europa.eu/), Section 'Best practice', Policy and practice briefings: Work places, https://www.emcdda.europa.eu/best-practice/briefings/workplace_en
Quite unknown and difficult to estimate: between one and nine percent of the employees take so-called neuro

enhancers. That is medication like tranquilizers, particularly in highly emotional jobs, or stimulants to survive long working hours - truck drivers, pilots, doctors etc..

[457] DG SANTE Health and Food Safety, Area Public Health, (https://ec.europa.eu/health/home_en), Section on EU Action on Health, subsections 'State of Health in the EU' (https://ec.europa.eu/health/state/summary_en) and 'indicators and Data' (https://ec.europa.eu/health/indicators_data/overview_en)

[458] Desiere, S., Lenaerts, K, 2020: Integrate and Harmonise National Surveys on Working Conditions? A scoping paper, Horizon project: InGRID-2, Integrating Research Infrastructure for European expertise on Inclusive Growth from data to policy – project number 730998 https://www.inclusivegrowth.eu/files/Output/D11.5-scoping-paper.pdf

[459] Desiere, S., Lenaerts, K., 2020: Integrate and Harmonise National Surveys on Working Conditions? p16

[460] ILO: National profiles on occupational safety and health National profiles on occupational safety and health

[461] WHO: Global Health Observatory https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates

[462] Quote here the new ILO Publication on OSH statistics

[463] Denmark: Ahlmark, N. et al, 2015: Survey nonresponse among ethnic minorities in a national health survey--a mixed-method study of participation, barriers, and potentials, in: Ethn Health 2015; 20(6):611-32, doi: 10.1080/13557858.2014.979768. https://pubmed.ncbi.nlm.nih.gov/25411892/

Netherlands: Mölenberg, F.J.M., de Vries, C., Burdorf, A. et al. 2021: A framework for exploring non-response patterns over time in health surveys. BMC Med Res Methodol 21, 37 (2021). https://doi.org/10.1186/s12874-021-01221-0

Aktas, E., Bergbom, B., Godderis, L. et al. Migrant workers occupational health research: an OMEGA-NET working group position paper. Int Arch Occup Environ Health (2021). https://doi.org/10.1007/s00420-021-01803-x

[464] 'European platform tackling undeclared work', https://www.ela.europa.eu/european-platform-tackling-undeclared-work

[465] Eurofound: New Forms of Employment, 2020 Update, New Forms of Employment

[466] Fundamental Rights Agency FRA, https://fra.europa.eu/en, Section on 'Trafficking and labour exploitation

[467] European Labour Authority: https://www.ela.europa.eu/en/home

[468] Besamusca, J., Steinmetz, S.: Vulnerable Groups in European Data Sets, An inventory of the measurement of vulnerable groups in 27 data sets covering the European area, Working paper, Horizon project: InGRID-2, Integrating Research Infrastructure for European expertise on Inclusive Growth https://www.inclusivegrowth.eu/files/Output/D11.3_inventory_report.pdf

[469] European Agency for Safety and Health at Work, 2013: Analysis of the determinants of workplace occupational safety and health practice in a selection of EU Member States, Luxembourg: Publications Office of the European Union, doi:10.2802/55885

[470] The 'Directive 89/654/EEC concerning the minimum safety and health requirements for the workplace' covers the following aspects: stability and solidity, electrical installations, emergency routes and exits, fire detection and firefighting, ventilation of enclosed workplaces, room temperature, natural and artificial room lighting, floors, walls, ceilings and roofs of rooms, windows and skylights, doors and gates, traffic routes - danger areas, specific measures for escalators and travelators, loading bays and ramps, room dimensions and air space in rooms - freedom of movement at the workstation, rest rooms, pregnant women and nursing mothers, sanitary equipment, first aid rooms/equipment, disabled workers, outdoor workplaces (special *provisions), Movement of pedestrians and vehicles*

[471] As example, European Agency for Safety and Health at Work, 2020: Biological agents and prevention of work-related diseases: a review. Luxembourg: Publications Office of the European Union,

[472] European Agency for Safety and Health at Work: Workers' exposure survey on cancer risk factors in Europe. https://osha.europa.eu/en/facts-and-figures/workers-exposure-survey-cancer-risk-factors-europe

[473] European Agency for Safety and Health at Work, 2021: Foresight Study on the Circular Economy and its effects on Occupational Safety and Health; EU-OSHA, 2019: Digitalisation and occupational safety and health - An EU-OSHA research programme

[474] DG EMPLOYMENT, SOCIAL AFFAIRS AND INCLUSION: Evaluation of the Practical Implementation of the EU Occupational Safety and Health (OSH) Directives in EU Member States, SYNTHESIS REPORT, November 2015, Available at: https://ec.europa.eu/social/BlobServlet?docId=16897&langId=en ; IALI: International Benchmarking on Occupational Safety and Health (OSH) Regulation, revised version 2018, http://www.iali-aiit.org/ ; OSH-WIKI: OSH Performance Indicators – and their application in the monitoring and evaluation of OSH-infrastructure, OSH-policies and OSH legislation,

[475] European Agency for Safety and Health at Work: ESENER survey; OSHWiki overview: Key performance indicators, https://oshwiki.eu/wiki/Key_performance_indicators European Agency for Safety and Health at Work, 2017: Methodologies to identify work-related diseases: Review of sentinel and alert approaches, Luxembourg: Publications Office of the European Union, E European Agency for Safety and Health at Work, 2018: Safety and Health in micro and small enterprises in the EU: Final report from the 3-year SESAME project

[476] E European Agency for Safety and Health at Work,2013: European Risk Observatory, Analysis of the determinants of workplace occupational safety and health practice in a selection of EU Member States, https://osha.europa.eu/en/publications/reports/analysis-determinants-workplace-OSH-in-EU
[477] European Agency for Safety and Health at Work, 2019: The value of OSH and the societal costs of work-related injuries and disease, Luxembourg;
Elsler D. et al: A review of case studies evaluating economic incentives to promote occupational safety and health. Scand J Work Environ Health 2010; 36: 289–298
[478] E European Agency for Safety and Health at Work, 2021: Improving compliance with occupational safety and health regulations: an overarching review
[479] Walters D, Johnstone R, Bluff E, Limborg HJ, Gensby U.: Improving compliance with occupational safety and health regulations: an overarching review EU-OSHA, 2021. Improving compliance with occupational safety and health regulations
[480] ILO and integration of OSH Into decent work https://www.ilo.org/global/topics/dw4sd/themes/osh/lang--en/index.htm
[481] Dijk, F., Yohama Caraballo-Arias, Y.: Where to Find Evidence-Based Information on Occupational Safety and Health? https://www.annalsofglobalhealth.org/articles/10.5334/aogh.3131/
Trade union position, one example: Vogel L (2014), The point of view of the European trade unions: It is urgent to revitalise the EU occupational health and safety policy, http://www.osha.mddsz.gov.si/.../Laurent_VOGEL_EN.pdf
Employer position, one example: Safer and healthier work for all - Modernisation of the EU occupational safety and health legislation and policy,
[482] Eurofound; Labour market change New forms of employment: 2020 update
[483] Eurofound, 2020: Working conditions in sectors, Publications Office of the European Union, Luxembourg, doi:10.2806/024695, p. 41
[484] Norway, STAMI: https://noa.stami.no/ National monitoring of work environment (National overvåkning af arbeidmiljø)
[485] Detailed Action Plan for the 4 Main Strategies to Create Safe Workplaces (update from 2020) https://kosha.or.kr/english/publications/Resources.do?mode=view&articleNo=277001&article.offset=0&articleLimit=10
[486] Sakurai, H.: Occupational Safety and Health in Japan: Current Situations and the Future https://www.jstage.jst.go.jp/article/indhealth/50/4/50_MS1375/_pdf/-char/ja
[487] Occupational Safety and Health Administration Ministry of Labor, Republic of China (Taiwan): National Occupational Safety and Health Profile of Taiwan, 2014, Chapter 8 National Occupational Safety and Health Profile of Taiwan
[488] See: https://www.mom.gov.sg/workplace-safety-and-health/wsh-reports-and-statistics

[489] E.g.: National Academies of Sciences, Engineering, and Medicine. 2018. A Smarter National Surveillance System for Occupational Safety and Health in the 21st Century. Washington, DC: The National Academies Press. https://doi.org/10.17226/24835, 2018

[490] E.g.: Publications from the Association of Workers' Compensation Boards of Canada, https://awcbc.org/en/
[491] Australian Safety and Compensation Council, Report on indicators for occupational disease, Australian Government, 2006, p1-45
[492] E.g.: https://data.worksafe.govt.nz/

[493] International Labour Organisation ILO (no publishing date available). Decent work: Measuring decent work. http://www.ilo.org/integration/themes/mdw/lang--en/index.htm

[494] Country profiles on Occupational Safety and Health, https://www.ilo.org/safework/countries/lang--en/index.htm
[495] Work Health Organisation WHO (2011). Global Health Observatory: WHO indicator registry., from: http://www.who.int/gho/indicator_registry/en/index.html
[496] United Nations: Sustainable Development Goals, https://sustainingdevelopment.com/sdg8-indicators/
[497] UNECE, 2010: Measuring Quality of Employment, https://unece.org/statistics/publications/measuring-quality-employment

[498]https://ec.europa.eu/eurostat/web/labour-market/quality-of-employment/database

[499] Eurostat overview on their data related to quality of employment https://ec.europa.eu/eurostat/web/labour-market/quality-of-employment

[500] Andersen, J. H., et al., 2019: Systematic literature review on the effects of occupational safety and health (OSH) interventions at the workplace. Scandinavian Journal of Work Environment and Health, 45(2): 103-113

[501] European Agency for Safety and Health at Work, 2019: The value of occupational safety and health and the societal costs of work-related injuries and diseases, Publications Office of the European Union, Luxembourg, doi:10.2802/251128

[502] A hint in this direction gives the EWCS 1995 evaluating per occupation the responses to the question: 'Is your job more difficult because of a chronic or permanent health problem by occupation?". Between 72% and 81% of the manually dominated occupations (agriculture, crafts, machine operators, elementary occupations) respond: 'No, never', that is, between 19% and 28% of these occupations see such problems. Compared to this, between 86% and 90% of the high-level clerk workers respond: 'No, never', that is, comparatively less, only between 10% and 14% see these problems.

[503] WHO: Cultural context of health and well-being, Policy brief No 1, Culture matters: using a cultural contexts of health approach to enhance policy-making, Cultural context of health and well-being

.

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en).

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696,
- via the following form: european-union.europa.eu/contact-eu/write-us_en.

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (european-union.europa.eu).

EU publications

You can view or order EU publications at op.europa.eu/en/publications. Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (european-union.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

EU open data

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

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 and 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 (EU-OSHA)

Santiago de Compostela 12, 5th floor
48003 Bilbao
Spain
Tel: (+34) 944 358 400
Email: information@osha.europa.eu

https://osha.europa.eu

Publications Office
of the European Union