

AN INTERNATIONAL COMPARISON OF THE COST OF WORK-RELATED ACCIDENTS AND ILLNESSES

The economic advantages of occupational safety and health have never been more apparent. New estimates from an international project show that work-related accidents and illnesses cost the EU at least EUR 476 billion every year. The cost of work-related cancers alone amounts to EUR 119.5 billion. The project results were presented at the XXI World Congress on Safety and Health at Work in Singapore in September and are available on the EU-OSHA website as an interactive data visualisation.

The European Agency for Safety and Health at Work (EU-OSHA) seeks to inform decision-makers in the areas of politics, business and science so that they can better understand the economic effects of occupational safety and health. To that end, EU-OSHA provides research results of a high scientific standard which examine the economic effects of work-related accidents and illnesses on society and business.

For example, over the last few years, research projects on the basis of cost-benefit analyses of occupational safety and health measures for small and medium-sized enterprises (SMEs) have been carried out and the possible economic incentives for preventive action have been analysed, such as points systems for accident insurance. EU-OSHA's latest project now focuses on the macro level and looks at the societal costs that can arise as a result of insufficient preventive action with a European and international comparison. This is in line with EU-OSHA's mandate from the European Commission, which was laid down as a priority in the EU Strategic Framework on Health and Safety at Work 2014-2020.¹

Forming a comprehensive estimate of the societal cost of work-related accidents and illnesses is a complicated task. However, it is essential that societal decision-makers recognise the consequences of insufficient preventive action and subsequently plan effective measures in different policy areas. If the economic effects on people's quality of life and work are not expressed in equivalent financial terms, there is the danger that they will not be sufficiently heeded, be it in the political sphere or in people's daily lives.

EU-OSHA thus aims to address this need in its two-stage overview project 'Costs and benefits of occupational safety and health', which aims to develop an economic costing model in order to produce reliable estimates of the costs. In phase one, a large-scale study was carried out to identify and assess the data available in each Member State that can be used to develop a model for calculating costs (2017²).

In phase two, the initial results of which are presented here, an approximation model is being created for the economic costing on the basis of internationally available data sources (EU-OSHA in cooperation with the International Labour Organization (ILO), the Finnish Ministry of Social Affairs and Health, the Finnish Institute of Occupational Health (FIOH), the Workplace Safety and Health Institute in Singapore and the International Commission on Occupational Health (ICOH)).

The project also includes a seminar for stakeholders to discuss the implications of the model for occupational safety and health policy and practice in 2019 and further dissemination and evaluation in 2020. A data visualisation tool and infographics will also allow easy access to and evaluation of the data.

Methodology

The method is based on estimates of disability adjusted life years (DALYs), which can be caused by illnesses and injuries. This is compared with the ideal scenario, in which a country or a region would lose no DALYs at all, either through work absences or fatal accidents or illnesses.

¹ <http://ec.europa.eu/social/main.jsp?catId=151&langId=de>

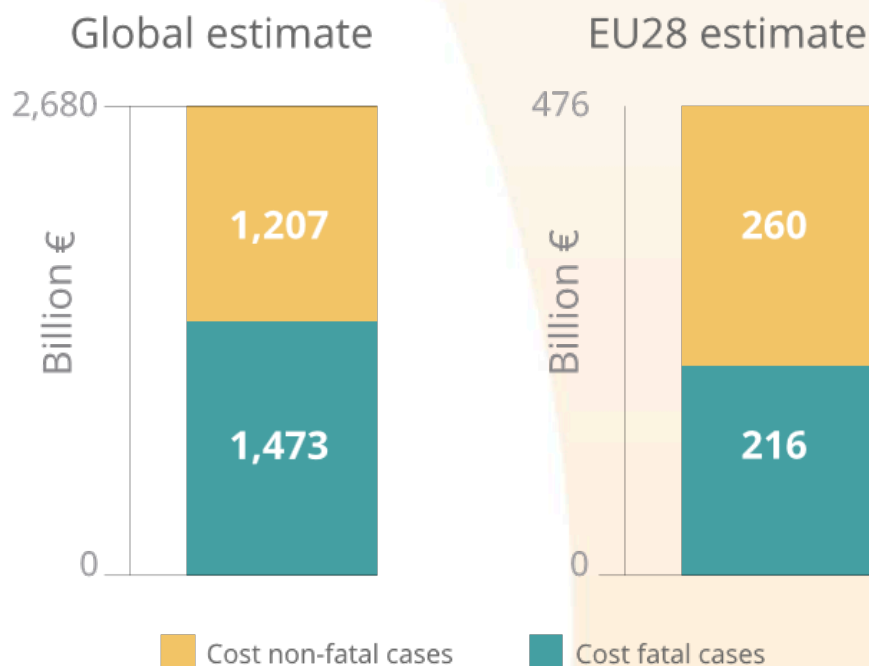
² <https://osha.europa.eu/en/tools-and-publications/publications/estimating-cost-work-related-accidents-and-ill-health-analysis/view>

In principle, the method is based on the number of work-related health problems which can be identified for a particular country, that is to say injuries, sickness and disruptions, both fatal and non-fatal. This was put into action by calculating fatalities, years of life lost (YLL), years lived with a disability (YLD) and the sum of those figures, disability adjusted life years (DALY). The calculations are based on the current figures of the ILO and the Institute of Health Metrics and Evaluation (IHME). The IHME data are updated annually by the Global Burden of Disease project,³ most recently for the year 2015. However, those data cover only particular work-related risks, meaning that they have to be corrected using the ILO data (Takala et al., 2017), otherwise the problem would be underestimated. The proportion (percentage) which the annual DALYs caused by work-related risks represent in terms of the absolute number of annual working years in a country then forms the proportion as a percentage of the loss of gross domestic product (GDP), which can also be expressed in financial terms. The costs are calculated by multiplying a country's DALYs by the GDP per employee of that country. For more information, please see the EU-OSHA website.⁴

Results

The global and European costs of work-related accidents and illnesses are considerable. Fig. 1 shows the global cost at EUR 2 680 billion, which is 3.9 % of global GDP. By comparison, the European cost is EUR 476 billion, which, at 3.3 % of European GDP, is proportionally below the global average. The split of the costs between fatal and non-fatal cases globally and in the EU-28 is almost the same: each category accounts for approximately half of the total costs.

Figure 1: Cost of work-related accidents and illnesses globally and in the EU-28

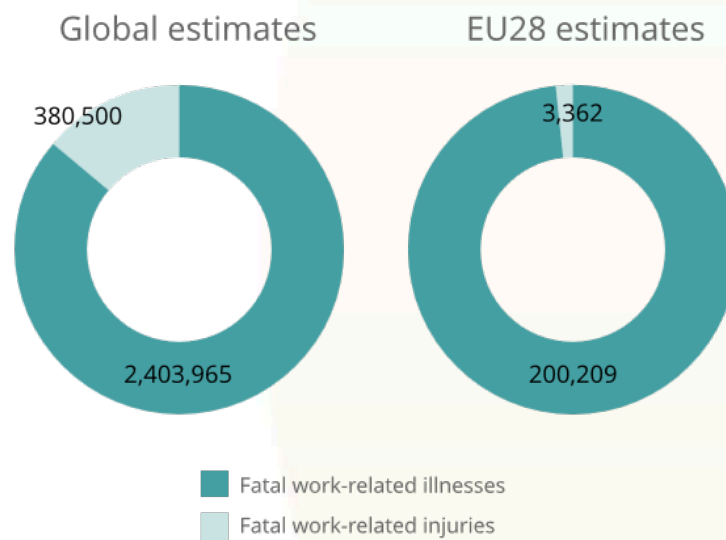


Other differences between the global and European estimates become apparent when only the numbers of fatal cases are considered. It is clear from Fig. 2 that the proportion of the total fatalities represented by fatal work-related accidents is significantly lower in Europe (1.8 %) than globally (15.8 %). It can be assumed, first, that a higher level of occupational safety and health in Europe has contributed to that and, secondly, that the higher life-expectancy in the EU is reflected in the higher proportion of fatal illnesses.

³ <http://vizhub.healthdata.org/gbd-compare/>

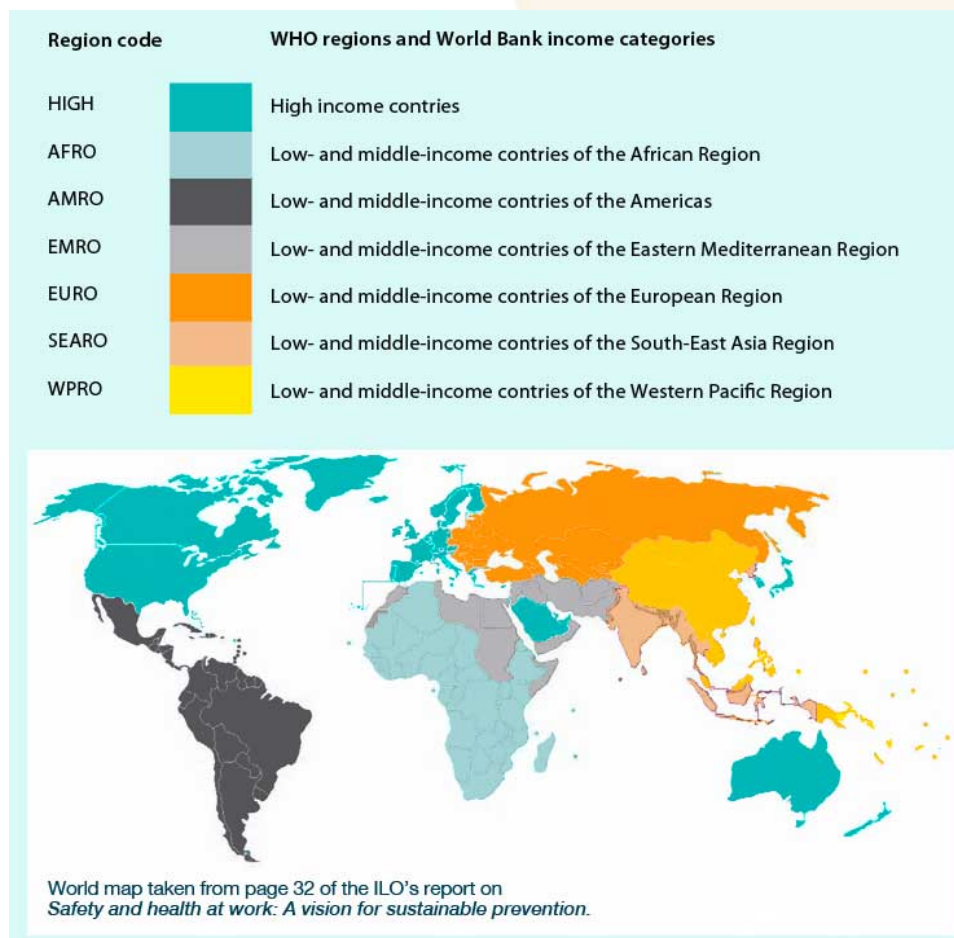
⁴ <https://visualisation.osha.europa.eu/osh-costs#!/about-estimates>

Figure 2: Fatalities globally and in EU-28 resulting from work-related illnesses and injuries



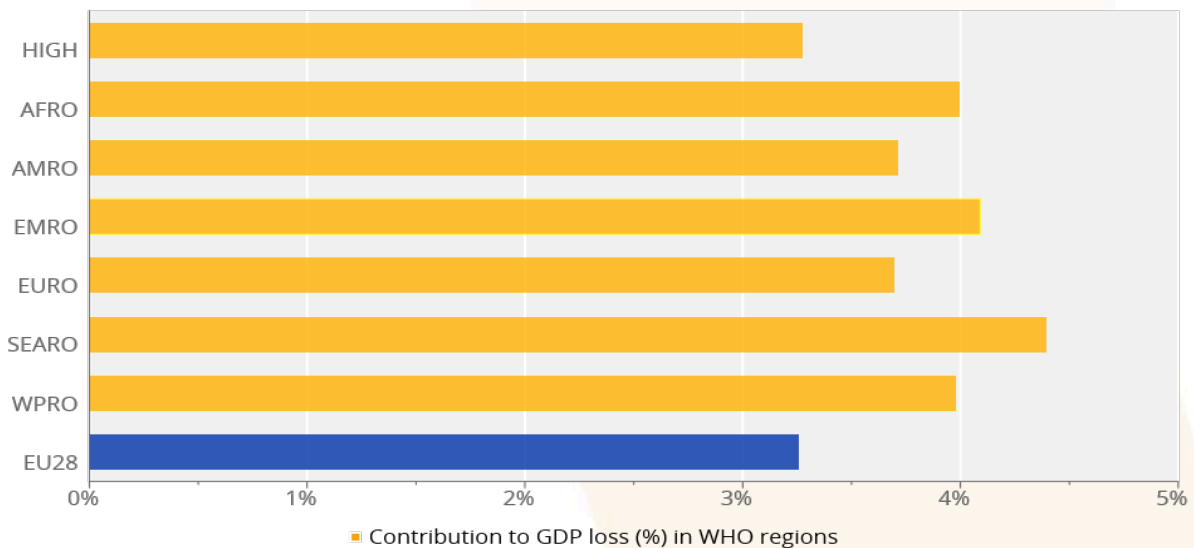
The global data can be broken down according to global region of the World Health Organization (WHO), which allows for more refined analyses. Fig. 3 shows the regions to which different countries belong. Nearly all WHO regions relate to geographic regions, apart from the HIGH group, which refers to high-income countries. In the further analysis, the European Union (EU-28) was introduced as an additional group composed of countries in the HIGH and EURO WHO regions.

Figure 3: World regions according to WHO classification



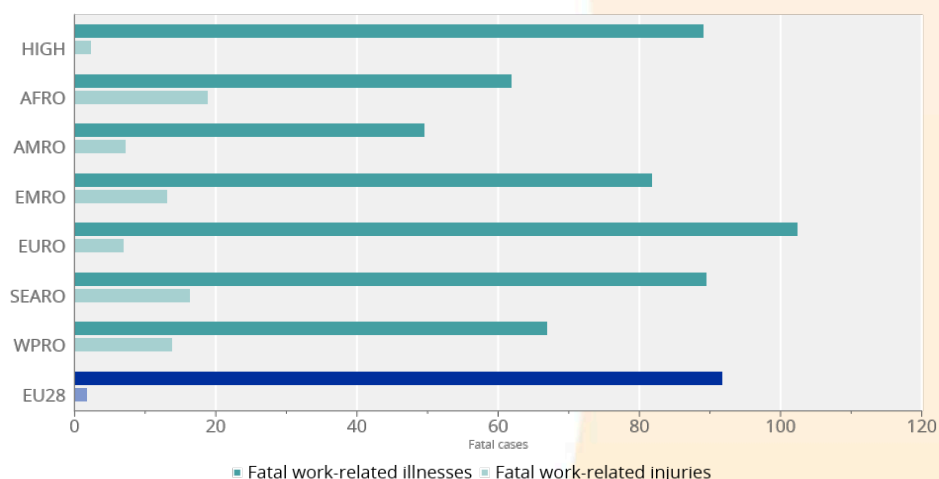
The costs for work-related accidents and illnesses as a percentage of the GDP of the WHO regions are set out in Fig.2. Compared with the other global regions, the EU has the lowest costs in percentage terms. As a general trend, the costs in the wealthier regions are proportionally lower than in less developed countries. As other studies have also demonstrated (World Economic Forum, 2013⁵), there is a positive correlation between the healthy working conditions and the prosperity and competitiveness of a region. On the societal level, investment in preventive action and occupational safety and health have positive effects on a region's prosperity.

Figure 4: The cost of work-related accidents and illnesses in the WHO regions.



The lower number of fatal workplace accidents in industrialised countries as a proportions of total fatalities can also be seen in the analysis of the WHO regions in Fig. 5. The HIGH and EU-28 regions have the lowest accidents rates. Aside from the general economic and technological developments in the affected countries, the economic structure of the regions is certainly a key factor. Less developed countries tend to be more reliant on agriculture and construction, that is to say sectors with significantly higher accident rates than the service sector, which is increasingly dominant in industrialised countries. It is striking that the number of fatal work-related illnesses in the HIGH and EU-28 regions is higher than in most other global regions. The better working conditions in industrialised countries therefore predominantly have an impact on the accident rate rather than on incidences of illness.

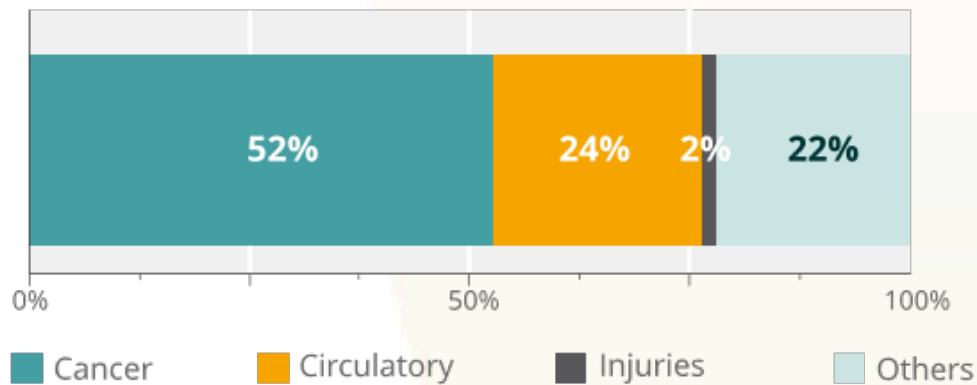
Figure 5: Work-related fatal accidents and illnesses in the WHO regions in fatalities per 100,000 employees



⁵ http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf

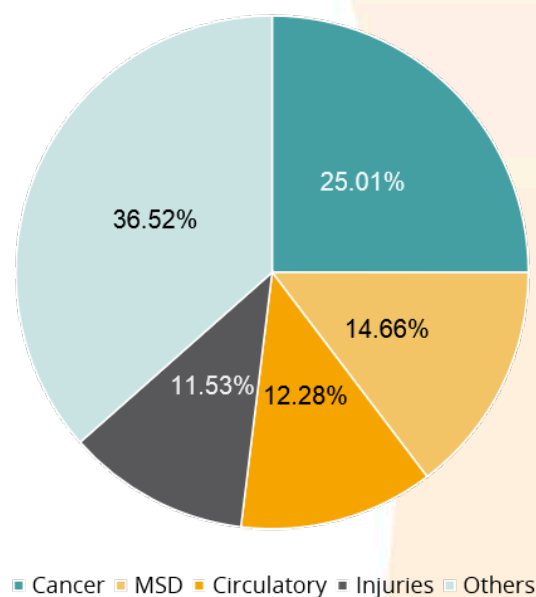
Since the EU-OSHA is an EU organisation, this project included additional detailed analyses for the countries of the EU28. The main factors responsible for almost 80 % of fatalities in work-related accidents and illnesses were first identified, namely cancers, circulatory diseases and fatal work-related accidents (see Fig. 6).

Figure 6: Causes of work-related fatalities (%) in the EU-28



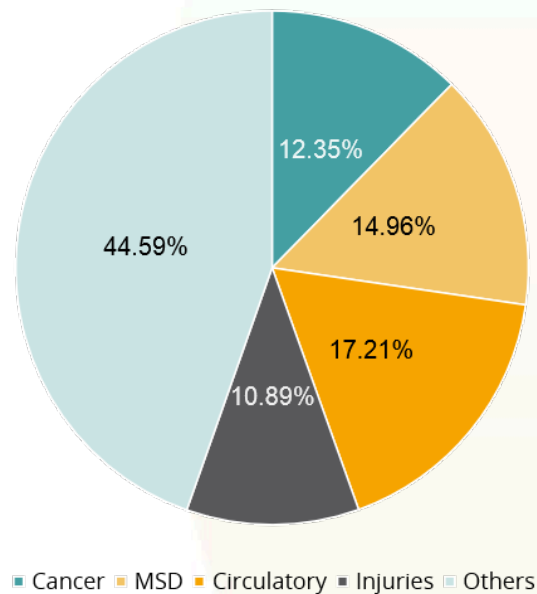
The DALYs for those main causes identified for work-related mortality and morbidity were then calculated for all EU countries in order to present the proportion (%) of those causes for each country. Fig. 7 shows which work-related adverse health effects cause the most loss of life years (DALYs) in the whole EU-28. In order, cancers are the leading cause, followed by muscular and skeletal illnesses, circulatory diseases, and injuries. The category 'Others' groups together the remaining illnesses, such as mental illnesses or communicable diseases.

Figure 7: EU-28 proportion (%) of the main causes for work-related mortality and morbidity in DALYs per 100,000 employees



In comparison to the EU-28 fig. 8 shows the same percentages of DALYs per main causes of work-related mortality and morbidity worldwide. In contrast to EU-28 circulatory diseases are the main burden, followed by MSDs, cancer and injuries.

Figure 8: World – proportion (%) of the main causes for work-related mortality and morbidity in DALYs per 100,000 employees



EU-OSHA conducted those analyses of the main causes for each EU-28 country, as well as for Norway and Iceland. This is shown in Fig. 9, 10 and 11, using Germany, Spain and Hungary as an example. All other countries can be seen on the EU-OSHA website. The distribution of the main causes of work-related adverse health effects can provide societal decision-makers with valuable insights into where future preventive strategies should be implemented in their countries.

Figure 9: Germany – proportion (%) of the main causes for work-related mortality and morbidity in DALYs per 100 000 employees.

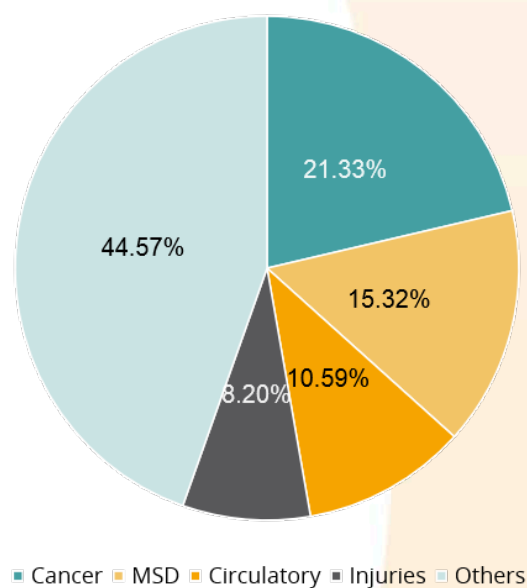


Figure 10: Spain – proportion (%) of the main causes for work-related mortality and morbidity in DALYs per 100 000 employees.

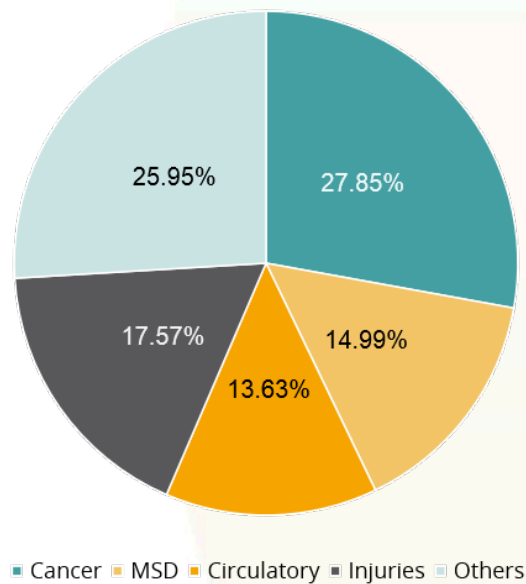
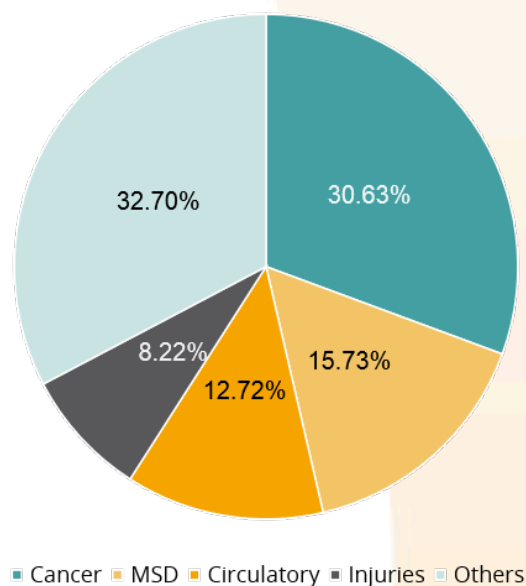


Figure 11: Hungary – proportion (%) of the main causes for work-related mortality and morbidity in DALYs per 100 000 employees.



Discussion

For over 20 years, the ILO has regularly published global estimates of work-related accidents and illnesses. This methodology has now been refined in cooperation with EU-OSHA and detailed data on the costs arising have been calculated for the first time. The challenges for international cost estimates in this area relate to the availability and comparability of data from different countries and regions.

The methodology developed is based on the internationally available data from the ILO, WHO and Eurostat and provides an approximation model of the costs to society. Despite all the limitations on the quality of the data, such as possible under-reporting or insufficient comparability of the statistics, this model delivers robust and reliable estimates. The execution of each individual stage of the model is described in detail on the EU-OSHA website, so the calculation is completely transparent and traceable.

Using the cost model developed, it is possible to identify the main causes of work-related accidents and illnesses and to calculate the DALYs and associated costs for each individual country.

In that regard, it can be assumed that this model provides a rather conservative cost estimate, since many factors cannot be taken into account owing to insufficient data. While the international health databases used provide the best global data currently available, it must be assumed that, for many countries, these data represent an underestimation of the true problems. The probable under-reporting at EU level alone has already been noted several times (e.g. Kurppa, 2015) and a similar problem can be assumed on an international scale.

Some risks, such as some forms of cancer, mental illnesses or communicable diseases, have yet to be incorporated into the WHO estimates. Moreover, the cost estimate is based only on reduced productivity through lost work years in each country. Many other cost factors, such as healthcare costs, early retirement costs or presenteeism (working even when sick) are also absent from this model. Moreover, various types of work are not included in the calculation at all, such as child labour, illegal employment and many types of casual labour, which make up a large part of the labour market in many countries.

The initial content analyses confirm the correlation between a country's improved preventive measures and an associated reduction in mortality and morbidity. This is expressed in the correspondingly lower costs for work-related illnesses and accidents compared with a country's GDP. On a societal level, investment in preventive measures is therefore cost-effective for countries and contributes to an increase in prosperity.

EU-OSHA is analysing in more detail the precise cost factors in some countries in a follow-up project that has already begun. That involves specifically selecting countries with a good standard of national data and conducting the cost estimate using national sources. This bottom-up analysis can then be compared with the approximation model using international data (top-down) outlined above. That will allow the reliability and validity of the model set out here to be evaluated and optimised in future stages. The initial comparisons of this model with national cost studies, for example on work-related incidences of cancer (Zand et al., 2016), show a high degree of concordance between the international and national cost estimates.

More information can be found here: <https://visualisation.osha.europa.eu/osh-costs#!/>

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