

Estimating the cost of accidents and ill health at work

Executive summary

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Executive summary

The costs of work-related injuries and illness can be substantial. In the EU-27 in 2007, 5,580 accidents at the workplace resulted in death and 2.9 % of the workforce had an accident at work that resulted in more than three days of absence. Additionally, approximately 23 million people had a health problem caused or made worse by work across a 12-month period⁽¹⁾.

Establishing an accurate overall estimate of the cost to all stakeholders at a national or international level with regard to work-related injuries and illness due to poor or non-occupational safety and health (OSH) is a complex task. However, it is vital that policymakers understand the scope and scale of poor or non-OSH in order to implement effective measures in this policy area.

TNO and Matrix were commissioned by the European Agency for Safety and Health at Work (EU-OSHA) to review studies evaluating the costs of OSH, critically compare methodologies and make recommendations for future research regarding the estimation of the cost of poor or non-OSH at a macro level. The focus was on scientifically published papers that provide a monetary value attached to the loss in productivity and increase in health problems resulting from poor or non-OSH.

The literature review identified studies in scientific databases (PubMed, Scopus, OSH-ROM and PsycINFO) that reported on the estimation of these costs. Altogether, 475 studies were identified and screened, 29 of which were shortlisted (including six additional studies, available in English or Dutch, identified by the International Labour Organization, EU-OSHA and national-level occupational health and safety institutions).

The final selection of studies from the shortlist then followed the subsequent criteria:

- covers a broad range of industries or a key industry for OSH (e.g. construction);
- not focused on a specific type of injury or illness;
- related to one of the European Union (EU) Member States.

Fourteen studies were selected that met at least two of the above criteria, and, in collaboration with EU-OSHA, nine of these were chosen for full review.

Each of the nine studies was assessed and compared with respect to the two key steps required to provide a quantitative estimate of the cost of occupational injuries and illnesses: (1) the identification of the number of cases and (2) the application of monetary values to the identified cases.

Regarding the **number of cases**, findings from the comparative analysis suggest that most studies drew on existing literature, surveys and statistics — typically labour force surveys, compensation statistics and national registries — as the focus of the papers was to establish cost estimates. In some studies, survey data were directly used to establish the number of cases; others applied the ‘population attributable risk’ method by which the probabilities of work-related exposure to a particular risk factor and the relative risk of developing a condition are estimated and applied to the overall number of cases to estimate the number of work-related cases.

At a broader level, studies applied either the incidence or the prevalence method; the former estimates the number of new cases in a given year (and then calculates all future costs for those cases) and the latter estimates the total number of cases in a given year. Either is methodologically valid; the choice depends mostly on data availability. The incidence method, however, gives a better approximation of current conditions, which may be useful for estimating changes over time.

In general, there is a significant potential for underestimation and underreporting of the number of cases, especially for long-latency disease (for which the cause may be difficult to establish) or for small-scale incidents or cases that do not result in a long absence from work (or may not be reported at all). Several papers used expert opinion to mitigate this, which is to be encouraged in future cost calculations. Further research on narrowing the extent of underestimation and statistically accounting for it is recommended.

(¹) Eurostat (2010), Health and safety at work in Europe (1999–2007): A statistical portrait. Available at: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-31-09-290/EN/KS-31-09-290-EN.PDF (accessed 21 June 2013).

Regarding the **estimation of costs**, a variety of methods and approaches were used throughout the studies. Costs were thereby categorised into five main types:

- Productivity costs: costs related to loss of output or production.
- Healthcare costs: medical costs, including both direct (e.g. pharmaceuticals) and indirect (e.g. caregiver time).
- Quality-of-life losses: monetary valuation of the loss of quality of life, such as physical pain and suffering.
- Administration costs: costs of administration, for example applying for social security payments or reporting on a workplace accident.
- Insurance costs: costs regarding insurance, such as compensation payments and insurance premiums.

These five main cost types are further assessed by the perspective(s) taken, that is in terms of costs to four stakeholders, namely:

- Workers and family: the affected individual and close family or friends who are affected by the injury or illness.
- Employers: the company or organisation for which the affected individual works.
- Government: the relevant public authority regarding, for example, social security payments.
- Society: all stakeholders — the effect on society is the overall impact of an injury or illness, excluding transfers between stakeholders (which cancel out).

Methodologies by paper for each cost type and cost perspective are presented in the main report. Accordingly, our recommendations include the most predominant and accurate methodologies for each cost type. Overall, the key methodological recommendations are to:

- include all cost categories and all cost perspectives in a thorough and rigorous study, taking care to avoid double counting, for example excluding transfers between stakeholders such as social welfare payments when calculating cost to society;
- discount and account for growth in future costs; and
- account for underreporting as much as possible.

In particular, for **productivity costs**, the human capital approach is most often used for workers and families and is recommended. This method consists of valuing time lost as a result of injury or illness by the wage rate, but it is also suggested that non-market production (i.e. productivity that is not financially compensated, such as household activities) is included. For employers, the friction cost method may be a better approach, as this assumes that workers are replaced after a given 'friction period' and measures productivity loss only during this time, in addition to reorganisation and retraining costs. However, there may be some permanent loss of productivity not captured by this method. For the government, social welfare payments paid to injured or ill workers should be included, as well as the loss in tax revenue, but it is important to note that at a societal level the former is simply a monetary transfer between stakeholders and not a cost to society. Gross wage plus reorganisation and recruitment costs to the employer represent overall societal productivity costs, although the friction cost method may be used if it is believed that an injured or ill worker is completely replaced as a result of structural unemployment.

Healthcare costs can be measured more directly, but there may be significant differences across countries depending on the individual healthcare systems. These differences include the distribution of costs over the different stakeholder perspectives. Therefore, it might be necessary to assess these costs locally or at national level.

Quality-of-life costs can be valued using the willingness-to-pay approach (i.e. asking respondents how much they would pay to avoid a certain health outcome). If included in an estimate, it should be specifically noted that this approach is a monetary approximation of a qualitative concept, that is the quality-of-life loss. This is different from assessing productivity or healthcare costs.

Administrative and insurance costs are deemed to be less substantial cost items but should be included in a thorough estimation and valued by the opportunity cost method (time taken multiplied by the wage rate of the administrator) and through figures from the insurance industry.

In general, given the high degree of uncertainty around all of these cost estimates, sensitivity analysis of key variables, as well as caution against placing too much emphasis on single, 'headline' figures, is strongly recommended. Further, a deeper look into the methodological theory is also advised, including work on the human capital approach, the friction cost method and the population attributable risk method, given that the focus of this study is primarily on the application of these methodologies.

An issue that was beyond the scope of this report but which is important in informing and evaluating policy decisions is that of the costs of complying with OSH regulation and providing a healthy and safe workplace. It is also worth noting that this burden of compliance falls predominantly on employers, who, on the other hand, may bear little of the cost of an occupational injury or illness (i.e. not complying), compared with the individual or even the government — healthcare costs are rarely borne by employers and productivity losses to the employer may extend only until a replacement worker is found. This disparity should be kept in mind by policymakers and reinforces the importance of examining costs per stakeholder. Our results encourage further research and the synthesis of existing evidence in this area.

For an EU-level estimate the issue of international transferability is paramount. To a large extent, this is because of the different social security and healthcare systems that operate in different countries. Not only do healthcare costs vary, as well as the stakeholders paying for them, but social security and healthcare systems can also incentivise individuals to behave in certain ways, such as continuing to work at low productivity or declaring disability. Differences in wages have a large impact on the productivity costs for the different countries, so some type of weighing using the gross domestic product (GDP) per capita is recommended.

Finally, and bearing these issues in mind, a close examination of existing country-specific literature and a review of national OSH systems is suggested in order to inform future research. The best approach for an EU-wide calculation of costs of poor or non-OSH would probably be an aggregation of national studies, highlighting the relevant structural differences. The most important factor for international comparability, however, is a standardisation of cost calculation methodologies at the country level. The models by the United Kingdom Health and Safety Executive (HSE) and Safe Work Australia could be taken as good-practice examples, and, based on this analysis, further theoretical research and national feasibility studies could be carried out. **The three basic cost categories that should be included in any cost of poor or non-OSH analysis are healthcare costs (direct), productivity costs (indirect) and quality-of-life losses (intangible).** Administrative and insurance costs should be added where possible.

As an idea of the scope of the problem of poor or non-OSH, the two papers that were judged to be the most methodologically sound, those by HSE and Safe Work Australia, reported, respectively, costs to the United Kingdom economy of GBP 13.4 billion in 2010/11 (calculated to be approximately 1 % of GDP⁽²⁾), excluding occupational cancers, and costs to the Australian economy of AUD 60.6 billion in 2008/09 (4.8 % of GDP). In the Netherlands, the costs of poor or non-OSH were estimated by another study (Koningsveld) at EUR 12.7 billion in 2001, or 3 % of GDP. The variation in these estimates leads us to caution against placing too much emphasis on headline figures taken alone, but gives a good impression of the size of the cost of poor or non-OSH.

⁽²⁾ HSE calculated the cost to society of workplace fatalities and injuries and work-related ill health in 2010/11, at 2010 prices, as GBP 13,424 million. The nominal GDP was taken from the UK Treasury's 'GDP deflators at market prices, and money GDP: September 2013', available at <https://www.gov.uk/government/publications/gdp-deflators-at-market-prices-and-money-gdp-march-2013> (accessed 14 October 2013). The cost to the economy is calculated at 0.89 % using the 2010/11 financial year GDP or at 0.90 % using the 2010 calendar year GDP (GBP 1,502,176 million and GBP 1,485,615 million, respectively). This compares with the 1.2 %, based on costs to society of GBP 16.5 billion, for 2006/07 and the 0.97 %, based on costs to society of GBP 14 billion for 2009/10 previously reported by HSE ('The costs to Britain of workplace injuries and work-related ill health in 2006/07' and its 2009/10 update), available at: <http://www.hse.gov.uk/economics/costing.htm> (accessed 14 October 2013).

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