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"STRESS IN THE WORKPLACE: WHAT ECONOMIC EVALUATION?"

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Stress in the workplace: what economic evaluation?

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Abstract

The aim of the work is that of combining and synthesizing the existing economic evaluation of the cost of work related stress (WRS), a broad and multifaceted phenomenon whose economic weight is largely underestimated. Starting from a review of the available evidence, cost of illness studies are organized by objectives, methodological approach and cost components (both direct, indirect and intangible). The analysis suggests that a huge amount of resources is absorbed by WRS from society and underlines some issues that are still open at international level: marked differences in definition of WRS, source of data, in its measure and methodology, in the consideration of all the cost components make comparison across sectors and countries very difficult to interpret. Furthermore, the inclusion of indirect and intangible components (often neglected) is essential to derive and obtain a holistic economic model of the total cost of WRS and to have a more representative estimate of the financial burden imposed by this problem, whose scale and magnitude strongly call for preventive measures.

Key words: work-related stress; economic evaluation; cost-of-illness study; intangible costs.

JEL Classification: H51; I11, I14

1. Introductory framework

WRS has become an important employment risk factor for industrialized countries (while little is known about newly industrialized and developing countries). Stress affects 22% of European workers, and in Italy 1 worker out of 4 claims to suffer from WRS.

Little attention is paid, however, to the economic weight of this social phenomenon: the costs associated with these psychosocial risks of work-related stress are relevant for both organizations and countries, in fact. Estimates of these costs provide valuable information to illustrate the scale and magnitude of the problem and call for preventive measures. A detailed assessment of these costs has rarely been considered; if it has been made, the methodology used has been poorly specified or unclear. It is therefore necessary to understand in depth how and in what context these costs arise.

After illustrating the causes and consequences of WRS (Work-Related Stress), costs are analyzed at an aggregate level, to move on to the review of some studies, distinguishing according to approach, cost components and method. In the final part, concluding considerations are presented, with particular attention to the issues that are still open.

2. Work-related stress: causes and consequences

Psychosocial risks refer to those aspects of design, organization and management of the work activity, within specific social and environmental contexts, with the potential to cause psychological, social or physical damage (Cox, Griffiths & Rial-Gonzalez, 2000). The work factors associated with such risks include: excessive workload and work rhythms, job insecurity, lack of flexibility in working hours (sometimes incompatible with a normal social life), poor interpersonal relationships, poor prospects for professional development, situations of conflict between family and work needs. Some risks are specific to some organizations and can only be identified by periodic evaluations. New risks may arise with the evolution and transformation of the workplace.

Exposure to these risks can be a source of stress, with a consequent deterioration in performance and serious health problems appear in the event of prolonged exposure. According to the European Agency for

Safety and Health at Work (EU-OSHA), WRS emerges when workplace demands exceed workers' ability to cope with (or control) them (EU-OSHA, 2009, p.14). Strongly linked to the concept of occupational stress is the concept of job strain, which is also characterized by extremely high demands in an environment where workers have little ability to control or intervene.

Even brief exposure to such risks causes (Beswick et al., 2006; Chandola, 2010): sleep disturbances, mood changes, fatigue, headaches and gastric irritability. Prolonged exposure causes mental and physical disturbances (Bosma et al., 1998; Guglielmi and Tatrow, 1998; Belkic et al., 2000; Stansfeld et al., 2000; Beswick et al., 2006; Sobeih et al., 2006), 2006; Stansfeld and Candy, 2006; Cohen, 2012): anxiety, depression, attempted suicide, sleep disorders, low back pain, chronic fatigue, digestive problems, autoimmune diseases, impaired immune function, cardiovascular disease (until death), hypertension and peptic ulcers. There are also other human costs of stress, such as emotional tension, deteriorating quality of life, deterioration in the quality of relationships with spouses, children and other family members.

Therefore, the psychosocial risks and health effects associated with these involve a significant financial burden on individuals, organizations and societies (European Commission, 2002; EU-OSHA, 2009).

This situation is being acknowledged by many stakeholders, from the European Agency for Safety and Health at Work to governments, economic policy makers and researchers, to indicate the complexity and topicality of a public health issue.

3. A preliminary look at costs at the social level, in Europe (deductive or inductive studies)

The European Commission (2002) calculated that in 2002 the annual cost of WRS in the EU-15 amounted to EUR 20 billion (EU-OSHA,1999). The total cost of work-related diseases for the 15 EU Member States was between 185 and 289 billion EUR per year.

Some estimates suggest (Davies and Teasdale 1994; Levi and Lunde-Jensen, 1996) that 10 % of work-related diseases would be attributable to stress. This percentage has been used to make a conservative

estimate of the total cost of work-related diseases (200 billion EUR) and to obtain the figure of 20 billion EUR related to the cost of work-related stress for this group of countries. Matrix (2013) identifies the cost of work-related depression calculated for Europe: EUR 617 billion per year. The total figure was made up of the costs for employers due to absenteeism and presentism (EUR 272 billion), loss of productivity (EUR 242 billion), health care costs totalling EUR 63 billion and costs in terms of social security benefits in the form of incapacity for work subsidies (EUR 39 billion).

3.1 Costs at organizational level

WRS and psychosocial problems result in increased absenteeism and staff turnover rates, reduced productivity and performance. There are very few estimates of these costs. The Sainsbury Centre for Mental Health (2007) for UK employers estimates the total cost of stress, anxiety and depression at EUR 1220 per employee per year. Of this, EUR 400 (32.4 %) is due to absenteeism, EUR 710 (58.4 %) to 'presentism' and EUR 111 (9.2 %) to staff turnover. Hoel et al. (2001) calculate an average cost per employee (due to absence for work-related illnesses) of GBP 175. Leymann (1990) calculated that in the U.S.A., the costs attributable to bullying (harassment) for organizations range between 30,000 and 100,000 USD per victim.

3.2 Costs at sector level: some interesting data

Costs can be reconstructed also considering the different economic sectors and some of them are below described.

Construction: In Germany (Bundesministerium für Arbeit und Soziales, 2012) psychosocial disorders are responsible each year for the loss of 1.5 million working days in the construction industry (5.2 % of all lost working days), which corresponds to a total loss of EUR 160 million for the industry's economy. The study, however, does not specify the extent to which these psychosocial disorders are related to the work environment.

Education: A survey conducted by the Schools Advisory Service (2004) among UK teachers revealed that 213 300 working days are lost each

year due to stress, anxiety and depression, at a total cost of GBP 19 million.

Healthcare: The British National Health Service (NHS) reported that the direct annual cost of absence from work due to illness is GBP 1.7 billion (Boormans, 2009). As NHS data indicate that 25 % of absences are due to 'stress, depression and anxiety', the cost of absenteeism due to stress is around GBP 425 million per year.

Table 1. Number of claims per sector for work-related health problems associated with work-related stress in Australia over the period 2003-2005 (average outlay per case $AUS 13100)

Sector	No. of requests
Education	3065
Construction	285
Healthcare	3480
P. A. and Defense	1450

Source: Australian Safety and Compensation Council (2007)

With regard to costs at industry level, some interesting figures are provided by the Australian Safety and Compensation Council (2007) which presents interesting figures on work-related stress claims and associated expenses in various sectors, as shown in Table 1.

3.3 Cost of diseases related to psychosocial risks: depression

There is a link between psychosocial risks and WRS and the development of negative health consequences, such as mental problems (depression), musculoskeletal disorders and diabetes.

Work-related stress is considered an important determinant of depressive disorders (Levi, 2005). Netterstrøm et al. (2008) showed that high demands on work performance doubled the likelihood of developing depression. Sobocki et al. (2006) collected national and European data from 28 European countries to calculate the total cost of depression in Europe. Using one-year prevalence data, they calculated that in 2004 the cost of depression in Europe amounted to EUR 118 billion, or 1% of European GDP.

According to the European Network for Work Health Promotion, mental disorders in general cost Europe EUR 240 billion per year: health care expenditure (EUR 97 billion), direct non-medical expenditure (EUR 9 billion) and indirect costs (EUR 133 billion)).

3.4 Cost of diseases related to psychosocial risks: cardiovascular diseases

The link between psychosocial factors, in particular work-related stress, and cardiovascular diseases is widely known (Schnall et al., 2000).

A literature review, edited by Everson-Rose and Lewis (2005), indicates that certain chronic and acute psychosocial factors (i.e. work-related stress, high performance demands, low recognition) and the lack of social support are related to cardiovascular disease.

The 2012 report of the European Heart Network (Nichols et al., 2012) analysed the overall cost of cardiovascular disease to the EU economy in general and to each Member State individually. The network calculated that the cost of cardiovascular disease to the EU economy in 2009 amounted to €196 billion per year. This cost could be broken down into direct health care costs (54 %), productivity losses (24 %) and informal care costs for people with cardiovascular disease (22 %).

3.5 Cost of illnesses related to psychosocial risks: musculoskeletal disorders, diabetes

Studies have shown that psychosocial factors at work can play a significant role in the development of musculoskeletal problems. The wide variety of musculoskeletal disorders makes an accurate

calculation of their costs difficult; while some authors try to quantify the total cost of these disorders, others focus on specific disorders such as back pain or arthritis (Parsons et al., 2011). At EU level, it is estimated that up to 2 % of GDP is spent to cover the direct costs of musculoskeletal disorders; among the European workforce, back pain costs more than EUR 12 billion per year (Bevan et al., 2009) while rheumatoid arthritis costs EUR 45 billion per year (Lundkvist et al., 2008).

Some studies have shown a correlation between the presence of psychosocial dangers and the onset of diabetes mellitus.

Estimates of diabetes costs (charges associated with Type I and Type II diabetes) include direct medical expenses (e.g., medication, inpatient and outpatient treatment) and indirect expenses including productivity losses as well as expenses associated with diabetes-related medical conditions.

A survey of health economists analyzed the costs associated with diabetes and its complications in five EU Member States: France, Germany, Italy, Spain and the United Kingdom (Kanavos et al., 2012). The total cost of diabetes in these five countries, calculated on the basis of 2010 data, amounted to EUR 90 billion.

4. Some concerns about cost measurement criteria

The first studies examined provide information at an aggregate level on costs, but difficult to use for comparative analysis. This is because the methodologies are different, as well as the cost components and sources from which the information comes (official databases, data from other studies, interviews), different is the period to which the cost estimates refer, there is a discrepancy between the date of data collection and the year of publication of the study, inflation is not taken into account, currencies are different, the per capita size is missing to make a comparison.

The systematic review of existing studies according to some precise criteria (Hassard et al. 2018), overcomes some of the mentioned difficulties.

4.1 COI studies (cost of illness)

Studies on the social cost of diseases provide a key to understanding the social impact of a disease, different and complementary to that of the more usual epidemiological indicators of morbidity and mortality, allowing to highlight the real economic impact.

The analysis of costs related to a disease is called the Cost of Illness Study (COI). COI studies have a purely descriptive purpose; they estimate the total economic impact of a disease within society, in other words, the resources absorbed by a specific disease are identified and measured. Methodologically they can be grouped into three main groups: top-down, bottom-up and deductive.

COI studies: top-down approach

In top-down approaches, resources absorbed by a specific health problem or disease are aggregated. It is necessary to identify the use that is made of health services or the expenses incurred for the specific disease. Example: Sultan-Taïeb et al. (2013) estimate the number of cases associated with mental disorders and cardiovascular disease that can be attributed to work-related stress. The burden of these cases on the total cost for medical expenses, absence due to illness and lost years of life (due to premature death), is first calculated and then aggregated to obtain the total cost caused by work-related stress.

The goodness of this approach depends on the quality of the secondary data (data already available, not specially constructed, but useful for research). It is difficult to distinguish differences from group to group in the consumption and use of health resources, but this type of approach is easier to conduct.

COI studies: bottom-up approach

The bottom-up approach considers the estimated cost for each case of work-related stress and then extrapolates it to the national level. For example, it evaluates the medical expense and/or loss of productivity per person or per case, and then multiplies it by the number of people or cases involved (Giga et al., 2008). The strength lies in being able to identify all the relevant cost components for each specific case or person. The disadvantage lies in the lack of reliable sources for the data

for which an accurate calculation can be very time-consuming or even impractical.

COI studies: deductive approach

The deductive approach, based on literature research, examines the proportion of costs associated with WRS to make a total estimate of disease costs or loss of productivity. For example, if stress costs constitute 10% of the total cost of work-induced ill health (estimated at a hypothetical 100 billion euros), the estimated cost of stress will be 10 billion euros. The strength of this approach lies in its simplicity. The biggest problem is that the cost components and the average cost of WRS are assumed to be identical to the average cost of work-induced ill health (EU-OSHA 1999).

The epidemiological approach: incidence and prevalence

The interpretation of a COI study is directly influenced by the epidemiological perspective used in the study, which may be based on incidence or prevalence.

In the case of incidence, the likely avoided costs are measured if new cases are prevented. These studies add up the estimated costs over the entire life cycle attributable to cases that occur over a specific period. The future costs are discounted to obtain the present value. The results obtained can demonstrate how costs vary with the duration of the disease and provide information for planned interventions at specific stages; they produce information relevant to the calculation of baseline costs in cost-effectiveness studies for targeted interventions.

Prevalence-based studies measure the current impact of existing cases, in terms of costs attributable to an illness, over a specific period of time. This approach is considered the most appropriate for assessing the total economic burden related to a health problem, as it generally refers to a cross section analysis of cases, which allows costs to be captured at various stages of the disease. However, this cross section of individuals may include cases that are not part of intervention actions. Therefore, estimates of this approach are considered less reliable for the measurement of potential savings from preventive interventions.

4.2 Cost components in COI studies: direct and indirect costs

The economic burden of a disease or health problem is estimated by taking into account costs associated with resource consumption, productivity losses and other intangible elements within a specific group.

The costs can be direct, indirect, intangible. Direct costs refer to those that have an economic quantification and can include: medical costs (hospital costs, costs of visits, cost of medicines) and non-medical costs (insurance, legal costs, travel costs). Direct medical costs are the easiest to estimate, and therefore most represented in many studies. Evidence for non-medical costs is less well documented and less readily available, so there remains a difficulty in estimating these costs.

Indirect costs attribute an economic value to those costs that do not involve a clear transfer of money and generally refer to productivity losses: sick leave, turnover, presentism (a decline in employee performance due to health problems when employees decide to go to work but are unable to provide the same level of performance under normal working conditions: in this case the costs are much higher than absenteeism).

In COI firms, it is also important to take account of non-work-related productivity losses (such as housewives' work, or volunteer work or other unpaid productive work).

Indirect costs are more difficult to quantify than direct costs, especially with regard to presentism. For this reason, many COI firms include a small number of indirect costs or do not include them at all.

4.3 Estimating indirect productivity losses: possible methods

The most commonly used methods are: the human capital method (or lost wages, HCM), the frictional cost method (FCM), loss of potential output (LPO), lost life years costs (CLYL). All use wages as a proxy for productivity, multiplied by the period in which the loss of productivity occurs. The difference between methods lies in the period for which an

individual is considered unproductive, but there is still some debate about the superiority of one method over the other.

These methods reflect the financial value attributable to pain and suffering and the reduced quality of life for the individual and the group of individuals. Quantification is done through the concept of willingness to pay: the financial value that people would pay to avoid the deterioration in quality of life induced by illness. Since they are difficult to quantify, they are rarely included in COI studies, although their empirical relevance in making reliable and valid estimates is widely recognized in the field of health economics and public health.

Table 2. Methods for estimating loss of productivity

Method	**Duration of Time Where Production Loss Occurs**	**Basic Formula for Productivity Loss**
Human Capital **HCM**	Loss of productivity of a worker is the period of time between when the worker exits the workforce due to illness or premature death, and the time they naturally would have exited the workforce (i.e., retirement).	(Mean retirement age – Age when worker left workforce) X Annual salary
Friction Cost **FCM**	Productivity is only affected in the period it takes someone from the unemployed pool to replace the performance of the worker. The longer it takes to replace a worker, or the longer a worker is absent from work, the higher the cost incurred.	(Time it takes to recruit and train a replacement) X annual salary
Loss-of-Potential-Output (Hansen, 1993) **LOP**	Like the human capital method, the period of production loss used by loss-of-potential-output method encompasses the time from early retirement or death, until the expected retirement age. However, this method involves an implicit weighting so that long-term absence results in a bigger loss of potential output. This means that inability to work among young workers is weighed more heavily than among elderly workers	(Mean retirement age – Age when worker left workforce) X Annual salary X Weighting value
Cost-of-Life-Years-Lost (Meltzer, 1997) **CLYL**	Individuals make productive contributions to society even in retirement. Therefore, the period of an individual's production loss ranges from when they exited to the workforce until their mean life expectancy.	(Mean life expectancy – Age when worker left workforce) X annual salary

Source: Hassard et al. (2018)

The review proposed by Hassard et al. (2018), of studies that produce economic cost estimates from WRS, is the result of a systematic research carried out according to some preferential reporting items for the Systematic Reviews and Meta-Analyses.

The selected COI studies meet these criteria: documented methodology; examine costs associated with the WRS, examine costs incurred at company or national level (such as the NHS), English, French and German language. Most of the studies come from Western Europe, in addition to studies from Australia, Canada and the USA. A standardization of costs has been carried out: the estimated annual costs, presented in Tables 3 and 4, have been brought up to 2014 and then transformed into purchasing power parities, in US dollars, in order to make a comparison between countries (World Bank, 2015). The average cost per worker was obtained by dividing the total cost by the workforce in 2014.

The top down studies (Table 3) come from Australia, Denmark, France, Sweden and the USA. The objective is to quantify the financial cost of WRS. The focus is on some stress-related diseases: mental disorders, cardiovascular and musculoskeletal diseases. The prevalence rate ranges from 9% to 27.3%, using data from national and regional epidemiological surveys between 1991 and 2010. Studies generally calculate the cost of stress on data from surveys conducted in the year of the estimates. The stress factors referred to are: being unemployed, lack of health insurance, change of job, working late, job insecurity, conflict between work and family, poor intervention capacity, extremely pressing demands, poor social support, poor organizational justice.

In top-down firms the cost components are as follows.

For direct costs, health care is in the first place, then antidepressant drugs, use of care services for mental disorders and primary care, outpatient services. There are no estimates for non-healthcare direct costs, nor for intangible costs.

For indirect costs, the cost components are: absence due to illness (frictional cost or human capital method, the number of days of absence is multiplied by GDP or per capita daily wage), premature death (human capital method, potential output method and cost of lost days of life), early retirement, turnover, presentism, disability pension.

A first assessment of top-down studies shows a wide range of cost variation; production-related costs account for the largest share of total estimated costs, at 70-90%. The remaining 10 to 30% are the costs

incurred by the national health system and other medical costs. Of course the calculation technique plays a role, as does the duration of the period in which the loss of production occurred: the shorter period

Table 3: Costs of WRS, *top-down* studies	**Definition**	**Annual Cost**	**In US dollars, 2014**	**Cost per worker**	**Direct Costs** **Healthcare (non-Healthcare not present)**	**Indirect Costs (intangible costs not present)**
LaMontagne et al. (2010); **Australia**	Job strain	AU$730 million (2007)	$580 million	$46.68	Antidepressant drugs; use of health services for mental health	Absence due to illness (FCM); turnover (FCM)
McTernan et al. (2013); **Australia**	Job strain	$294.5 million (2009)	$221.13 million	$17.79		Presenteeism (FCM); Absence due to illness (FCM)
Juel et al. (2008); **Denmark**	Job strain	DKK 14.64 billions (2005)	$245 million-1.46 billions	$130.08-777.26	Hospital visits; primary care visits; premature death, primary care	Pension (FCM/ HCM); Premature death (FCM/HCM); sickness absence (FCM)
Bejean & Sultan-Taieb (2005) **France**	Job strain	€1.17-1.62 billions (2000)	$1.83-3.08 billions	$60.94-102.39	Medical and outpatient assistance	Premature death (HCM/CLYL) Absence due to illness (FCM)
Sultan-Taieb et al. (2013) **France**	Job strain	€1.84-2.97 billions (2003)	$2.7-4.35 billions	$89.85-145.03	Medical assistance (consumption of health products and services Health care and rehabilitation costs	Premature death (HCM,) Absence due to illness (FCM)
Trontin et al. (2010) **Francia**	Job strain	€1.9-3 billions (2007)	$2.54-4 billions	$84.41-$133.28	Medical Assistance	Premature death (HCM); retirement (HCM); Absence due to illness (FCM)
Levi & Lunde-Jensen (1996) **Svezia**	Job strain and workplace stressors	ECU 450 million (1993)	$703 million	$136.71	Health care and rehabilitation costs	Premature death (LPO); Retirement (LPO) Sickness absence (FCM)
Goh et al. (2016) **USA**	Job strain and workplace stressors	US$ 187 billion (2011)	$187 billion	$1211.84	Medical expenditure	
FCM: frictional cost method; HCM: human capital method; LOP: potential output loss method; CLYL: cost of living lost years method						
Source: Hassard et al. (2018)						

Table 4: WRS costs, studi bottom-up and deductive studies*	Definition	Annual Cost	In US dollars, 2014	Cost per worker	Direxte		Indirect costs	Intangible costs
					Healthcare	Non healthcare		
SafeWork Australia (2012);	Mental Stress	$5.3 billions (2009)	$3.98 billions	$320.14	Medical; Rehabilitation	Compensation & welfare; Funeral; Investigation; Legal; Tax loss; Travel; Penalties	Retirement (HCM); Sickness absence (FCM); Turnover (FCM)	
Ramaciotti & Perriard (2003);	Stress in working population	CHF 4.19 billions (1999)	$3.33 billions	$701.14	Doctor visits; Hospital visits; Self-medication		Sickness absence (FCM)	
HSE (2013):	Stress, Depression and anxiety	£3.66 billions (2011)	$5.42 billions	$164.58	NHS treatment and rehabilitation; Prescription	Administration; Fines; Funeral; Home; Income loss; Insurance; Travel	Turnover (FCM); Work reorganization (FCM)	Non-financial human costs
SCMH (2007);	Stress, Depression and anxiety	£1.26 billions (2006)	$2.18 billions	$66.35			Sickness absence (FCM)	
Chandola* (2010); R.U.	Work stress (Depression and anxiety)	£7- 12.6 billions (2002)	$13.12- 23.63 billions	$398.10-716.58			Economic	
European Commission* (2000); EU15	WRS (high demands, low controls)	€20 billions (1999)	n/a				GDP	
Shain et al.* (2008);	Psychosocial hazards (high demands, low controls)	$2.97-11 billions (1998)	$2.59- 9.59 billions	$131.30-486.33	Mental health care	Social services	Productivity loss	
Source: Hassard et al. (2018)								

of the HCM (753 million €) produces a lower cost than the CLYL (€ 954 million).

For the bottom-up studies (Table 4), these are the countries of origin: EU-15, Australia, Switzerland, UK, Canada.

The goal is to quantify the financial cost of WRS, with a wider variety of the WRS definition. The focus is on the degree of self-perceived stress, therefore anxiety, depression. It emerges the use of national surveys and statistics on incidence (frequency of cases related to WRS and number of days of work lost).

The cost of WRS or work-related ill health is multiplied by the number of people with WRS; the range of costs is more varied: for direct costs we have health care; for indirect costs, administrative costs, funeral, legal and travel expenses, turnover, reorganization of work, absence due to illness. The intangible costs (human costs not financial) were based on information from a representative sample on their willingness to pay to avoid the deterioration of quality of life resulting from illness or death (in fact only one study conducted by the UK Health and Safety Executive, 2013).

In the first evaluations, bottom-up studies show a wide range of cost variation; the intangible component amounts to 56% (HSE study, 2013). Indirect costs for loss of production are 86% of total costs for work-related ill health (SafeWork Australia 2012). In line with the top-down studies, a study on Switzerland (2003) quantifies the costs for sick leave at about 60%, followed by medical services at 31% and self-medication at 9%.

Deductive studies are presented in Table 4. The countries of origin are EU-15, UK, Canada. The goal is to quantify the total cost of work-related ill health, so the percentage representing the proportion of these costs is applied to the total cost of work-related ill health. The Chandola UK study (2010) applies the figure of 35%, according to data from the UK Labour Force Survey. Other studies (EC 2002, Shain et al. 2008) consider a range of 10-25% (based on a Swedish study, Levi and Lunde-Jensen, 1996) without providing a clear explanation. The WRS cost components are the same as those used for the cost of work-related illnesses: mental health costs, use of social services, loss of productivity, other cost items. Costs per capita range from $131 to $486 for Canada, from $398 to $716 for U.S.

5. Open questions and concluding considerations

Some aspects are still open and need to be further discussed:

1. The range of variation is extremely wide: from 221.3 million to 187 billion at aggregate level, from 17.79 to 1211 billion at per capita level (US$, 2014): this reflects differences at national, international and methodological level. It is clear that there are some gaps to fill, in terms of countries and institutional contexts (some countries are totally absent).

2. Understanding the economic impact of psycho-social problems related to working conditions means understanding the economic impact caused by poor psycho-social conditions in the workplace, beyond WRS costs.

3. WRS is defined and measured very differently (stress, exhaustion, depression and anxiety).

4. All three cost components should be included: direct, indirect and intangible (the latter almost never considered). Very few firms consider direct cost components not related to health care services (transportation, family expenses, legal costs, relocation costs, and any other type of informal care).

5. In the case of indirect costs, turnover and presentism-related costs are often absent. Some studies have estimated that the latter has a cost 1.5 to 10 times higher than absence from illness (Goetzel et al., 2004; McTernan et al., 2013; SCMH, 2007).

6. Intangible costs are a significant component of economic estimates, representing 56% of the total cost of work-related ill health (HSE, 2013). It is therefore a considerable conceptual omission. This cost category has often been defined in relation to quality of life indicators such as grief, suffering, pain and loss. It should also be extended to quality of life indices such as job satisfaction, work commitment, rewarding work and so on. The inclusion of these intangible components is essential to derive and obtain a holistic economic model of the total

cost of WRS and to have a more representative estimate of the financial burden imposed by this phenomenon.

These pictures of cost can give an approximation of the financial burden imposed on society by the WRS, but at the same time give important input on the configuration of future COI studies.

Therefore, the quantification of costs from WRS (especially those borne by companies) is a great challenge, especially because of their only partial visibility, and their rough estimate, when present. This risks to make the burden of prevention programs heavier (especially in the eyes of employers), when instead a recent report commissioned by EAHC, estimates that for every euro spent on mental health prevention and mental health promotion programs, for a selection of European countries, net economic benefits are generated over a year up to 13.62 EUR (Matrix 2013).

A thorough knowledge of the costs associated with stress and psychosocial work-related risks, with the promotion of activities that encourage employers to make this assessment can have a positive effect on the prevention and management of these risks.

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