

Why sleep matters

The economic costs of insufficient sleep

Sleep is considered to be essential for our health and wellbeing. Insufficient sleep is associated with a higher mortality risk and a loss of productivity at work. These micro-level consequences of insufficient sleep snowball into societal-level effects on public health, productivity and, ultimately, the economic performance of nations. Improving individual sleeping habits has huge implications. Small increases in how much we sleep can make big differences to our national economies.

The aim of RAND Europe's novel study was to quantify the economic and social costs of insufficient sleep among the global workforce. As part of the study, five OECD countries were considered: the United States, the United Kingdom, Canada, Germany and Japan.



High costs to economy, productivity and mortality

In order to measure the economic costs to the countries mentioned, we built an economic model that mimics the behaviour of real agents in the economy who consume, invest or save money, go to work or school, and retire. By examining mortality risks and productivity at work, we were able to quantify these economic costs.

Economy

The model found that the overall cost of insufficient sleep among the working-age population is incredibly high. The economic losses range from 2.92 per cent of a country's GDP per year in the case of Japan, to 1.35 per cent in Canada. The UK loses up to \$50bn per year, which equates to 1.56 per cent of its GDP. These figures could drastically be reduced by making small changes to how long individuals sleep. For example, if the working-age population went from 6 hours of sleep or less per night to between 6 and 7 hours, each nation could save over half of the economic losses caused by sleep, with the United States saving up to \$226.4bn.

Productivity

Economic losses are incurred, in part, by the loss of productivity as a result of insufficient sleep. Productivity loss can be split into two categories: absenteeism and presenteeism. When these are combined and translated into working days lost, we can see the direct effect insufficient sleep can have. Workers who sleep less than six hours per day report on average about a 2.4 percentage point higher productivity loss than



Absenteeism accounts for when an employee is not at work



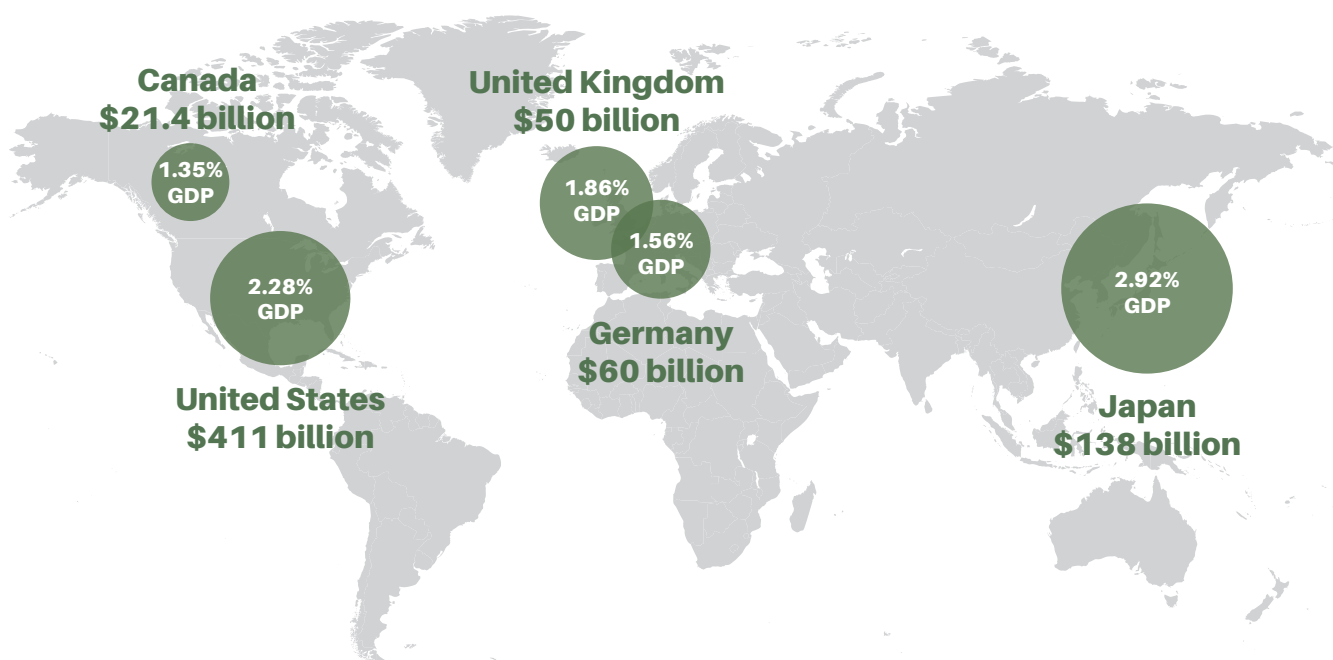
Presenteeism means an employee is present at work but performing at a sub-optimal level

workers sleeping between seven to nine hours per day. Inevitably, the loss in working days contributes to the economic costs previously mentioned.

Mortality

Another contributor to the economic cost of insufficient sleep is an increase in mortality risk. At any given point in time, an individual who sleeps on average between 6 and 7 hours per night has a 7 per cent higher mortality risk than someone sleeping within a 'healthy sleep range' (between 7 and 9 hours). This risk rises to 13 per cent if an individual has less than 6 hours sleep per night. The mortality effect reduces a country's labour populations and degrades skills and competence, thereby impacting the economy.

Economic costs of sleep deprivation



Methodology

The study's methodology followed four stages:

1. Understanding the main drivers of insufficient sleep with an analysis of the determinants of sleep duration at two different levels: the individual, which covered lifestyle, health and personal and socio-demographic factors, and workplace-related factors.
2. Revisiting existing literature on the link between insufficient sleep and mortality risk. A meta-analytical approach was taken to evaluate this evidence.
3. Assessing the economic effects of insufficient sleep by quantifying its effect on productivity levels using a large, linked employer–employee dataset. This included observation data from 62,000 working individuals from VitalityHealth's 'Britain's Healthiest Workplace' study during 2015 and 2016.
4. Using all of the quantitative empirical estimates to predict the economic effects of insufficient sleep for the five different OECD countries.

Potential causes of insufficient sleep

After seeing the effects of insufficient sleep, it was necessary to research the factors associated with it. There are a number of different individual and workplace-related factors that affect sleep. Individual factors refer to anything from lifestyle, e.g. marital status, to health, e.g. body mass index (BMI) or smoking. Workplace-related factors include long commutes, unrealistic time pressures and irregular working hours. Health and workplace-related factors account for the two highest of sleep loss figures.

Mental health and physical activity

Mental health was found to have the biggest impact on sleep. People with a medium to high risk of mental health problems sleep on average 17.2 minutes less per day than those with a low risk of mental health issues. Other health and lifestyle issues also have an influence, although not to the same extent. People with a BMI status of overweight or obese sleep on average between 2.5 minutes and 7 minutes less per day than those with a healthy BMI. Related to this, less than 120 minutes of physical activity per week is associated with sleeping 2.6 minutes less per day, compared with people who exercise for more than the recommended 150 minutes per week. Other health factors, such as smoking and musculoskeletal conditions, also take their toll on the amount people sleep per night.

Workplace and jobs

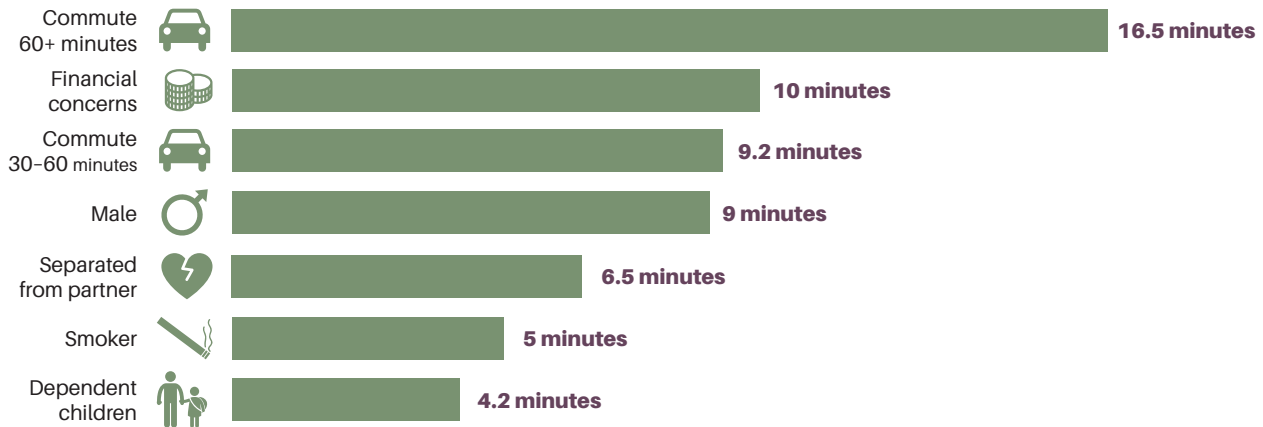
After mental health, the commute to work is the next highest factor associated with sleep deficiencies. Heavy commuters who travel for more than 60 minutes to work (one way) sleep on average 16.5 minutes less per day than those with short commutes (up to 15 minutes one way). The commuting time correlates with

sleep loss: the shorter the commute, the less sleep lost. Other workplace-related factors are also associated with negative sleep patterns. People reporting unrealistic time pressures and workplace stress sleep on average 8 minutes less per day than those with low levels of workplace stress. Additional factors include a lack of choice in daily work routines and irregular working hours, resulting in up to 2.7 minutes of sleep loss per day when compared with flexible routines and regular hours.

Personal and socio-demographic factors

Personal and socio-demographic factors also appear to impact sleep. An individual's gender, marital status and family situations all have an effect on the amount people sleep. For example, people with dependent children under the age of 18 living in the same household, sleep on average about 4.2 minutes less per day than those without dependent children. Unpaid care produces similar effects: people who provide unpaid care to family or friends sleep on average about 5 minutes less per day than those who do not. Financial concerns also have a detrimental effect, and have been found to be associated with losing 10 minutes of sleep per day compared with people without these concerns.

Factors affecting sleep loss (in minutes per night)



Recommendations to improve sleep

In light of the findings, the study provided a number of recommendations to help people get more sleep, and to help employers and public authorities encourage people to sleep more.

Individual changes

Individuals should limit the use of electronic communication and other devices, particularly before they go to bed. In addition to this, it is advised that individuals limit the amount of time they spend in bed not sleeping, as better sleep outcomes might be achieved if people make an effort to leave the bed when they are awake. Outside of bed-related routines, increasing the amount of exercise can help, as physical activity is associated with improved sleep outcomes.

Employer changes

Employers can play a greater role in encouraging individuals to adopt healthier sleep-related habits. Employee-sponsored health and wellbeing

programmes, building brighter workspaces or accommodating nap rooms as part of the office space are all ways to do this. Other ways to help would be to tackle workplace-related stress among employees and discourage the lengthy use of electronic devices after working hours.

Public sector changes

The public sector can also implement changes to help tackle insufficient sleep. More support could be given to health professionals in providing sleep-related help, as this advice can be passed on to patients. Authorities could also encourage employers to pay attention to sleep issues among employees, particularly those working irregular hours or shifts.

Concluding remarks

Sleep matters to all aspects of society, from individual health to workplace wellbeing. Improving sleep habits and duration not only makes people healthier and more productive, it also helps to increase the success of the global economy, and in doing so, improves the world's bottom line.

This summary describes work done by RAND Europe documented in *Why sleep matters — the economic costs of insufficient sleep* by Marco Hafner, Martin Stepanek, Jirka Taylor, Wendy M. Troxel, Christian Van Stolk, RR-1791-VH, 2016 (available at www.rand.org/t/rr1791). To view this summary online, visit www.rand.org/t/rb9962. RAND Europe is an independent not-for-profit research institute that helps to improve policy and decision making through research and analysis. RAND Europe's publications do not necessarily reflect the opinions of its research clients and sponsors. RAND® is a registered trademark.

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