

# Quantifying the Economic Costs of Insufficient Sleep



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Sleep deprivation is associated with a higher mortality risk and productivity losses at work. Economic modelling of data from five OECD countries found that individuals who sleep fewer than six hours a night on average have a 13 per cent higher mortality risk than people who sleep at least seven hours. At a national level, up to 3 per cent of GDP is lost due to lack of sleep, and an increase in sleep could add billions of dollars to a country's economy.

## Background

The Centers for Disease Control and Prevention (CDC) in the United States has declared insufficient sleep a 'public health problem', with more than one-third of American adults not getting enough sleep on a regular basis. However, insufficient sleep is not exclusively a US problem; it equally concerns other countries.

Some evidence indicates the proportion of people sleeping less than the recommended hours of sleep is rising. This has been associated with lifestyle factors related to a modern 24/7 society, such as psychosocial stress, alcohol consumption, smoking, lack of physical activity and excessive electronic media use, among others. Sleep is considered essential for health, productivity and wellbeing. A lack of sleep has been found to be associated with a range of negative health and social outcomes, and it has an influence on health status as well as success in school and the labour market.

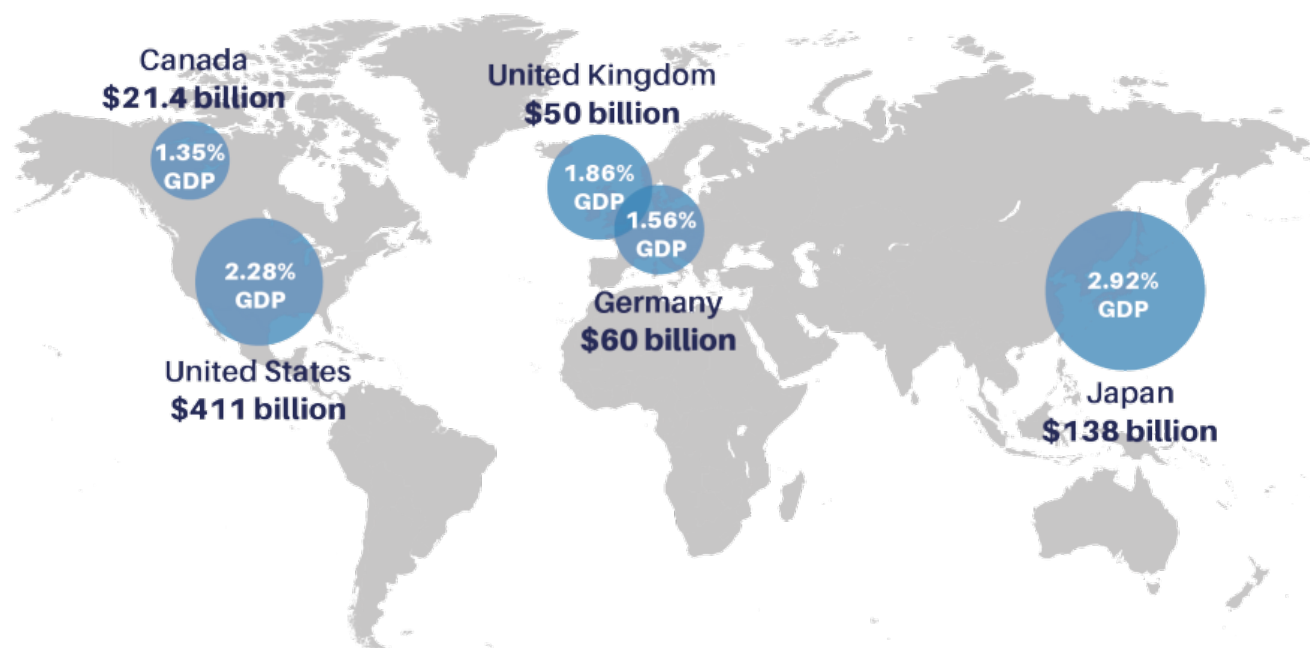
Because of the potential adverse effects of insufficient sleep on health, wellbeing and productivity, the consequences of sleep deprivation have far-reaching and expensive economic consequences. However, efforts to quantify the economic effects of sleep deprivation have been limited thus far.

## Goals

The aim of this study was to assess the wider economic and societal effects of sleep deprivation, or so-called ‘short sleep’, in four key stages:

1. The project team developed an understanding of the factors associated with insufficient sleep and poor sleep quality.
2. The study then revisited the existing literature on the link between insufficient sleep and mortality risk to synthesise and evaluate this empirical evidence using a meta-analytical approach.
3. To assess the economic effects of insufficient sleep, the team quantified the productivity effects of insufficient sleep using a large linked employer-employee dataset.
4. Finally, the project team put all of their quantitative empirical estimates into context and applied them in a bespoke analytical modelling framework to estimate the loss in economic output due to insufficient sleep for five different OECD countries.

## Findings



Map showing economic costs of insufficient sleep across five OECD countries

Jess Plumridge/RAND Europe

**The U.S. sustains by far the highest economic losses (up to \$411 billion a year, which is 2.28 per cent of its GDP) due to the size of its economy, followed by Japan (up to \$138 billion a year, which is 2.92 per cent of its GDP).** Germany (up to \$60 billion, 1.56 per cent of its GDP) and the UK (up to \$50 billion, 1.86 per cent of its GDP) have similar losses. Canada has the lowest financial losses due to lack of sleep (up to \$21.4 billion, which is 1.35 per cent of its GDP).

**Small changes to sleep duration could have a big impact on the economy.** For example, if individuals that slept under six hours started sleeping six to seven hours then this could add \$226.4 billion to the U.S. economy. This could add \$75.7 billion to the Japanese economy, \$34.1 billion to the German economy, \$29.9 billion to the UK economy and \$12 billion to the Canadian economy.

**Sleep deprivation is linked to lower productivity at work, which results in a significant amount of working days being lost each year.** On an annual basis, the U.S. loses an equivalent of around 1.2 million working days due to insufficient sleep. This is followed by Japan, which loses on average 600,000 working days per year. The UK and Germany both lose just over 200,000 working days. Canada loses around 80,000 working days.

**Sleep deprivation is linked to a higher mortality risk.** An individual that sleeps on average less than six hours per night has a 13 per cent higher mortality risk than someone sleeping between seven and nine hours. An individual sleeping between six to seven hours per day still has a seven per cent higher mortality risk.

**Multiple factors are associated with shorter sleep.** These include obesity, excessive alcohol and sugary drink consumption, smoking, lack of physical activity, mental health problems, stress at work, shift work/irregular working hours, financial concerns, and long commuting.

## Recommendations

To improve sleep outcomes

- **Individuals could:** Set consistent wake-up times; limit the use of electronic items before bedtime; and exercise.
- **Employers could:** Recognise the importance of sleep and the employer's role in its promotion; design and build brighter workspaces; combat workplace psychosocial risks; and discourage the extended use of electronic devices.
- **Public authorities could:** Support health professionals in providing sleep-related help; encourage employers to pay attention to sleep issues; and introduce later school starting times.