

### Air pollution and extreme temperatures

Climate change is one of the biggest challenges of present and future generations. It is linked to different types of environment distress, including air pollution and extreme temperatures. Air pollution is already a major cause of death and disability today, and its future impact is likely to be even greater without adequate policy action. Projections have estimated that outdoor air pollution may cause 6 to 9 million premature deaths a year worldwide by 2060, and cost 1% of global GDP as a result of sick days, medical bills and reduced agricultural output (OECD, 2015[1]).

Among OECD countries, ambient (outdoor) and household (indoor) air pollution caused about 40 deaths per 100 000 people in 2016 (Figure 4.16). Death rates ranged from over 80 deaths per 100 000 in Latvia, Hungary and Lithuania, to 15 deaths or less in New Zealand and Canada. In partner countries, death rates were particularly high in India and China (around 140 deaths per 100 000 people), and also higher than most OECD countries in the Russian Federation and Indonesia.

Extreme temperatures are also a consequence of climate change. Both extreme heat and cold can cause health problems and lead to death, as has been experienced in some OECD countries in recent decades. Extreme cold has generally had a greater impact on mortality than heatwaves, particularly in Eastern Europe and Nordic countries. Still, heatwaves have caused significant numbers of deaths in certain years. For instance, the record warm summer of 2003 caused around 80 000 deaths in Europe and the heatwaves in the summer of 2015 caused more than 3 000 deaths in France alone.

Death rates due to cold extreme temperatures are far higher in Lithuania, Latvia and Estonia than other OECD countries, with over 1 400 deaths per million people since 2000 (Figure 4.17). Although these high death rates are clearly linked to the naturally cold climates in these countries, they should not be viewed as inevitable – for example, Canada, Iceland and Norway had less than 80 deaths per million people over the same period. Evidence suggests that these deaths might be also linked to excessive alcohol use. For instance, in Finland among the deaths due to extreme cold in 2015-2017, 46% of men and 24% of women were alcohol-intoxicated.

Extreme heat caused 82 deaths per million people in Japan, followed by rates of 39 in France, 28 in Belgium and 21 in the United States since 2000. Whilst the total number of deaths due to cold temperatures has remained relatively stable since 2000, deaths from extreme heat have been on an upward trend, with two peaks in 2003 and 2010 (Figure 4.18).

Inter-sectoral policies are needed to address the impact of climate change. Countries can start planning to address pollution and its impacts on health, for instance, by creating partnerships with various international, national and local stakeholders, including local city authorities and ministries of industry, environment, transport, and agriculture. Bottled gas, for instance, can be used to replace solid fuels for cooking in order to address indoor pollution deaths. Reducing crop burning and lowering emissions from motor

vehicles and industries would lower ambient air pollution. Health systems can also contribute, by preparing for new diseases that can develop with new climate conditions; promoting consumption of sustainably grown and sourced food; and reducing the carbon footprint of health facilities. In addition, health providers can reduce the environmental footprint in hospitals and in nursing homes by encouraging healthier food consumption, waste reduction and efficient energy use (Landrigan et al., 2018[2]; OECD, 2017[3]).

#### Definition and comparability

Household (indoor) air pollution results from polluting fuel used mainly for cooking. Ambient (outdoor) air pollution results from emissions from industrial activity, households, cars and trucks, which are complex mixtures of air pollutants, many of which are harmful to health. Of all of these pollutants, fine particulate matter has the greatest effect on human health. Polluting fuels include solid fuels such as wood, coal, animal dung, charcoal, crop wastes and kerosene. Attributable mortality is calculated by first combining information on the increased (or relative) risk of a disease resulting from exposure, with information on how widespread the exposure is in the population (e.g. the annual mean concentration of particulate matter to which the population is exposed). Applying this fraction to the total burden of disease (e.g. cardiopulmonary disease expressed as deaths or DALYs), gives the total number of deaths that results from exposure to household or ambient air pollution.

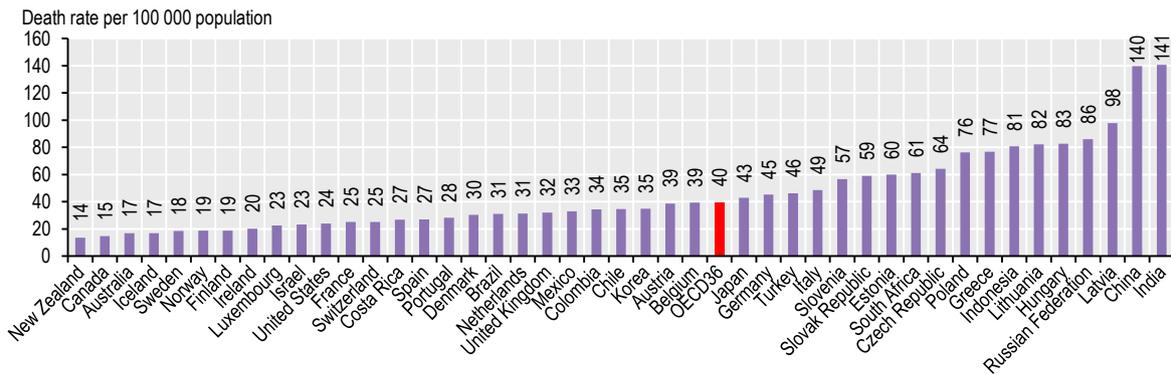
Data on fatalities due to extreme temperature events come from national registries on deaths by cause collected in the WHO Mortality Database. Deaths due to exposure to excessive natural heat (ICD code X30) and exposure to excessive natural cold (X31) were selected.

Note that for both air pollution and deaths from extreme temperatures, data are based on WHO estimates, which may differ from national data.

#### References

- [1] OECD (2015), *The Economic Consequences of Climate Change*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264235410-en>.
- [2] Landrigan, P. et al. (2018), “The Lancet Commission on pollution and health”, *The Lancet*, Vol. 391/10119, pp. 462-512, [http://dx.doi.org/10.1016/s0140-6736\(17\)32345-0](http://dx.doi.org/10.1016/s0140-6736(17)32345-0).
- [3] OECD (2017), *Healthy people, healthy planet – The role of health systems in promoting healthier lifestyles and a greener future*, Organisation for Economic Cooperation and Development, OECD, Paris, <http://www.oecd.org/health/healthy-people-healthy-planet.htm>.

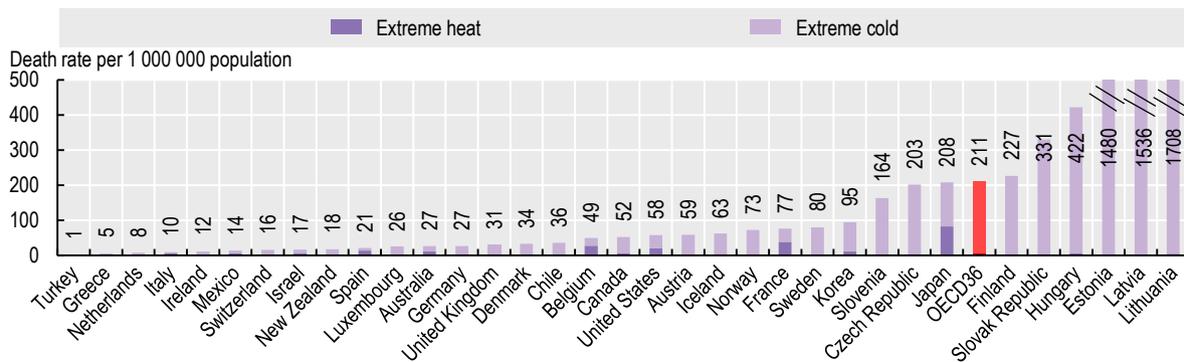
Figure 4.16. Ambient and household air pollution attributable death rate, 2016



Source: Global Health Observatory data repository, WHO.

StatLink <https://doi.org/10.1787/888934015562>

Figure 4.17. Cumulative death rate due to extreme heat and extreme cold temperatures, 2000-17

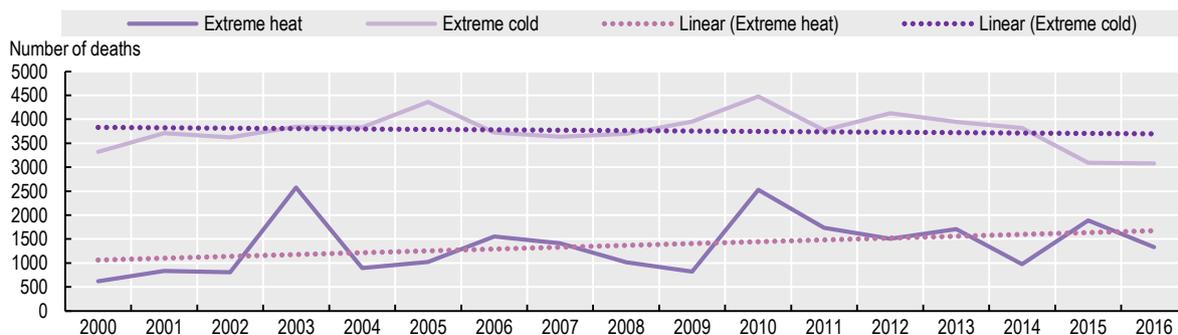


Note: Lithuania, Latvia and Estonia show cumulative death rates higher than 500 per 1 000 000. The graph is truncated at this level to allow better comparability.

Source: WHO Mortality Database.

StatLink <https://doi.org/10.1787/888934015581>

Figure 4.18. Number of deaths due to extreme heat and extreme cold temperatures in OECD36, 2000-16



Source: WHO Mortality Database.

StatLink <https://doi.org/10.1787/888934015600>



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