post-corona-planet

COVID-19 and Europe’s environment: impacts of a global pandemic

The COVID-19 pandemic has had a significant impact on people’s lives worldwide. This briefing focuses on what we know about the short-term effects of COVID-19 on our environment, approximately six months after large parts of the world went into some degree of lockdown. It considers what can be learnt from these effects and how they might help shape decision-making in the future.

Key messages

- The COVID-19 pandemic further highlights the interrelations between our natural and societal systems: societal resilience depends on a resilient environmental support system.
- Biodiversity loss and intensive food systems make zoonotic diseases more likely.
- Often related to social inequalities, environmental factors such as air quality appear to influence COVID-19 outcomes.
- Increased reliance on single-use plastics and low oil prices resulting from lockdowns have negative consequences.
- Lockdowns during the COVID-19 pandemic may have some direct, short-term, positive impacts on our environment, especially in terms of emissions and air quality, although these are likely to be temporary.

Biodiversity, food systems and zoonotic disease

Evidence points to COVID-19 being a zoonotic disease – i.e. one that jumped from animals to humans. The emergence of such zoonotic pathogens is linked to environmental degradation and related human interaction with animals in the food system.

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About 60 % of human infectious diseases are of animal origin (Woolhouse and Gowtage-Sequeria, 2005), while three quarters of new and emerging infectious diseases are transmitted to humans from animals (Woolhouse et al., 2001). These include viruses responsible for significant global mortality, such as: the human immunodeficiency viruses (HIV) HIV-1 and HIV-2 that cause acquired immune deficiency syndrome (AIDS) that emerged from wild primate populations; the Rift Valley fever virus that jumped from infected livestock to humans and influenza viruses such as bird flu and swine flu that were also transmitted from domestic animals and birds to humans.

Novel viruses have emerged from intensive systems of domestic livestock rearing. The intensive production of animal protein involves rearing concentrated populations of genetically similar animals in close proximity, often in poor conditions, fostering vulnerability to infection (UNEP, 2020). More than 50 % of zoonotic infectious diseases that have emerged since 1940 have been associated with measures to intensify agriculture (Rohr et al., 2019).

Beyond the causes of COVID-19, in many countries, the period of lockdown has given us a glimpse of how animal and plant species react to less human disturbance, in both rural and urban settings. During the Europe-wide lockdown, many anecdotal stories appeared concerning the changing behaviour of wildlife. Since the 1970s, there have been numerous studies on the impact of human disturbance on wildlife, in particular on breeding birds. Less disturbance in both urban and remote areas (less recreational tourism) gives ecosystems and habitats a chance to recover and provides new spaces and niches for species to occupy. New research is looking into how urban nature areas increase the resilience of cities, maintaining well-being in urban populations whilst also enabling social distancing. Maintaining or expanding space for nature in cities should increasingly become part of the sustainability agenda.

Greenhouse gas emissions: short-term benefits and lessons for the future

In addition to affecting people's lives, the COVID crisis is having a direct impact on energy use and greenhouse gas (GHG) emissions at both global and EU levels. The European Commission's forecast for the year 2020 estimates a 7.6 % contraction in GDP for the EU as a whole. Due to the effect of COVID-19 on the economy, in 2020, we can expect an unparalleled reduction in GHG emissions in the EU compared to 2019. We will only be able to fully quantify its magnitude after 2020.

The transport sector, a key source of GHG, is particularly affected by the crisis. The demand for passenger transport has declined as a result of international travel restrictions and reduced commuting, tourism and business travel. The International Road Transport Union (IRU) expects a 57 % decline in turnover from road passenger transport activity in Europe for 2020 compared to the previous year[1]. For air transport, figures from the International Air Transport Association (IATA) show a 65.2 % drop in air passenger kilometres in Europe for the year-to-date ending July compared to the same period in 2019[2] . These figures point to a significant decline in GHG emissions from transport in 2020.

According to initial evaluations from the International Energy Agency (IEA), global energy demand in 2020 could fall by around 6 %. Therefore, the strong contraction in GDP and energy use might play a role in the EU achieving its 20 % renewable energy target and its objective to improve energy efficiency by 20 % in 2020, in addition to the effects of policies dedicated to reaching these objectives.

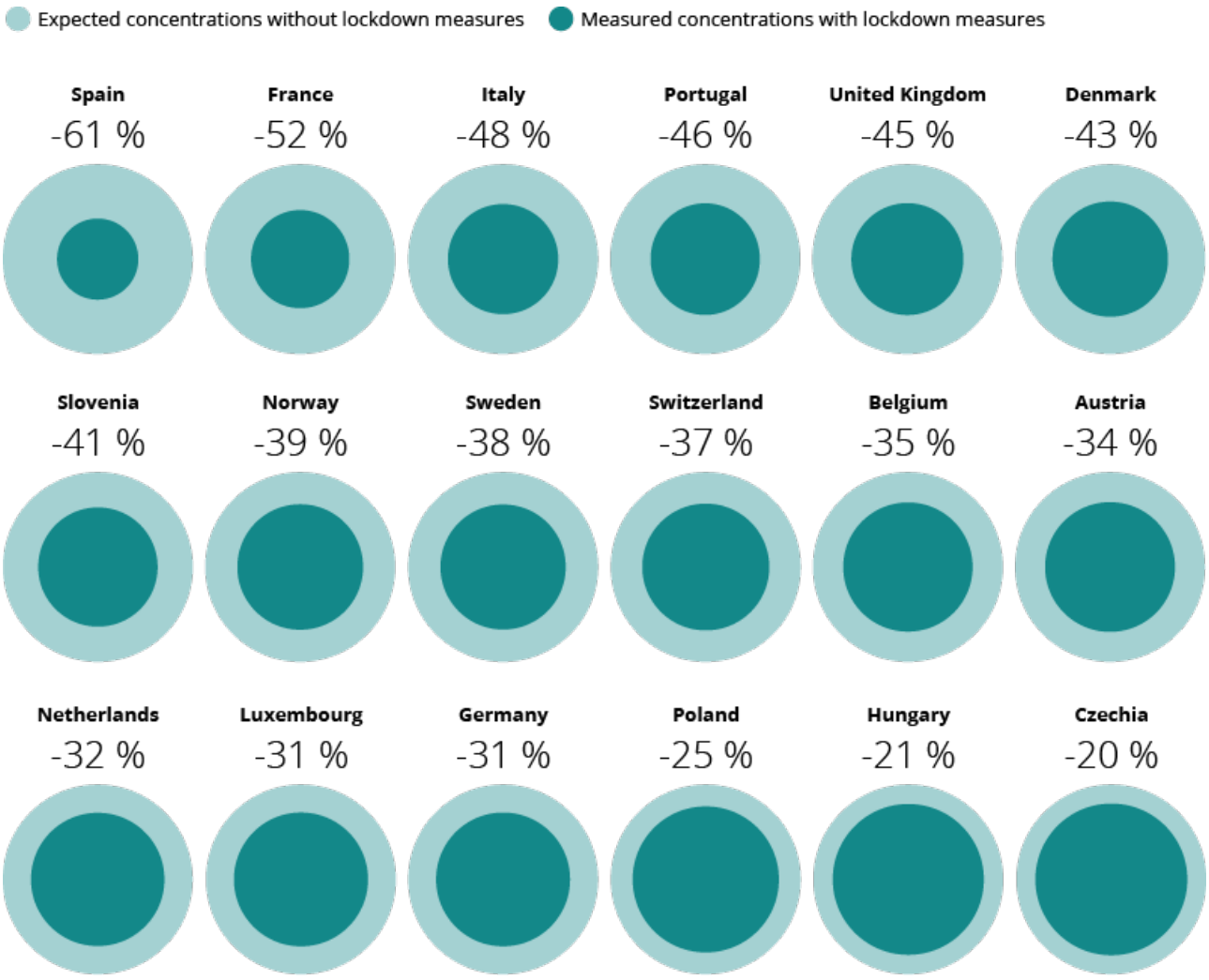
While the short-term reductions in energy use and emissions may make 2020 targets achievable, any longer-term goals will require political decisions that prioritise recovery measures which contribute significantly to climate change mitigation. Clearly, the transition of the energy and mobility systems must accelerate if we are to achieve climate neutrality by 2050.

Air quality, noise and (un)healthy environments

One of the most evident short-term effects of COVID-19 lockdowns has been the dramatic improvement in air quality, especially in some of the world's most polluted cities. Although air quality levels appear to be returning to near-pre-lockdown levels in many parts of the world as stricter lockdown measures are lifted, this period has revealed some of the benefits that could be achieved from a lasting and sustainable reduction in air pollution.

The EEA's Air quality and COVID-19 viewer tracks average weekly and monthly concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). Data show how concentrations of NO_2 — a pollutant mainly emitted by road transport — fell sharply in many European countries where lockdown measures were implemented in the spring of 2020.

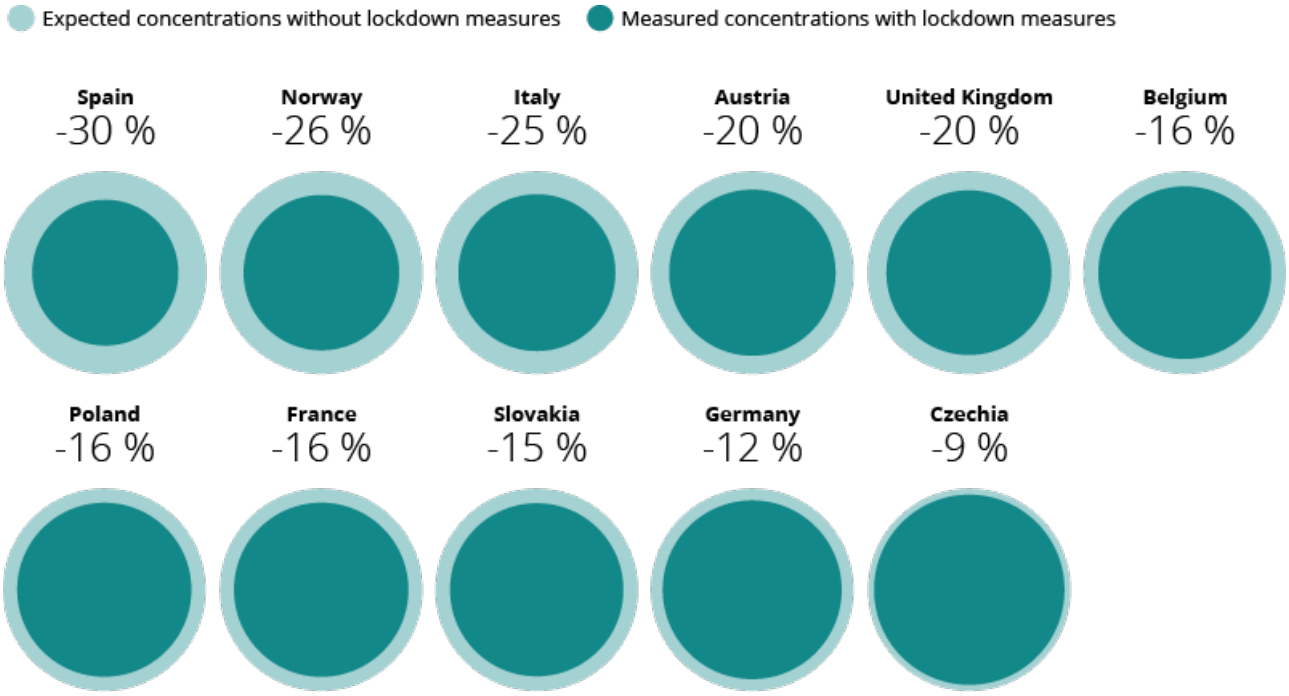
Figure 1. Effect of COVID lockdown measures on air quality
Comparison between expected and actual NO 2 concentrations (selected countries, April 2020)



Source: EEA forthcoming report - Air quality in Europe – 2020

Concentrations of PM 10 also fell across Europe in this period, but decreases were less pronounced . Whereas NO 2 emissions are largely attributable to road transport, PM concentrations are influenced by emissions from natural sources as well as man-made sources such as residential heating , agriculture and industry, which are less likely to have been affected by lockdown restrictions.

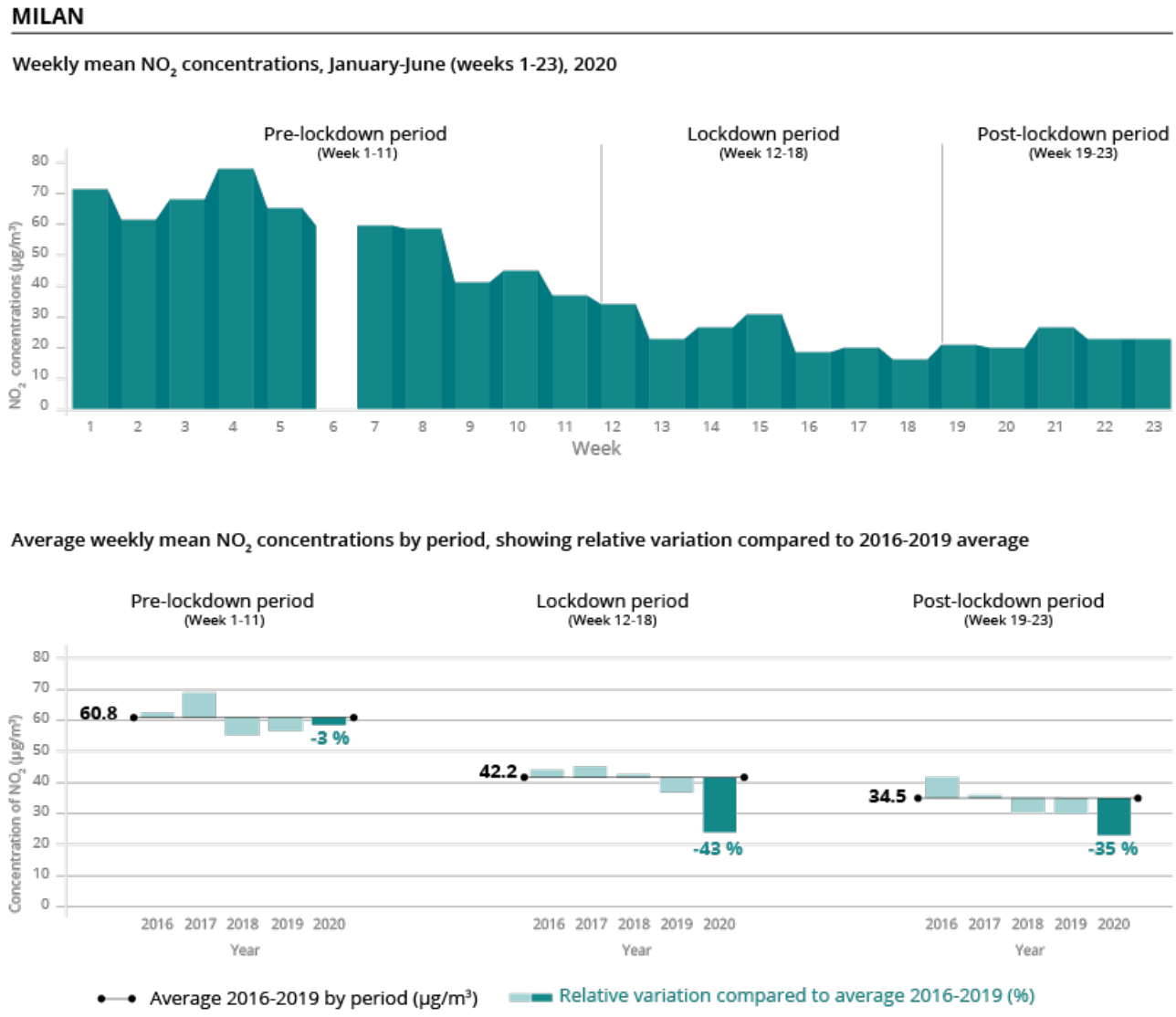
Figure 2. Effect of COVID lockdown measures on air quality
Comparison between expected and actual PM 10 concentrations (selected countries, April 2020)



Source: EEA forthcoming report - Air quality in Europe – 2020

The extent of reductions varied considerably, with the largest reductions of up to 70 % seen in urban centres in those countries most affected by COVID-19 at that time, such as Milan and Madrid. Other cities, such as Athens which was less affected by the COVID first wave and saw economic activity returning sooner, experienced sharp initial declines in NO_2, followed by a return to pre-lockdown levels.

Figure 3. Weekly average NO2 concentrations, selected cities



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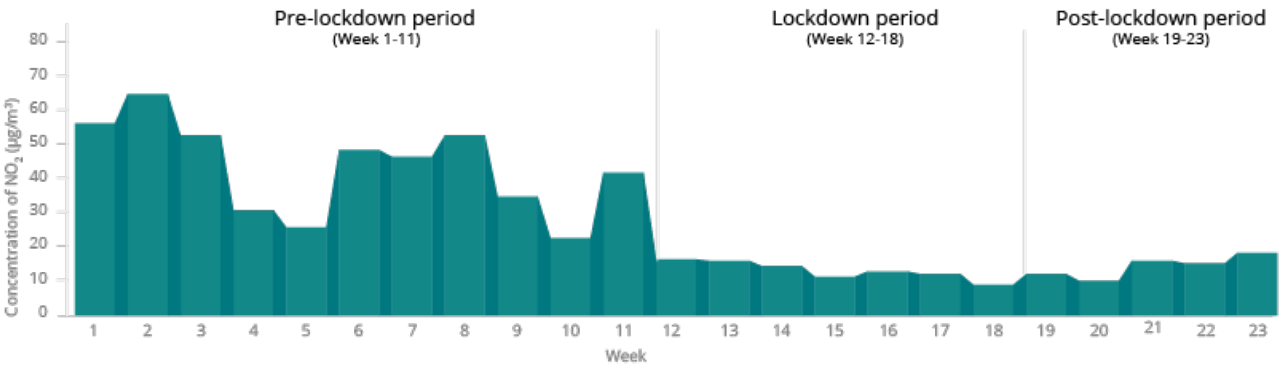
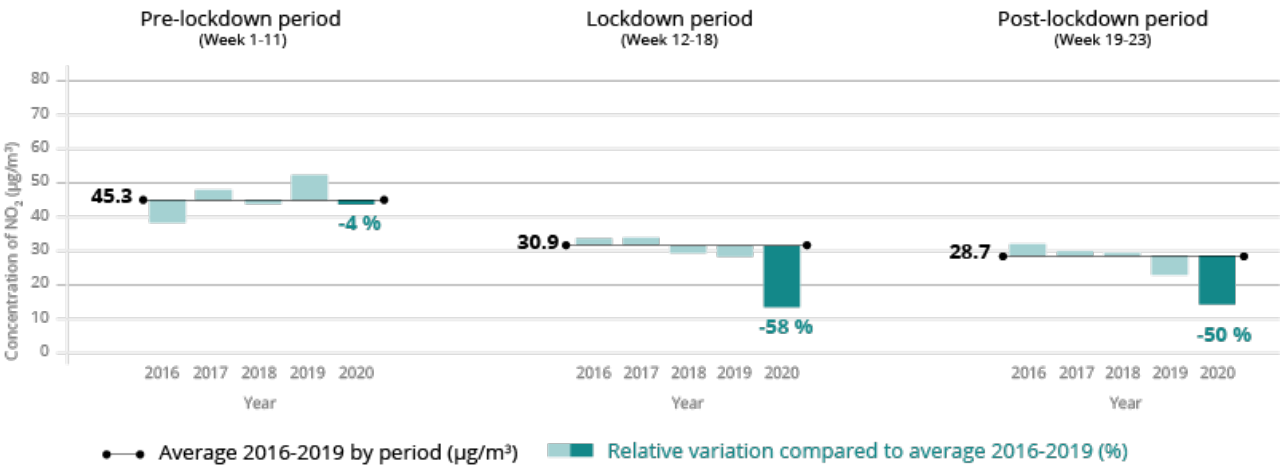
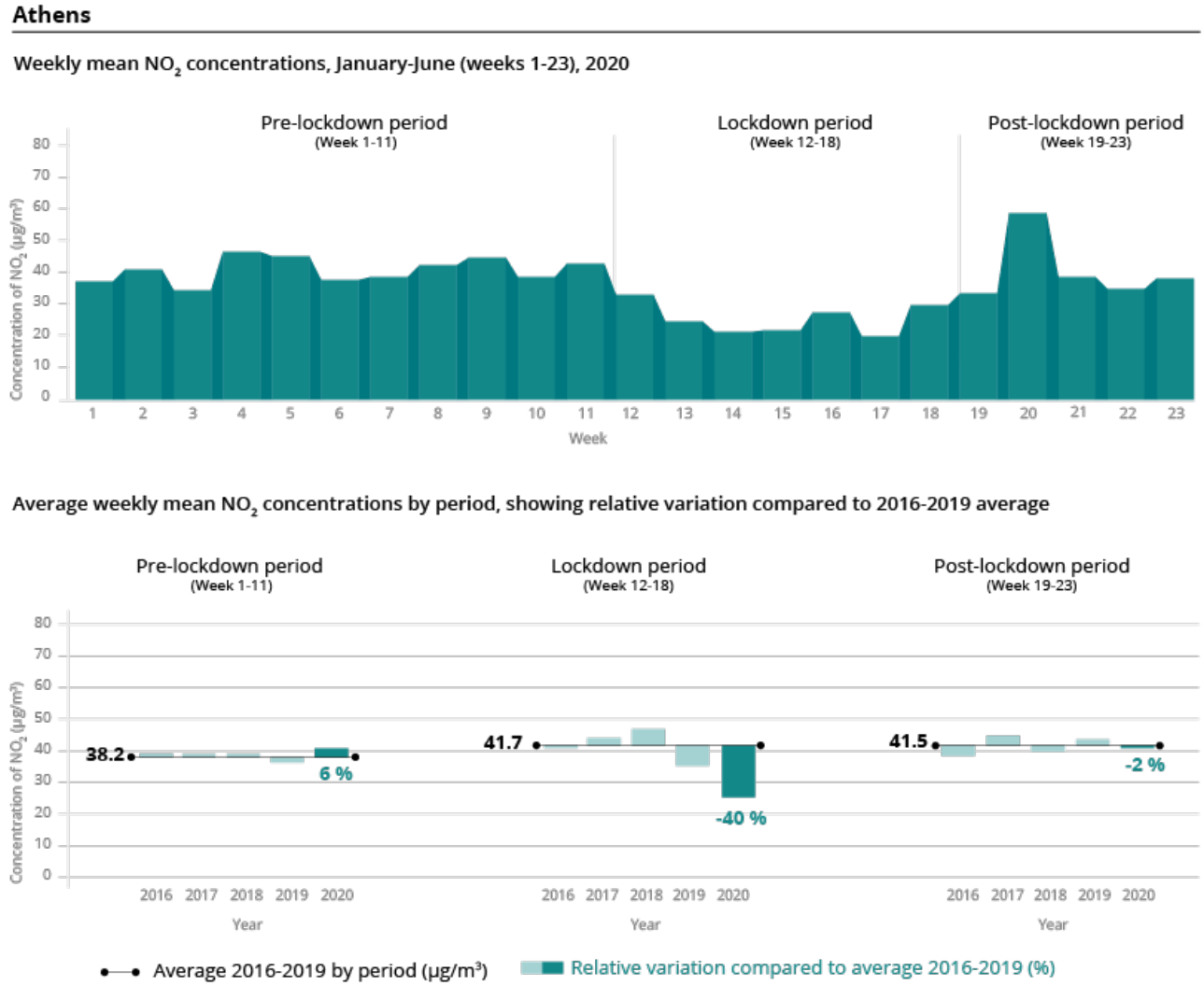
Weekly mean NO_2 concentrations, January-June (weeks 1-23), 2020



Average weekly mean NO_2 concentrations by period, showing relative variation compared to 2016-2019 average



Athens



Source: EEA air quality and COVID-19 tracker[3]

Researchers are exploring the role air pollution may play in influencing the severity of COVID-19. Exposure to air pollution is associated with cardiovascular and respiratory disease, both pre-existing health conditions identified as risk factors for death in COVID-19 patients (Yang et al., 2020). As such, long-term exposure to air pollution might be expected to increase humans' susceptibility to COVID-19, with previous studies having demonstrated, for example, exposure to particulate matter (PM) as having a role in worsening the impact of respiratory viruses (Sciomer et al., 2020). Recent studies have explored the evidence for links between air pollution and high mortality rates for COVID-19. An Italian study argued that since long-term exposure to air pollution, including PM, ozone (O_3) and sulphur dioxide (SO_2), weakens the immune defences of the upper airways, this would facilitate entry of the SARS-CoV-2 into the lower airways resulting in infection with COVID-19 (Conticini et al., 2020). However, as there are a number of significant limitations within these early studies, findings must be interpreted with care.

Another public health question currently being researched is whether PM can transport the virus. In Italy, genetic material from the SARS-CoV-2 virus was detected on PM samples taken from the city of Bergamo in northern Italy (Setti et al., 2020). While there are concerns that air pollution could carry the virus over longer distances and drive infection, at this stage, it is not known whether the virus remains viable on pollution particles. Again, further research is required.

Meanwhile, chemical exposure has been indirectly linked to vulnerability to COVID-19. Certain chemicals are associated with health impacts, such as obesity, cardiovascular diseases, immunotoxicity and respiratory diseases which, in turn, have been found to increase susceptibility to COVID-19. In this context, a recent study has suggested that long-term, low-dose exposure to mixtures of chemicals may lead to immunodeficiency in the face of epidemics and pandemics (Tsatsakis et al., 2020).

> It is likely that there has been a **significant drop in noise levels during the COVID-19 lockdown**, as noise pollution from traffic is typically correlated with NO_2 levels.

While we have grown accustomed to unhealthy noise levels in cities, the short-term reduction during lockdown allowed people to experience the immediate benefits of quieter cities. Several sources have also documented a dramatic fall in ground vibrations generated by human activity, such as road traffic and industrial activities, across the EU.

Environmental noise levels are reported over a prolonged period of time, as health effects appear when exposure is long term. It is safe to say that a reduction in noise levels over a few months would not significantly reduce the annual noise-level indicator used to measure the effects of noise, unless societal responses to COVID-19 result in longer-term reductions in traffic levels, air transport and other noise-producing activities.

Plastics, waste and recycling

The COVID-19 pandemic has caused significant changes in the production and consumption of plastics, and in plastic waste. T he pandemic led to a sudden surge in global demand for personal protecti ve equipment (PPE), such as masks, gloves, gowns, bottled hand sanitiser, etc. During early efforts to stop the spread of the virus, the World Health Organization (WHO) estimated that, each month, 89 million medical masks were required globally, together with 76 million examination gloves and 1.6 million sets of goggles[4].

As a result of lockdown measures across most of Europe, coupled with stringent hygiene requirements, **COVID-19 has had a significant effect on the consumption of single-use plastic packaging and products**.

Since most restaurants in Europe were closed for on-site dining, many moved to offering take away and delivery services using single - use plastic containers. Several large coffee retailers stopped allowing customers to bring refillable containers , using disposable cups in their place. Meanwhile, online shopping outlets have seen a surge in demand , with many products packed in single-use plastic.

While disposable plastic products have played an important role in preventing the spread of COVID-19, in the shorter term, the upsurge in demand for these items may challenge EU efforts to curb plastic pollution and move towards a more sustainable and circular plastics system. The production, consumption and disposal of additional single-use plastics will have had a greater impact on the environment and climate, such as increased air pollut ion and greenhouse gas emissions, waste generation and risk of littering.

In addition to the direct effects stemming from increased demand for single-use plastics, other factors related to the pandemic should also be noted. Reduced economic activity has seen sharp falls in global oil prices. In turn, this has made it significantly cheaper for manufacturers to produce plastic goods from virgin , fossil-based materials rather than using recycled plastic materials. The economic viability of the European and global plastics recycling market is presently under significant pressure. L ower market demand for recycled plastics has also complicated the efforts of many of Europe’s local municipalities to manage their waste practices sustainably, with less desirable waste-disposal methods now being required for significant quantities of plastic waste.

Social inequalities in the spotlight

It has become clear that COVID is not affecting all socio-economic groups equally. Several factors may have increased the vulnerability of those with low socio-economic status.

Less-well-off people are more likely to live in poor quality, overcrowded accommodation, jeopardising compliance with social distancing recommendations and increasing the risk of transmitting infection. They are also more likely to have jobs that cannot be carried out from home, such as working in healthcare, care homes, supermarkets, factories, warehouses and public transport. In addition, people with lower socio-economic status are more likely to endure unstable work conditions and to face financial uncertainty due to the economic impacts of the response to COVID-19. Such individuals are under significant pressure to continue working even when they fall ill, in order to safeguard household incomes.

Beyond the higher risk of transmission under such conditions, sustained stress also weakens the immune system, increasing susceptibility to a range of diseases (Patel et al., 2020). Finally, poorer people in urban areas are likely to be exposed to higher levels of air pollution and noise, associated with respiratory and cardiovascular diseases, and hypertension, respectively (EEA, 2019). These conditions are all risk factors for death from COVID-19 (Yang et al., 2020), suggesting that people of low socio-economic status have greater susceptibility to COVID-19 mortality (Patel et al., 2020).

Conclusions

The COVID-19 pandemic continues to unfold across Europe, with changing levels of restrictions and more focus on testing and social distancing. Although some economic activity has returned since the European lockdowns of spring 2020, economies continue to be hit by COVID-related restrictions. As governments try to plot courses out of the pandemic, with a particular reliance on significant stimulus packages, a focus on reshaping our unsustainable production and consumption systems is vital. The pandemic is highlighting, yet again, the interconnected nature of our planetary systems, from the zoonotic origins of disease and their relation to our natural environment and food systems, to the greater vulnerability to disease resulting from social inequality, poor air quality, pollution and other environmental factors.

Sources

In order to present a full and contextualised snapshot of these rapidly developing scenarios, we rely on a variety of external sources, as well as the valuable work of the European Environment Information and Observation Network (Eionet). More COVID-related research studies from Eionet and other EEA partners can be found here: https://www.eea.europa.eu/post-corona-planet/explore/#search-the-database

Footnotes

1. https://www.iru.org/system/files/COVID-19%20Impacts%20on%20the%20Road%20Transport%20Industry%20-%20Executive%20summary.pdf

2. https://www.iata.org/en/iata-repository/publications/economic-reports/air-passenger-monthly-analysis---july-2020/

3. https://www.eea.europa.eu/themes/air/air-quality-and-covid19/air-quality-and-covid19

4. https://www.who.int/news-room/detail/03-03-2020-shortage-of-personal-protective-equipment-endangering-health-workers-worldwide

References

Conticini, E., et al., 2020, 'Can atmospheric pollution be considered a co-factor in extremely high level of SARS-CoV-2 lethality in Northern Italy?', Environmental Pollution 261, p. 114465 (DOI: 10.1016/j.envpol.2020.114465).

EEA, 2019, 'Unequal exposure and unequal impacts – European Environment Agency', accessed 8 October 2020.

Patel, J. A., et al., 2020, 'Poverty, inequality and COVID-19: the forgotten vulnerable', Public Health 183, pp. 110-111 (DOI: 10.1016/j.puhe.2020.05.006).

Rohr, J. R., et al., 2019, 'Emerging human infectious diseases and the links to global food production', Nature Sustainability 2(6), pp. 445-456 (DOI: 10.1038/s41893-019-0293-3).

Sciomer, S., et al., 2020, 'SARS-CoV-2 spread in Northern Italy: what about the pollution role?', SpringerLink, accessed 8 October 2020.

Setti, L., et al., 2020, 'SARS-Cov-2RNA found on particulate matter of Bergamo in Northern Italy: First evidence', Environmental Research 188, p. 109754 (DOI: 10.1016/j.envres.2020.109754).

Tsatsakis, A., et al., 2020, 'COVID-19, an opportunity to reevaluate the correlation between long-term effects of anthropogenic pollutants on viral epidemic/pandemic events and prevalence', Food and Chemical Toxicology 141, p. 111418 (DOI: 10.1016/j.fct.2020.111418).

UNEP, U.N., 2020, 'Preventing the next pandemic – Zoonotic diseases and how to break the chain of transmission', UNEP - UN Environment Programme, accessed 8 October 2020.

Woolhouse, M. E. J., et al., 2001, 'Risk factors for human disease emergence', Philosophical

Transactions of the Royal Society of London. Series B: Biological Sciences 356(1411), pp. 983-989 (DOI: 10.1098/rstb.2001.0888).

Woolhouse, M. E. J. and Gowtage-Sequeria, S., 2005, 'Host Range and Emerging and Reemerging Pathogens', Emerging Infectious Diseases 11(12), pp. 1842-1847 (DOI: 10.3201/eid1112.050997).

Yang, J., et al., 2020, 'Prevalence of comorbidities and its effects in patients infected with SARS-CoV-2: a systematic review and meta-analysis', International Journal of Infectious Diseases 94, pp. 91-95 (DOI: 10.1016/j.ijid.2020.03.017).

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