



# Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK

CIEH submission to the Air Quality Expert Group at DEFRA

April 2020

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## **About the Chartered Institute of Environmental Health (CIEH)**

CIEH is the professional voice for environmental health representing over 7,000 members working in the public, private and third sectors, in 52 countries around the world. It ensures the highest standards of professional competence in its members, in the belief that through environmental health action people's health can be improved.

Environmental health has an important and unique contribution to make to improving public health and reducing health inequalities. CIEH campaigns to ensure that government policy addresses the needs of communities and business in achieving and maintaining improvements to health and health protection.

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## Key points

We would expect to see a reduction in air pollution, mostly due to the reduced road traffic associated with people working from home and not doing school runs. However, concentrations later in the year will depend on how the restrictions are eased by the Government.

The Summer holiday season will be a time when emissions could rise again as people take holidays in the UK rather than going abroad. Use of barbeques and fire pits in the warmer months may also contribute to localised pollution and exposure.

All areas we received information from reported an increase in complaints about bonfires. This will have an impact on the local exposure of potentially vulnerable population during lockdown.

We have also been told that areas are seeing increases in ozone levels in the air due to reductions in NO<sub>x</sub> concentrations in the air, which usually 'mops up' ozone particles.

## About this submission

We have received contributions from environmental health teams at the following local authorities. We have used these contributions as the basis for our response and can provide more detailed information if required.

Adur & Worthing Councils  
BCP council  
City of London  
Dartford & Sevenoaks Councils  
East Cambridgeshire District Council  
East Northamptonshire Council  
Exeter City Council  
Harborough District Council  
Harrogate Borough Council  
Herefordshire Council  
Milton Keynes Council  
North Devon Council  
Sedgemoor District Council  
Shropshire Council  
Southend on Sea Borough Council  
Stafford Borough Council  
Wakefield Council

## **1. What sectors or areas of socioeconomic activity do you anticipate will show a decrease in air pollution emissions, and by how much?**

We expect the dramatic reductions in road transport and traffic to translate into reductions in air pollution, particularly NO<sub>x</sub>. The absence of school runs and the drops in the numbers of people commuting in relation to the lockdown are key drivers. Emissions from commercial buildings and industrial premises that are temporarily closed are also expected to contribute to reductions to air pollution concentrations but it is difficult to quantify these accurately. However, teams suspect that one sector that has been relatively unaffected, in terms of air pollution generation, has been agriculture and power generation. The NHS is also not expected to have reduced pollution for obvious reasons.

Some teams have told us that large drops in pollution levels measured by diffusion tubes locally. However, others cited problems with continuing measurements locally, owing to the closure of laboratories processing the tubes.

The data submitted below is meant to give an indication of the direction that air pollution is moving in across different sectors, however it should be used with some caution as these are estimates only.

Specific changes observed from local areas:

- In East Cambridgeshire DC, diffusion tube monitoring showed NO<sub>2</sub> concentrations in March were up to 30% lower than in February in some cases and substantially lower than in March 2019. Overall decrease of around 20% is expected.
- In Southend Council, data from passive diffusion tubes for March 2020 has shown a decrease in NO<sub>2</sub> of between 4-50% compared to March 2019. Commercial data from the council also confirms drops in activity across most sectors, which are expected to contribute to drops in emission of pollutants.
- In Stafford BC, emissions of solvents from industrial production are declining locally by around 30%. Emissions from commercial and public buildings, due to reduced heating and power use, are likely to represent a reduction of around 25% compared to equivalent times last year because of the lockdown. Transport emissions appear to be declining by around 25% estimated from road traffic reduction, mineral production (sand and gravel) appears to have reduced as demand has fallen by about 50%.
- In Herefordshire Council, recent monitoring indicated that NO<sub>2</sub> levels were reduced by 20% during the initial lockdown period.
- In Wakefield Council, data from a continuous monitoring station in Wakefield City centre shows that the diurnal peaks are still present but are reduced and fall away to significantly lower levels outside times of peak traffic flow when compared to a week prior to lockdown in the UK.

## **2. Are there any emissions sources or sectors which might be anticipated to lead to an increase in emissions in the next three months?**

Whilst most respondents have told us that the overall trend will be a reduction in air pollution, there will be industries and sources of pollution that are likely to be increasing their emissions during the lockdown. In particular, some areas told us that *“Ozone and PM episodes as witnessed during the recent Easter weekend are locally significant from a public health viewpoint.”* Ozone increases are associated with the drops in NO<sub>x</sub> pollutant concentrations in the air due to reduced road traffic.

Activities contributing to increases:

- Medical waste incineration
- HGVs and home deliveries
- Domestic bonfires (garden and other), bonfires on building sites and burning of fly-tipped waste
- Solid fuel burning, depending on the weather
- Use of crematoriums in Boroughs
- Increase in traffic to hospitals, including newly built Nightingale hospitals

## **Bonfires**

When gathering information for this submission, we specifically asked about increases in complaints about bonfires, as our previous research on noise and nuisance revealed an increase across almost every area. It should be noted that number of complaints does not necessarily correlate with number of fires. There may be the same number of fires this year but more people exposed to the effects due to lockdown so more complaints are received. Equally there could be ten times as many fires this year but people are tolerating it and not complaining as they appreciate people need to dispose of waste in some other way than visiting recycling centres.

Specifically, many respondents called for national press releases by DEFRA calling on the public not to have bonfires and to save their waste until recycling centres reopen and to compost garden waste instead. Local areas are already trying to raise awareness locally but feel that an amplified message would be a huge help. Promoting the message around being considerate to neighbours would be helpful as smoke from bonfires could have an impact on neighbours suffering from COVID19 or other respiratory conditions.

As well as garden bonfires, the mild/warm weather in the weeks to come may prompt people to use fire pits and barbeques in their gardens, contributing to particulate pollution locally.

Below is a summary of responses we received in relation to bonfires:

- Sedgemoor DC - A massive increase in bonfires complaints. 5 reports in April 2019, compared to 28 reports in April 2020.

- East Cambridgeshire – An increase, especially for April. For 2019, we recorded 5 bonfires in Feb, 4 in March and 5 in April. For 2020, we recorded 4 bonfires in Feb, 3 in March and 9 in April (up to 21/4/2020).

- East Northamptonshire Council have had an increase in bonfire complaints:

| Month               | 2020 | 2019 |
|---------------------|------|------|
| March               | 4    | 3    |
| April (to 21 April) | 11   | 3    |

- Exeter - We have seen a large increase in complaints about bonfires and smoke. Since March 26<sup>th</sup> we have received 23 complaints, compared to just 3 in the same period last year.
- In Southend, complaints about bonfires have doubled in the first weeks of April. During 1-21 April 2019, number of complaints about bonfires was 8, whilst for the same dates this year it was 20.
- Complaints to Wakefield Council of smoke nuisance have more than doubled when compared to the same period in 2019.
- Stafford reported an increase particularly as garden waste collections have halted.

|      | 23-29 March | 30 March – 5 April | 6-12 April | 13-19 April | TOTALS |
|------|-------------|--------------------|------------|-------------|--------|
| 2019 | 0           | 0                  | 0          | 2           | 2      |
| 2020 | 1           | 1                  | 0          | 4           | 6      |

- Harborough DC also saw an increase during March and April:

| Year  | February | March | April |
|-------|----------|-------|-------|
| Y2017 | 1        | 4     | 1     |
| Y2018 | 2        | 1     | 0     |
| Y2019 | 2        | 3     | 1     |
| Y2020 | 2        | 7     | 9     |

- Milton Keynes reported that from 16 Mar - 21 Apr 2019 they received 24 bonfire complaints and for the same period this year the number was 60.
- Adur & Worthing reported a marked increase. The number of complaints has reduced slightly since last week, since they put out messages to residents not to burn waste.

|      | January | February | March | April |
|------|---------|----------|-------|-------|
| 2020 | 8       | 2        | 10    | 39    |
| 2019 | 3       | 6        | 4     | 7     |

- Harrogate has reported a tripling of complaints received on bonfires. Between 1 March – 20 April 2019 there were only 5 complaints about bonfires, the same period this year, we have received 14 complaints.
- North Devon reported a 30% increase in bonfire complaints compared to same period in recent years although they acknowledged that there are other factors which could influence this, such as when Easter falls and the weather.

- Bournemouth, Christchurch and Poole - With regards to bonfires, they have experienced a significant rise in complaints with more people stuck at home and the green waste service being stopped, although this is starting up again very shortly. "Across Bournemouth, Christchurch and Poole between 15/3/20 and 15/4/20, we've had 114 domestic smoke complaints compared to 33 during the same period last year, so a significant increase, but we are hopeful the reopening of the green waste service will help reduce this."
- Shropshire also reported more bonfire complaints - both domestic and industrial. "We have had a slight increase in complaints of fires in lock down compared to the same three weeks of dates last year (24 compared to 16). However, it should be noted that last year the Easter break was late and therefore some fires after bank holiday clearances and gardening may have come later last year... We are still receiving complaints."

### **3. What changes do you anticipate in indoor air quality as a result of the Covid-19 pandemic?**

All the practitioners we heard from anticipated reductions in air quality indoors. This is due to more people spending more time indoors, people doing more cooking, cleaning, home decorating and undertaking DIY work. This is likely to vary between individual households and will likely be dependent on socio-economic factors. For example, small dwellings with larger numbers of residents may see an increase in indoor pollution as a result of human activities such as cleaning. There may be more exposure to particulates and volatile organic compounds from more home cooking. Household fuel use will have a significant impact, with solid fuels producing worse indoor air quality than gas or electric forms of heating. Households with smokers are likely to be the most impacted. If restrictions continue or are repeated in winter months, indoor air quality will be more of a problem.

However, better and warmer weather means windows tend to be open, which mitigate against poor air quality. Furthermore, it is possible that as outdoor pollution levels fall in urban areas, indoor pollution levels may also improve.

### **4. How might public exposure to air pollution have changed as a consequence of recent restrictions on movement?**

Overall, most practitioners responding to our request for information expected the overall exposure to air pollution to be lower than a similar time last year, due to the reasons cited in response to questions 1 and 2. Many people are not commuting to work. As a result, the exposure in vehicles and on buses would be reduced. Even for those who are still travelling, the exposure should be slightly lower, given that traffic levels are lower on the roads. Taking exercise outdoors may also be associated with lower exposure due to reduced traffic levels. Exposure to air pollution in the home is likely to be higher but as long as the weather stays warm and windows are opened, the net effect should be less exposure overall.

However, the above summary is a very general trend. This will vary between individuals, locations and households. Some who would ordinarily commute and work in more polluted environments will see a benefit. Others will have less access to 'fresh air' and may be

impacted by increases in indoor air pollution. Children living with smokers are likely to be the most impacted. Furthermore, as a result of increased bonfires, on a micro scale, some individuals will have increased exposure.

### **5. How might altered emissions of air pollutants over the next three months affect UK summertime air quality?**

If the lockdown continues in its current form, this should lead to an overall improvement in UK summertime air quality. The emissions of pollutants will depend on how long lockdown lasts and how quickly it is eased and for which sectors. If restrictions are relaxed but many people may continue to work from home, the improvement in air quality would last longer. However, if and when we get back "to normal" we could see a re-surge in emissions.

It is important to look forward to summertime and to ask what will happen to people's holiday plans. At the moment, it seems likely that foreign travel will remain restricted for some time meaning continuing reductions in emissions from air traffic. However, if restrictions to movement within the UK are eased, it is likely that day trips, short breaks and holidays within the UK would increase, possibly leading to an increase in emissions from road vehicles. As a result, it is possible that air quality in rural areas may be adversely affected with people heading for the coast and to national parks.

Most of our respondents would expect to see a reduction of particles and combustion gasses from traffic, but an increase in ozone in urban areas. Increased summertime ozone episodes are expected due to decreased traffic emissions, which would normally locally scavenge (reduce) exhaust emissions. Ground level ozone related to crop production is also likely to remain the same as for other years, along with all agricultural emissions.

Ozone and PM episodes originating from the continent will continue to be a public health issue whatever happens in the UK, so it will be important to consider what neighbouring countries will be doing and how quickly they ease restrictions. The weather will also play a part.