## Living near a busy road can stunt children's lung growth footnotes

1. Full report can be downloaded here: http://bit.ly/KingsHEIR2019

Further information about the research project:
http://www.erg.kcl.ac.uk/research/home/projects/personalised-health-impacts.html

2. Full statistics from report for each city available below.

Population of London estimated at 8,908,081 (ONS, mid 2018) so 33% would be 2,969,360.

3. **13 Health conditions / outcomes:** asthma; coronary heart disease; cardiovascular disease; cardiac arrest; lung cancer; reduced lung function; COPD; respiratory disease; pneumonia; bronchitic symptoms; chest infection (acute bronchitis); term low birthweight; stroke

4. **13 cities in UK and Poland:**
London, Birmingham, Bristol, Derby, Liverpool, Manchester, Nottingham, Oxford, Southampton.
Warsaw, Wroclaw, Poznan, Bielsko-Biala

5. "levels of NO2 pollution in London having reduced by 29% due to ULEZ".Greater London Authority - Central London Ultra Low Emission Zone – Six Month Report (October 2019) https://www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/central-london-ulez-six-month-report

**Summary of key UK statistics:** (NB. some cities do not have roadside monitoring stations for comparing health impacts on busy roads compared with quieter streets, hence the gaps in the table below)

| Example Statement | London | Birmin-gham | Bristol | Derby | Liverpool | Man-chester | Nottin-gham | Oxford | South-ampton |
|---|---|---|---|---|---|---|---|---|---|
| Roadside air pollution in **London** stunts lung growth in children by 12.5% (long-term). | 12.50% | 7.70% | 5.30% | | 4.60% | | 2.80% | 14.10% | 3.80% |
| Cutting air pollution in **London** by one fifth would increase children's lung capacity by around 4.1% (long-term). | 4.10% | 2.60% | 2.30% | 3.10% | 2.10% | 2.60% | 2.80% | 2.80% | 3.20% |
| Living near busy roads in **London** may contribute to a 9.7% greater chance of | 9.70% | 4.10% | | | | | | | |

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| developing lung cancer (long-term). | | | | | | | | | |
| Cutting air pollution in **London** by one fifth would decrease lung cancer cases by around **7.6%** (long-term). | **7.60%** | **6.40%** | **5.90%** | | **5.30%** | **5.60%** | **6.70%** | **6%** | **5.90%** |
| Living near a busy road in **London** increases your risk of out-of-hospital cardiac arrest by **3.0%** (short-term). | **3.0%** | | | | | | | | |
| Living near a busy road in **London** increases your risk of hospitalisation for stroke by **6.6%** (short-term). | **6.6%** | **4%** | **2.80%** | | **2.40%** | | **1.50%** | **7.40%** | **2%** |
| Living near a busy road in **London** may increase your risk of stroke by **10.2%** (long-term). | **10.20%** | | | | | | | | |
| Living near a busy road in **London** can increase your risk of coronary heart disease by **6.3%** (long-term). | **6.30%** | **0.20%** | **8%** | | | | **1%** | **2.70%** | **5.60%** |
| Cutting air pollution in **London** by one fifth may result in **1,885** fewer cases of coronary heart disease each year (long-term). | **1885** | **165** | **62** | | **62** | | **52** | **83** | **48** |
| Air pollution may contribute to asthmatic children that live near busy roads in **Birmingham** being subject to a 6.7% greater chance of developing bronchitic symptoms (long-term). | | **6.70%** | **4.50%** | | **3.80%** | | **2.30%** | **13.30%** | **3.10%** |

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|---|---|---|---|---|---|---|---|---|---|
| Cutting air pollution in **London** by one fifth could contribute to **3,685** fewer asthmatic children with bronchitic symptoms each year (long-term). | **3685** | **328** | **94** | | **85** | **85** | **134** | **38** | **69** |

6. The calculation of increased lung cancer risk is based on the difference between long term average air pollution ($PM_{2.5}$) levels at roadside monitoring sites compared to the long-term average at the city background. Note that a 10% greater chance is not the same as a 10% chance – the absolute chance for an individual depends on other factors not just air pollution. (This point applies to other health outcomes as well).

7. The calculations on reduced lung growth are based on the difference between long term average nitrogen dioxide levels at roadsides compared to the long-term average at less polluted, quieter streets (the city background). Compares the resulting predicted change in Forced Vital Capacity (a measure of the volume of the lungs) in children from age 11-15 with the theoretical normal values in children across the same age span. For the table, one fifth is an arbitrary number for a reduction in long-term nitrogen dioxide concentrations.

8. The calculations of increased risk for coronary heart disease are similar to the above (i.e. the difference between long term average air pollution levels at roadsides compared to the long-term average at less polluted, quieter streets (the city background)). Coronary heart disease (heart attacks and a type of angina (heart pain)) has many well-established causes e.g. (fatty diet) but air pollution may contribute too.

9. The calculation of bronchitic symptoms in asthmatic children aged 5 to 14 are based on the difference between long term average air pollution levels at roadsides compared to the long-term average at less polluted, quieter streets (the city background). Bronchitic symptoms in asthmatic children refers to symptoms of cough and phlegm. While less well known, these are also symptoms of asthma along with wheeze and breathlessness.

10. The calculations for short-term exposure to air pollution beside busy roads in the table are based on the difference between the middle of the range of air pollution levels at roadsides and the middle of the range of air pollution levels away from roads.

11. One pollutant was chosen for each outcome because there can be overlap between the effects of the different pollutants in the original studies.