

What is the impact of deprivation on air quality and noise pollution?

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Project overview

This project aims to investigate the existence of a link between air and noise pollution and deprivation. We have undertaken this project because Nottingham has previously been one of the most polluted areas in Europe and there are also issues with deprivation, suggesting that there may be a correlation. We have worked with the University of Nottingham to develop the necessary skills for the project. We will use primary and secondary data to help us investigate the relationship. For primary data we will use air and noise pollution monitors and environmental surveys. For secondary data we will use government pollution records and the Index of Multiple Deprivation (IMD).

What we hope to accomplish

- We will find whether there is any relationship between air and noise pollution and deprivation and whether any correlation is positive.
- We will use primary and secondary data to find evidence for this link to ensure that any findings are widely supported.
- We will investigate a variety of different locations around Nottingham and Derby, with varying socioeconomic characteristics to find any anomalies and ensure that the data is reliable.

Background information

Air pollution is the single greatest environmental threat to health in the UK (1) and the Journal of Public Health published that in Wales air pollution concentrations were highest in the most deprived areas (2). Therefore, it may be likely that there is a similar relationship in Nottingham and parts of Derby. Long term air pollution exposure can lead to health issues like asthma, dementia and heart disease which can make people unable to work. This may make people more deprived as income is one of the domains of the IMD and so perhaps air pollution leads to deprivation, rather than the other way around. However, houses in polluted areas such as near large roads and in industrial areas are less desirable and cheaper which may lead to the area becoming more generally deprived. In this case, again air pollution would cause an area to become deprived. This all suggests that there is a link between the variables.



Hand-held air pollution monitor

Methodology

We have been using mobile air pollution monitors with GPS tracking that automatically maps the data. We have then compared this data with the IMD maps to review the link between deprivation and the areas of more severe pollution. We have also used a hand-held air pollution monitor and noise pollution monitors in specific locations in Nottingham city centre so we can assess how the levels of pollution fluctuate and the potential factors that may provoke this. We have also used diffusion tubes at several postcodes from Nottingham to Derby which contain a chemical that calculates NO₂ concentrations using colourimetric analysis, we can therefore see areas of higher air pollution.

Predicted results

We expect that there will be a correlation between the areas of higher air/noise pollution and higher deprivation. Areas of higher deprivation are associated with urban areas of high density building and areas that are closer to main roads – so would likely have greater levels of air/noise pollution. However, it is difficult to prove the direction of causation between air pollution and deprivation, we are developing a strategy to investigate this relationship as reliably as possible.

Conclusion

There is currently little to conclude due to being in early stages of the project, however, patterns between air and noise pollution and levels of deprivation has been found by topical research conducted across several secondary sources. It is a complex question with several factors interacting (for example, weather, seasons, and land use).

Next steps

We plan to continue using mobile air pollution monitors and decibel readers in areas of varying deprivation - judged using primary data (environmental surveys) and secondary data (IMD) - to conclude whether there is a significant correlation between the two factors. We will also carry on our partnership with the University of Nottingham to improve our data collection skills for this with workshops. After this, we shall start to research confounding variables such as weather to determine whether deprivation is the most significant factor.

References: 1. Environment Agency (2023). State of the Environment: Health, People and Environment. Available at: [State of the environment: health, people and the environment - GOV.UK \(www.gov.uk\)](https://www.gov.uk/state-of-the-environment/health-people-and-environment) 2. Brunt et al (2016) Air Pollution, Deprivation and Health: Understanding Relationships to Add Value to Local Air Quality Management Policy and Practice in Wales, UK. Journal of Public Health, 39(3)

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