

## BiB Breathes Briefing Note 1

# Air Quality and the Clean Air Zone in Bradford – what do Bradford Residents think?

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### Why is air pollution a problem?

Air pollutants, such as those from vehicle exhaust, negatively impact on the health of both children and adults<sup>1</sup>. Pollution is linked to a range of health outcomes including poor birth outcomes<sup>2</sup>; cardiorespiratory disease<sup>3</sup>; lung<sup>4</sup> and non-lung cancer<sup>5</sup>; and cognitive development and neurological disorders<sup>6</sup>.

Over 64,000 deaths each year are attributable to outdoor air pollution in the UK<sup>7</sup>, with the health and economic impact of poor air disproportionately affecting young people and the elderly<sup>8</sup>, as well as those living in more deprived areas.

### What do we know about the health effects of air pollution in Bradford?

Born in Bradford is an internationally-recognised research programme which aims to find out what keeps families healthy and happy. Between 2007-2011 we recruited over 12,400 families during pregnancy and have been following up the lives of these children since birth. Our research has shown that in Bradford pollution is linked to:

- Lower birth weight in babies<sup>9</sup>
- Higher blood pressure in children aged 4-5<sup>10</sup>
- Childhood obesity at ages 6-11<sup>11</sup>
- Poorer cognitive development at age 5<sup>12</sup>
- Biological aging of telomeres (the end caps of our chromosomes which protect our DNA) in children aged 8<sup>13</sup>

In Bradford, pollution is associated with 33% of childhood asthma cases<sup>14</sup> and our research indicates that deprived communities bear the greatest health burden from pollution<sup>15</sup>.

### How is Bradford planning to reduce air pollution?

One way of improving these health outcomes is to reduce the amount of air pollutants people experience; the current UK regulations set the limit of nitrogen dioxide (NO<sub>2</sub>), a pollutant formed from the burning of fuels, at 40 µg/m<sup>3</sup> while the limit set by the World Health Organization (WHO) is a quarter of that (10 µg/m<sup>3</sup>).

Bradford has been identified by the UK government as exceeding this at several locations across the city, many of which are in inner-city areas where the most deprived wards are located and where there are high levels of ethnic diversity and young people under the age of 16<sup>16</sup>. Improving air quality for these areas would therefore help those who are the most affected by air pollution.

### What is the Bradford Clean Air Zone?

In 2018 Bradford was one of 28 local authorities to receive a ministerial directive to quickly reduce pollution in the city by implementing a clean air zone (CAZ). Bradford Council developed a [clean air plan](#) which includes the introduction of a CAZ where older, more polluting commercial vehicles such as buses, vans and taxis will be charged a daily fee for entering the zone. Passenger cars are exempt from charges.

The CAZ boundary encompasses the city's inner ring road and a key corridor out to the North West of the city (Figure 1). The boundary contains approximately 20% of the Bradford population and encompasses an area of 22.4 km<sup>2</sup>, comprised of the most deprived inner-city wards but also includes less deprived wards on the outskirts of the city. The CAZ will go into effect on September 26, 2022.

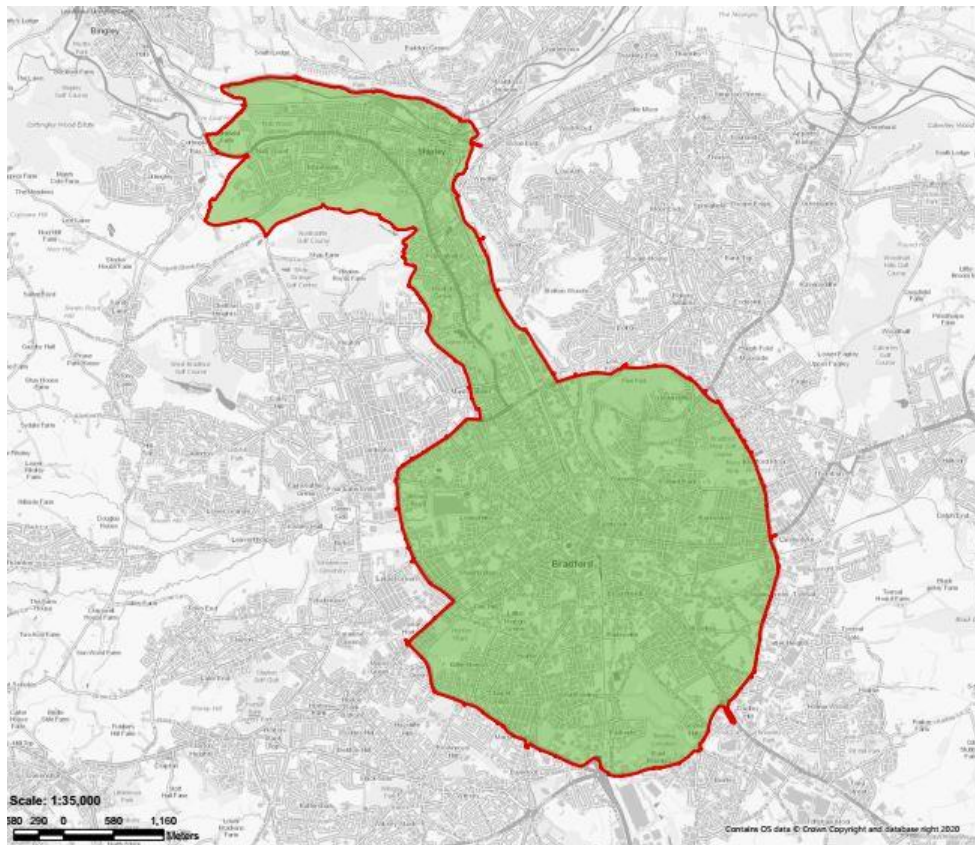


Figure 1: The Bradford Clean Air Zone boundary (Image from Bradford Council)

Local businesses and taxis are able to access grants to contribute to the cost of upgrading or replacing their vehicles to CAZ standards with 25% of all grants prioritised for electric vehicles. Bradford residents and businesses (including small/medium enterprises and the self-employed) with non-compliant vehicles can apply for exemptions that mean they will not be charged to drive in the Bradford CAZ. It is planned that the CAZ will be supported by a range of other initiatives including: electric bus routes in key parts of the city

with road space allocation to prioritise buses and reduce journey times; installation of alternative energy centres providing cost effective green refuelling/recharging facilities; travel planning with businesses to promote car sharing, active travel and public transport use amongst employees.

### **What do Bradford residents think about air quality and the clean air zone?**

The Born in Bradford team surveyed 1,154 BiB families, as well as 842 people who work or live in Bradford, about their perceptions of air quality in Bradford and their thoughts on the CAZ between April – December 2021. BiB families were contacted by a member of the BiB team and completed questionnaires remotely, online, via post, telephone, or face-to-face. Members of the general public completed the questionnaire online or at community events such as those held in public parks.

Thirty-nine percent of the BiB families sample reported that they were of Pakistani origin, 91% were female, and over 90% were aged between 35-54 years. Just over half (51%) of the BiB sample lived in the most deprived quintile of England and Wales according to the Index of Multiple Deprivation (IMD).

Ten percent of the general public sample reported that they were of Pakistani origin, 50% were female, and 46% percent were aged between 35-54 years.

*Details of the recruited BiB and general population sample can found in Appendix 1 and a summary of their responses in Appendix 2.*

### **Summary of key findings**

- Few thought the air quality in Bradford was good (14% BiB families; 8% general public) and only 10% were not concerned about Bradford’s air quality.
- The majority of our BiB families (65%) and the general public (70%) thought it was extremely important to improve air quality in Bradford.
- Nearly three-quarters of respondents said they supported the implementation of the CAZ (71% BiB families; 75% general public).
- Almost half of the sample thought that the CAZ would reduce air pollution in Bradford (46% BiB families; 45% general public) while only one fifth of respondents thought that the CAZ would not reduce air pollution (19% BiB families; 23% general public).
- Two thirds of respondents agreed that the CAZ would improve the health of their families and community (66% BiB families, 64% general public).

## About this briefing note

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## References

1. World Health Organisation. Ambient (outdoor) air pollution. [https://www.who.int/en/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/en/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health) (2021).
2. Li, X. *et al.* Association between ambient fine particulate matter and preterm birth or term low birth weight: An updated systematic review and meta-analysis. *Environmental Pollution* vol. 227 596–605 (2017).
3. Requia, W. J. *et al.* Global Association of Air Pollution and Cardiorespiratory Diseases: A Systematic Review, Meta-Analysis, and Investigation of Modifier Variables. *Am. J. Public Health* **108**, S123–S130 (2017).
4. Hamra, G. *et al.* Outdoor Particulate Matter Exposure and Lung Cancer: A Systematic Review and Meta-Analysis. *Environ. Health Perspect.* **122**, 906–911 (2014).
5. Kim, H.-B., Shim, J.-Y., Park, B. & Lee, Y.-J. Long-term exposure to air pollution and the risk of non-lung cancer: a meta-analysis of observational studies. *Perspect. Public Health* **140**, 222–231 (2019).
6. Fu, P., Guo, X., Cheung, F. M. H. & Yung, K. K. L. The association between PM<sub>2.5</sub> exposure and neurological disorders: A systematic review and meta-analysis. *Sci. Total Environ.* **655**, 1240–1248 (2019).
7. Lelieveld, J. *et al.* Cardiovascular disease burden from ambient air pollution in Europe reassessed using novel hazard ratio functions. *Eur. Heart J.* **40**, 1590–1596 (2019).
8. Public Health England. *Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report.* [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/708855/Estimation\\_of\\_costs\\_to\\_the\\_NHS\\_and\\_social\\_care\\_due\\_to\\_the\\_health\\_impacts\\_of\\_air\\_pollution\\_-\\_summary\\_report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/708855/Estimation_of_costs_to_the_NHS_and_social_care_due_to_the_health_impacts_of_air_pollution_-_summary_report.pdf) (2018).
9. Pedersen, M. *et al.* Ambient air pollution and low birthweight: a European cohort study (ESCAPE). *Lancet Respir. Med.* **1**, 695–704 (2013).
10. Warembourg, C. *et al.* Urban environment during early-life and blood pressure in young children. *Environ. Int.* **146**, (2021).
11. Vrijheid, M. *et al.* Early-Life Environmental Exposures and Childhood Obesity: An Exposome-Wide Approach. *Environ. Health Perspect.* (2020) doi:10.1289/ehp5975.
12. Binter, A. C. *et al.* Urban environment and cognitive and motor function in children from four European birth cohorts. *Environ. Int.* **158**, (2022).
13. Clemente, D. B. P. *et al.* Prenatal and childhood traffic-related air pollution exposure and telomere length in European children: The HELIX project. *Environ. Health Perspect.* **127**, (2019).
14. Khreis, H. & Nieuwenhuijsen, M. J. Traffic-related air pollution and childhood asthma: Recent advances and remaining gaps in the exposure assessment methods. *Int. J. Environ. Res. Public Health* **14**, 1–19 (2017).
15. Mueller, N. *et al.* Socioeconomic inequalities in urban and transport planning related exposures and mortality: A health impact assessment study for Bradford, UK. *Environ. Int.* (2018) doi:10.1016/j.envint.2018.10.017.
16. Rashid, R., Chong, F., Islam, S., Bryant, M. & McEachan, R. R. C. Taking a deep breath: a qualitative study exploring acceptability and perceived unintended consequences of charging clean air zones and air quality improvement initiatives amongst low-income, multi-ethnic communities in Bradford, UK. *BMC Public Health* **21**, (2021).

## APPENDIX ONE: Characteristics of the included sample

	BiB families (N=1154) N (%)	General public (N=842) N (%)
<b>Age</b>		
18-24	0 (0.0)	45 (6.9)
25-34	73 (7.5)	112 (17.1)
35-44	540 (55.4)	172 (26.3)
45-54	338 (34.7)	128 (19.6)
55-64	23 (2.4)	96 (14.7)
65+	0 (0.0)	87 (13.3)
Prefer not to say	0 (0.0)	14 (2.1)
<b>Total</b>	<b>974(100)</b>	<b>654 (100)</b>
<i>Missing</i>	<i>180</i>	<i>188</i>
<b>Ethnicity</b>		
White British	505 (45.2)	393 (77.1)
Pakistani	437 (39.1)	53 (10.4)
Other	175 (15.7)	64 (12.6)
<b>Total</b>	<b>1117 (100)</b>	<b>510 (100)</b>
<i>Missing</i>	<i>37</i>	<i>332</i>
<b>Gender*</b>		
Male	105 (9.2)	401 (47.6)
Female	1042 (90.9)	418 (49.6)
Prefer to use own term	0 (0.0)	4 (0.5)
Prefer not to say	0 (0.0)	19 (2.3)
<b>Total</b>	<b>1147 (100)</b>	<b>842 (100)</b>
<i>Missing</i>	<i>7</i>	<i>0</i>
<b>Deprivation (IMD)*</b>		
Quintile 1	581 (51.1)	-
Quintile 2	300 (26.4)	-
Quintile 3	142 (12.5)	-
Quintile 4	92 (8.1)	-
Quintile 5	23 (2.0)	-
<b>Total</b>	<b>1138 (100)</b>	
<i>Missing</i>	<i>16</i>	<i>-</i>

\*The BiB sample is predominately female as the BiB cohort recruited pregnant women so mothers are the main respondents.

\*IMD is not available for the general population survey as we did not collect post code information to derive this information.

## APPENDIX TWO: Survey responses

### 1. What do you think about the air quality in Bradford generally?

	BiB families N (%)	General public N (%)
Very Poor	84 (7.4)	150 (18.5)
Poor	308 (27.1)	347 (42.9)
Fair	574 (50.6)	239 (29.5)
Good	157 (13.8)	63 (7.8)
Excellent	12 (1.11)	10 (1.2)
<b>Total</b>	<b>1135 (100)</b>	<b>809 (100)</b>
<i>Missing</i>	<i>19</i>	<i>33</i>

### 2. How concerned are you about air quality in Bradford?

	BiB families N (%)	General public N (%)
Not at all Concerned	124 (10.9)	74 (8.8)
Slightly Concerned	285 (25.1)	130 (15.4)
Somewhat Concerned	313 (27.5)	152 (18.1)
Moderately Concerned	207 (18.2)	175 (20.8)
Extremely Concerned	137 (12.1)	262 (31.1)
Don't know	71 (6.4)	17 (2.0)
<b>Total</b>	<b>1137 (100)</b>	<b>810 (100)</b>
<i>Missing</i>	<i>17</i>	<i>32</i>

### 3. How important do you think it is to improve air quality?

	BiB families N (%)	General public N (%)
Not at all Important	6 (0.5)	16 (2.0)
Slightly Important	46 (4.0)	43 (5.3)
Somewhat Important	126 (11.1)	65 (8.1)
Moderately Important	186 (16.3)	107 (13.3)
Extremely Important	740 (65.0)	568 (70.4)
Don't know	35 (3.1)	8 (1.0)
<b>Total</b>	<b>1139(100)</b>	<b>807(100)</b>
<i>Missing</i>	<i>15</i>	<i>35</i>

#### 4. Do you think the Clean Air Zone is a good idea?

	BiB families	General public
	N (%)	N (%)
Yes	794 (71.1)	571 (74.7)
No	110 (9.9)	109 (14.3)
Don't Know	213 (18.5)	84 (11.0)
<b>Total</b>	<b>1117 (100)</b>	<b>764 (100)</b>
<i>Missing</i>	37	78

#### 5. Do you think the Clean Air Zone is going to reduce the air pollution in Bradford?

	BiB families	General public
	N (%)	N (%)
Yes	509 (45.6)	350 (45.5)
No	209 (18.7)	176 (22.9)
Don't Know	398 (35.7)	243 (31.6)
<b>Total</b>	<b>1116 (100)</b>	<b>769 (100)</b>
<i>Missing</i>	38	73

#### 6. How much do you agree or disagree with the following statement: the CAZ will improve the health of my family/community

	BiB families	General public
	N (%)	N (%)
Strongly Disagree	67 (6.0)	55 (7.2)
Disagree	63 (5.6)	67 (8.7)
Neither Agree nor Disagree	251 (22.4)	151 (19.6)
Agree	519 (46.3)	326 (42.4)
Strongly Agree	221 (19.7)	170 (22.1)
<b>Total</b>	<b>1121 (100)</b>	<b>769 (100)</b>
<i>Missing</i>	33	73