

# Investigating the impact of London's Ultra Low Emission Zone on children's health and costs: evidence from NHS health records

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## BACKGROUND

- Traffic-related air pollution (TRAP) negatively affects children's health and development.<sup>1</sup>
- In 2017, air pollution in England cost the NHS and social care an estimated £157 million.<sup>2</sup>
- Clean air zones such as **London's Ultra Low Emission Zone (ULEZ)** aim to improve air quality by discouraging highly polluting vehicles.
- A 2023 systematic review suggests that low emission zones are associated with improvements in cardiovascular outcomes.<sup>3</sup> The impacts on children's health and potential economic benefits remain unknown.

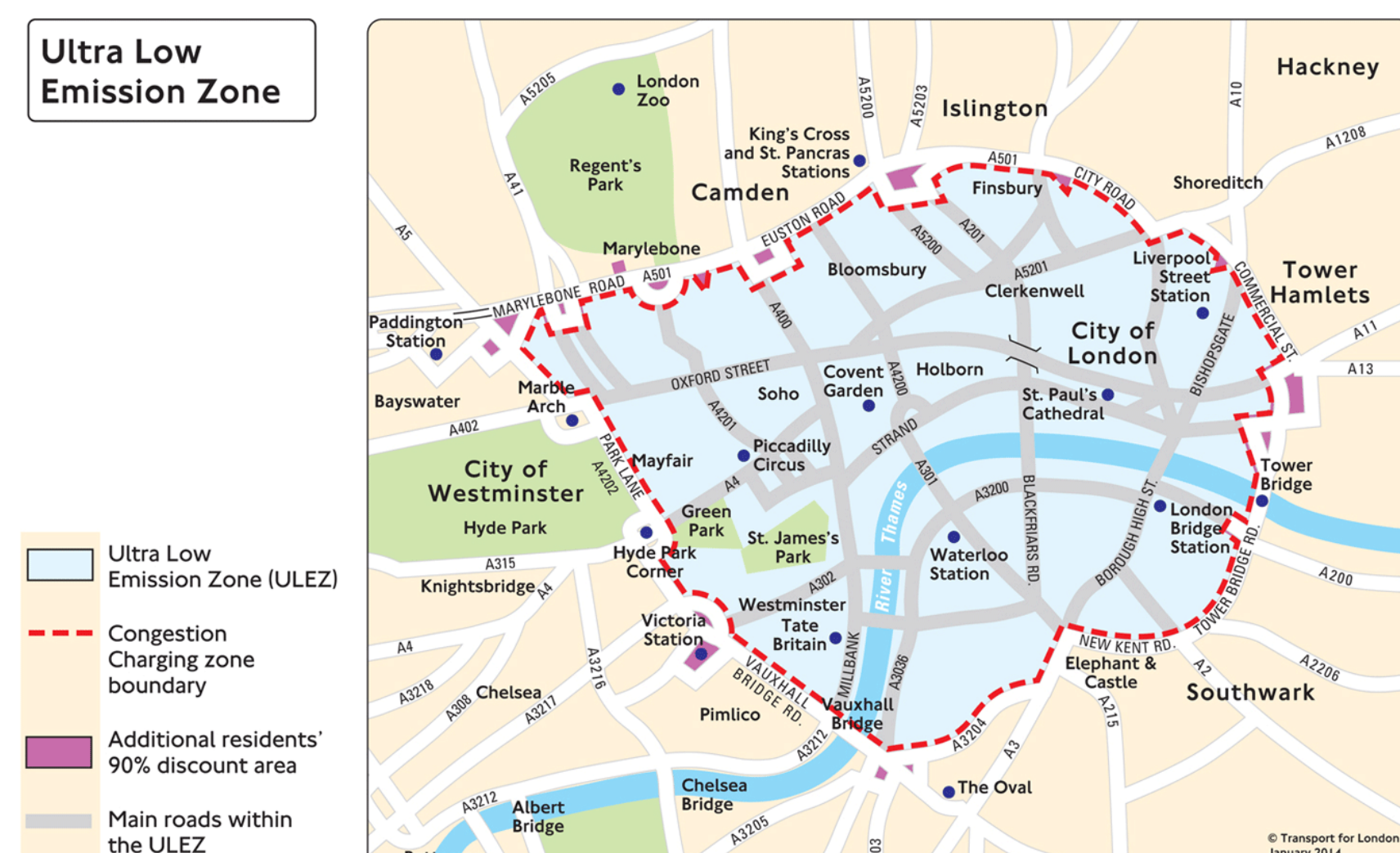


Figure 1. A map representing the ULEZ boundary, introduced in April 2019. In August 2023, it was extended to span all London Boroughs.

## OBJECTIVE

Using data from **Children's Health in London and Luton (CHILL)**, a prospective parallel cohort study, we aim to evaluate the impact of the ULEZ on children's health and health economics using CHILL participants' NHS health records.

## THE CHILL STUDY

The study population comprises the subset of children in the CHILL cohort who have consented to health record data access.

- Participants:** 3,414 children born between 2008-2012 were recruited from primary schools in central London (intervention site) and Luton/Dunstable (comparator site) in 2018/19.
- Comparator:** Luton has similar demography and social deprivation to central London and faces substantial problems with TRAP with less stringent air quality improvement strategies.
- Study data:** Health assessments were completed at baseline prior to the implementation of the ULEZ and repeated annually for four years.

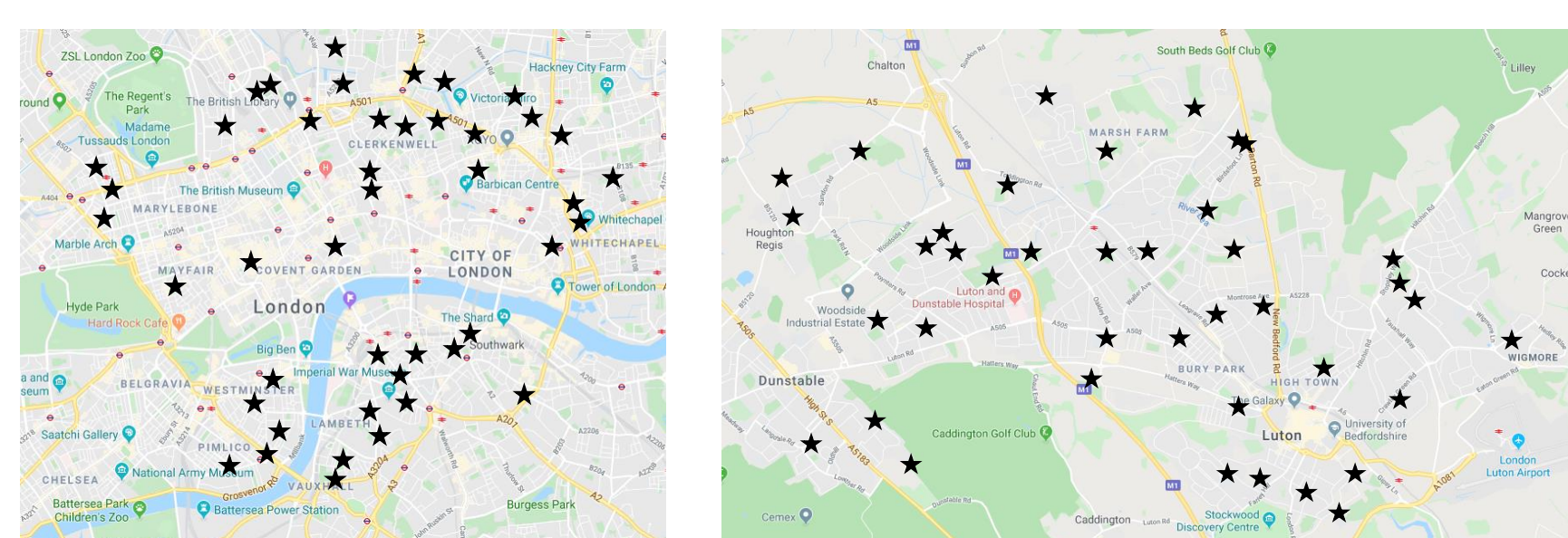
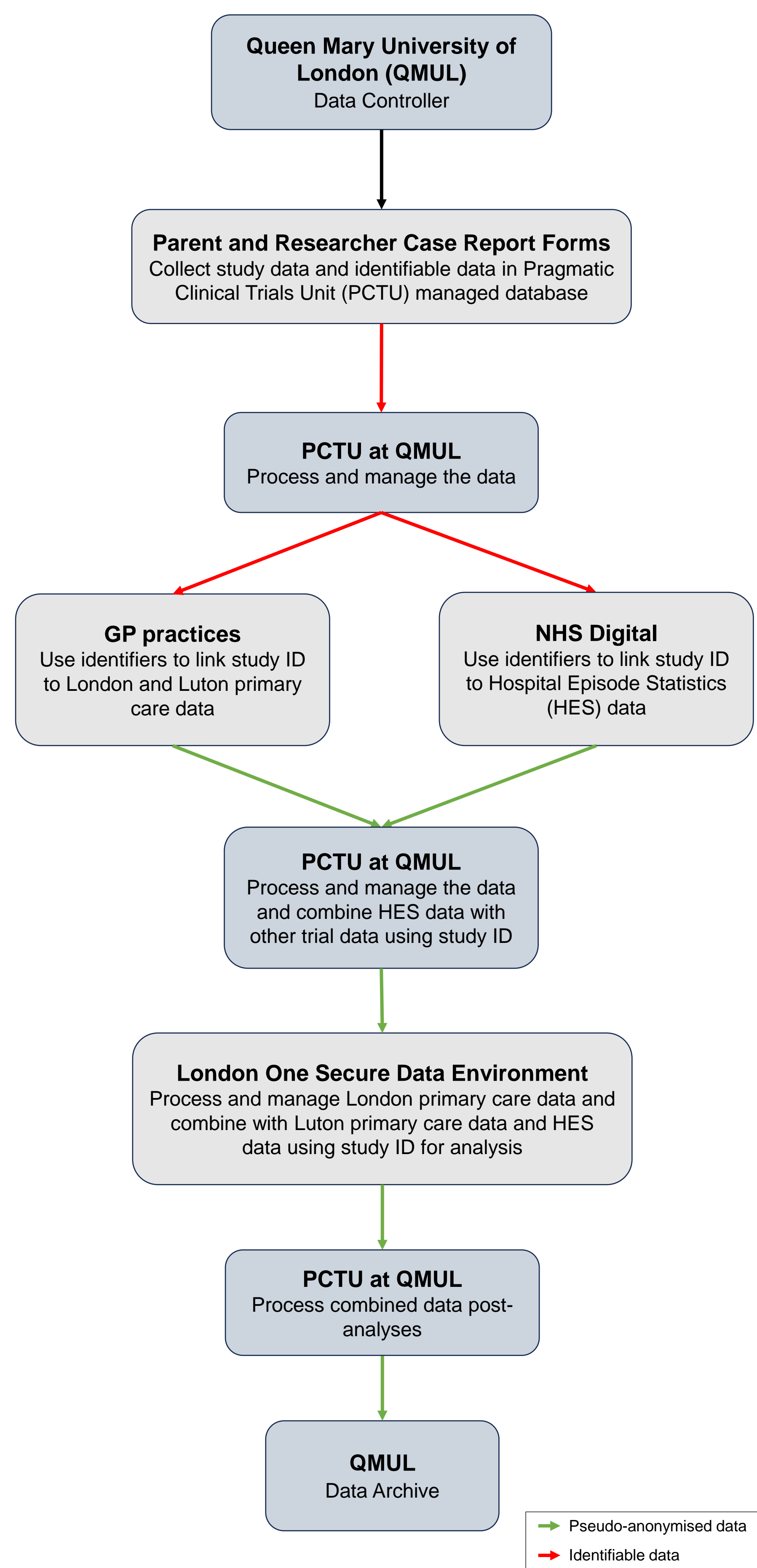


Figure 2. Maps indicating locations of recruited schools.

## METHODS

- Parental consent was provided at the start of the study and reconfirmed in 2023.
- For consented children, we will extract coded primary care data via GP practices and secondary care data via NHS Digital.
- Outcome measures** include respiratory, allergy, developmental and mental health conditions, infections, including COVID-19, and prescribing and healthcare use and costs.
- Health record data will be linked to:
  - Annual measurements of lung function and cognitive development
  - Parental and child annual questionnaire data
  - Annual pollutant exposure estimates (including NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, and O<sub>3</sub>)
- Data will be analysed longitudinally through a mixed effects model and health economic cost-consequence analysis.

## DATA FLOW DIAGRAM



## RESULTS

- 1,964 children (968 in London, 996 in Luton) consented for access to health records.

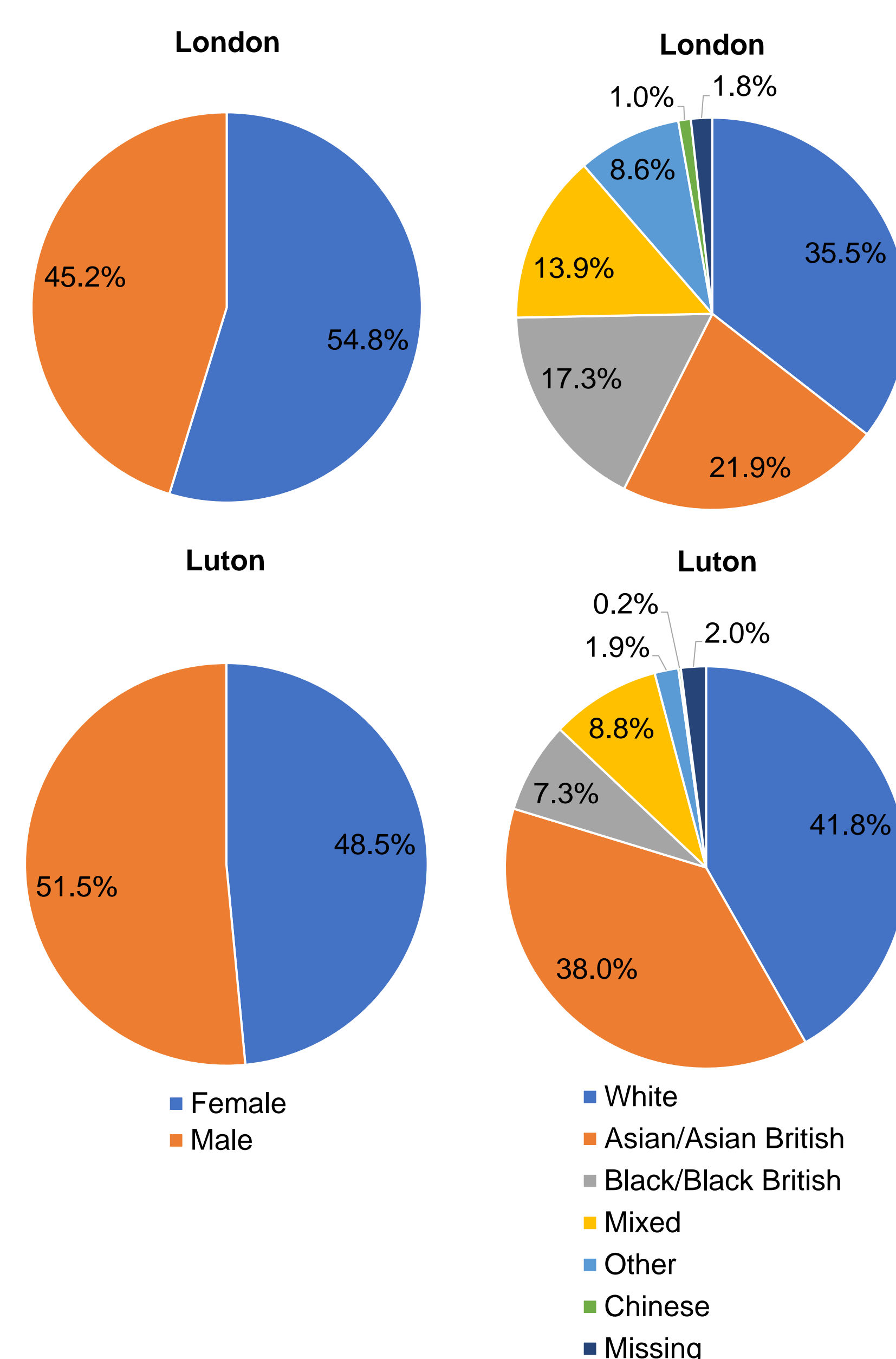


Figure 3. Sample demographics of consented children in each site, by sex and ethnicity.

## CONCLUSIONS

Findings will improve our understanding of how clean air zones impact children's health, wellbeing, healthcare use and costs, and will help inform implementation of air quality interventions across the UK and globally.

## REFERENCES

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