

Child deaths due to Asthma

Sylvia Stoianova

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University of Bristol**

Thematic report: Child deaths due to asthma or anaphylaxis

Sylvia Stoianova
Deputy Director, NCMD

NCMD
National Child Mortality Database

Knowledge, understanding and
learning to improve young lives

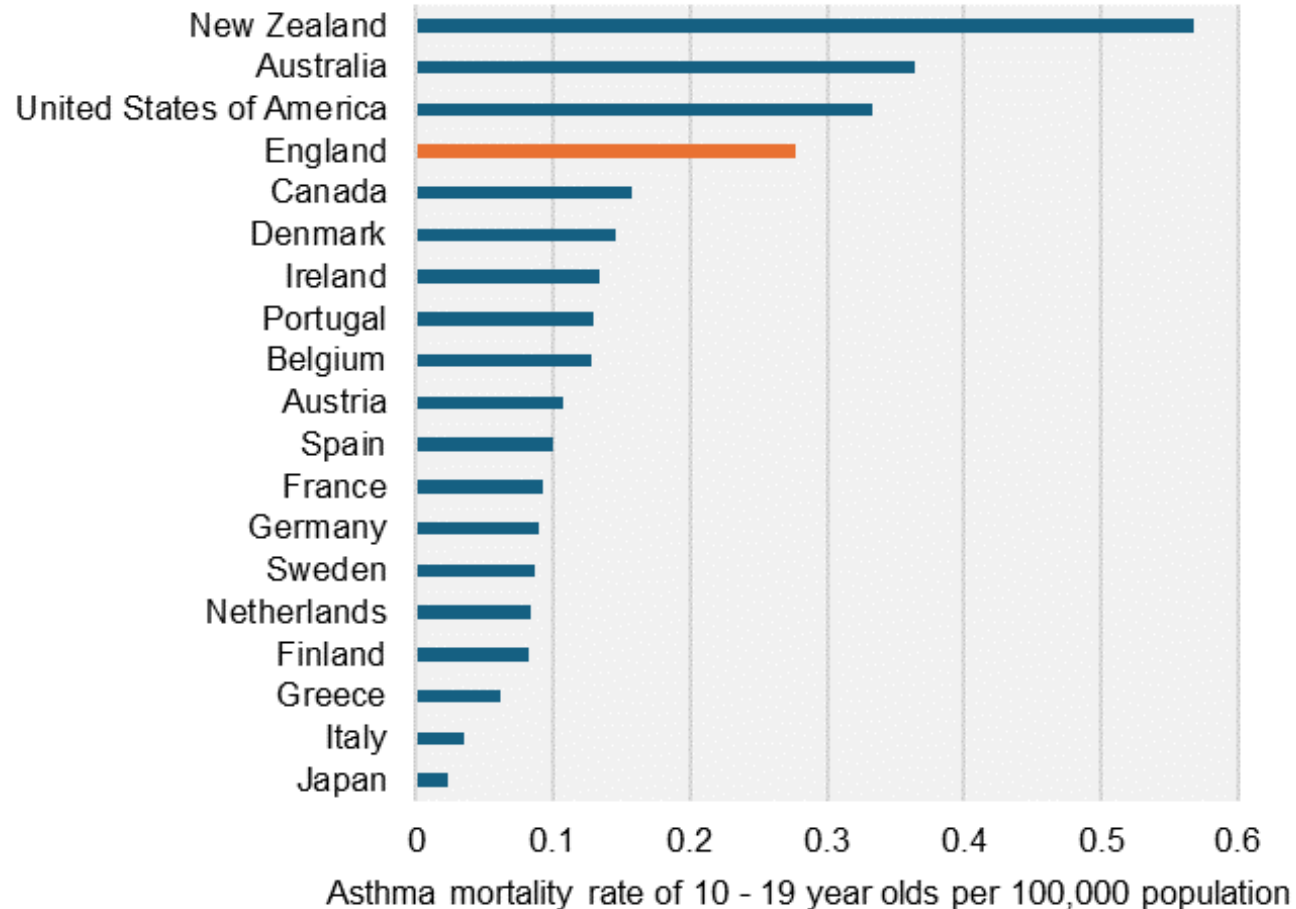
Asthma: Background

- One in 11 children and young people in the UK has asthma and asthma is the most common long-term medical condition in children in the UK¹.
- The UK has one of the highest prevalence, emergency admission and death rates for childhood asthma in Europe¹.
- Children and young people living in the most deprived areas are affected the worst².

1. Childhood Asthma, NHS England CYP Transformation Programme, <https://www.england.nhs.uk/childhood-asthma/>

2. State of Child Health, Royal College of Paediatrics and Child Health, 2020, [RCPCH – State of Child Health – Insight into the state of child health in the UK](#)

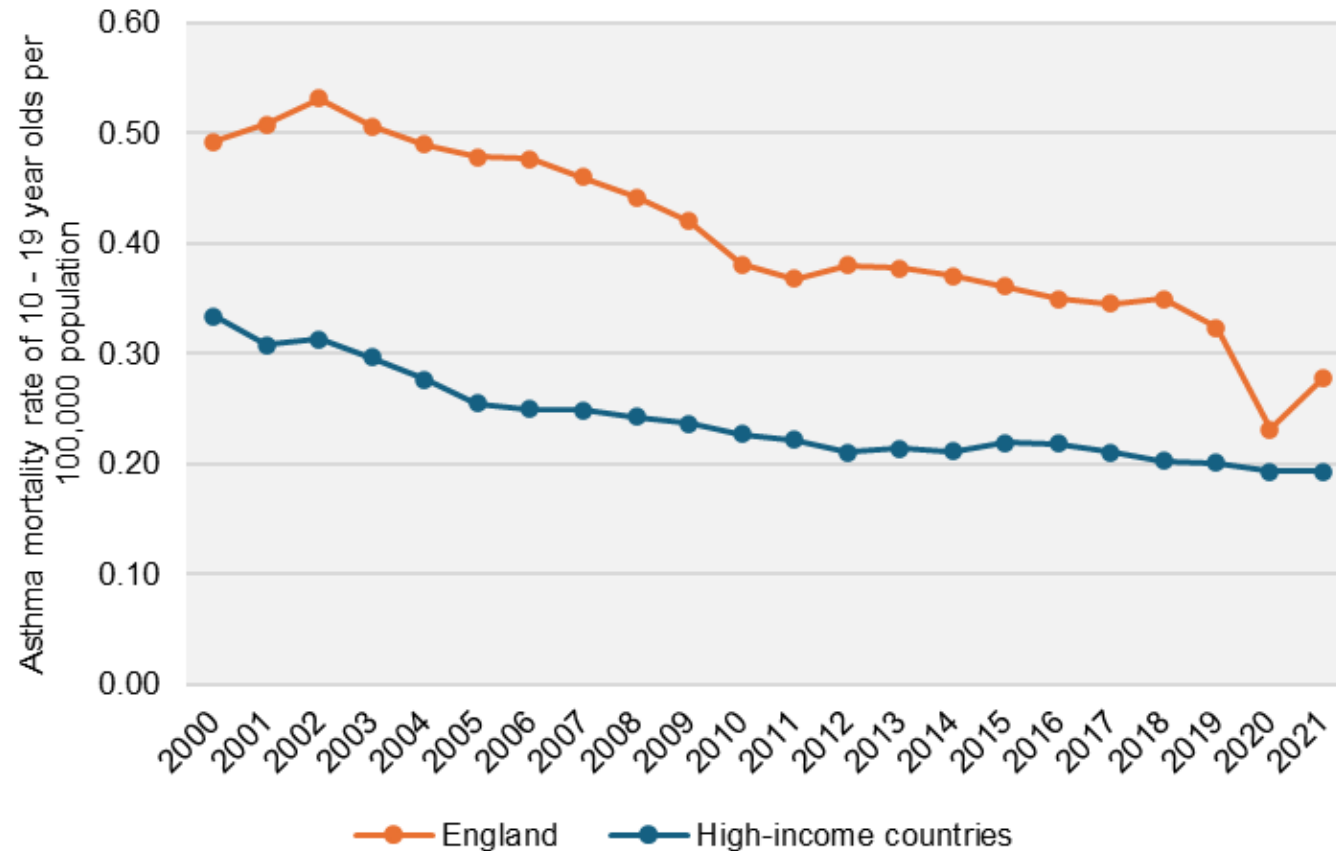
Asthma: International context



Adolescents in England have higher mortality rates from asthma than other similar countries, and the highest in Europe.

Data source: Global Burden of Disease Study 2021 (GBD 2021) Results. Available from: <https://vizhub.healthdata.org/gbd-results/> (Accessed: 21 May 2024)

Asthma: International context



Data source: Global Burden of Disease Study 2021 (GBD 2021) Results. Available from: <https://vizhub.healthdata.org/gbd-results/> (Accessed: 21 May 2024)

Long term exposure to traffic-related air pollution both increases the risk of children developing asthma, and more severe symptoms once it has developed.



Ananberg et al estimated that 1.85 million new asthma cases in children were attributable to traffic-related NO₂ globally in 2019.

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Long-term trends in urban NO₂ concentrations and associated paediatric asthma incidence: estimates from global datasets

[Susan C Anenberg, PhD](#) ^{a,1} [Arash Mohegh, PhD](#) ^{a,1} [Daniel L Goldberg, PhD](#) ^{a,b} [Gaige H Kerr, PhD](#) ^a [Michael Brauer, ScD](#) ^{c,d}

[Katrin Burkart, PhD](#) ^c et al. [Show more](#)

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new cases of asthma
4 million new asthma cases in children per year
attributable to traffic-related pollution

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Global, national, and urban burdens of paediatric asthma incidence attributable to ambient NO₂ pollution: estimates from global datasets

[Pattanun Achakulwisut, PhD](#)^a · [Prof Michael Brauer, ScD](#)^{b,c} · [Perry Hystad, PhD](#)^d · [Susan C Anenberg, PhD](#)^a  

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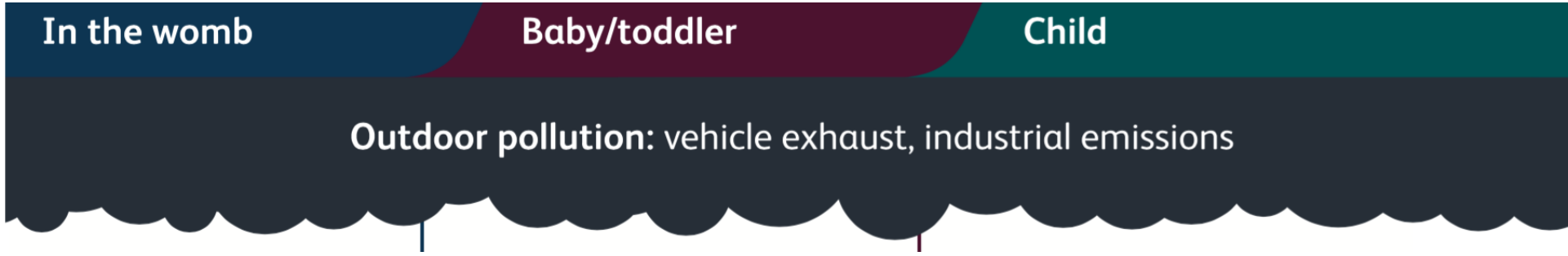
Achakulwisut *Lancet Planet Health*. 2019






Every breath we take: the lifelong impact of air pollution

Report of a working party
February 2016





-  **Harms from high pollution**
-  Smaller head
-  Lower birth weight at term





The inside story: Health effects of indoor air quality on children and young people

Published January 2020



Birth and infancy

- Respiratory problems - wheeze, rhinitis, atopic asthma, respiratory infections
- Low birthweight and pre-term birth



Pre-school

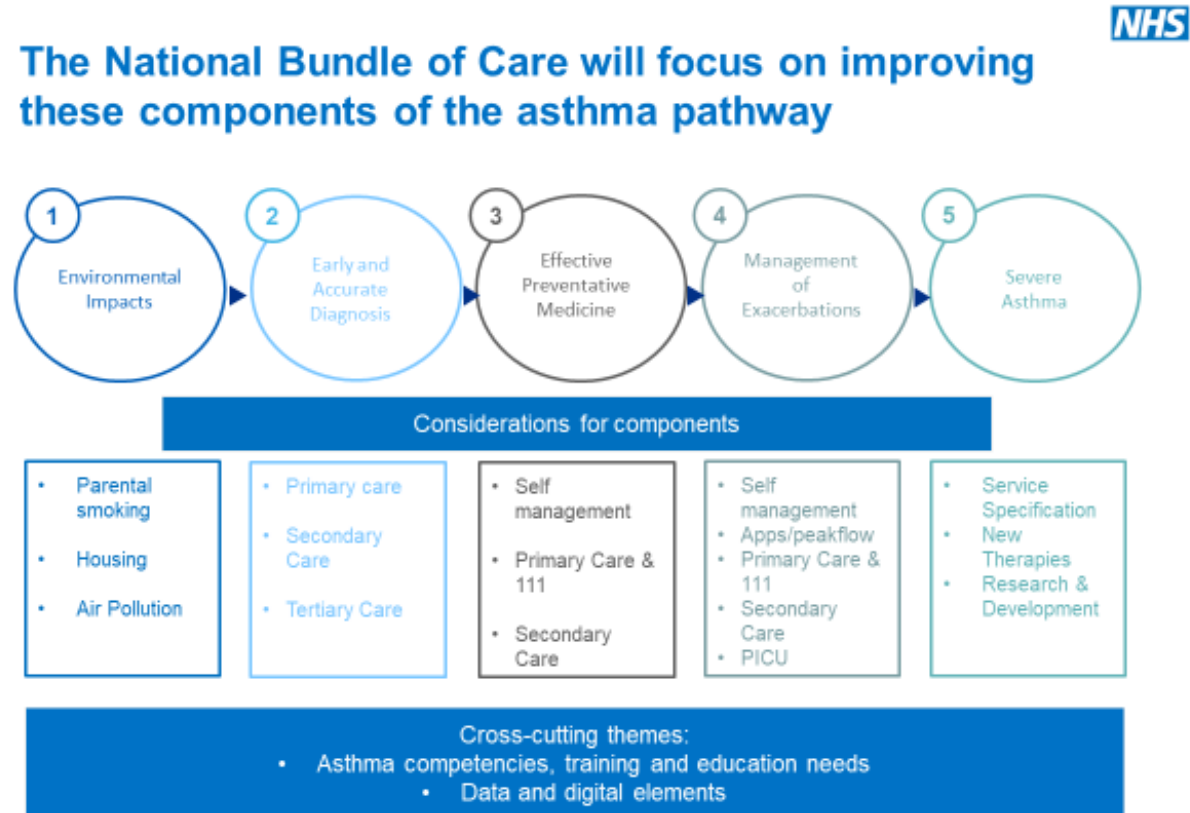
- Respiratory problems - wheeze, allergies, asthma, risk of respiratory diseases and pneumonia
- Eczema and atopic dermatitis
- Greater hyperactivity, impulsivity and inattention



School age

- Respiratory problems - wheeze, rhinitis, asthma, throat irritation, nasal congestion, dry cough
- Eczema, dermatitis, conjunctivitis, skin and eye irritation
- Reduced cognitive performance, difficulty sleeping

The National Bundle of Care for Children and Young People with Asthma includes national standards of care for professionals on air pollution and indoor air quality.



First clinic to look at dirty air's impact on children to open in London

VIEW 1 COMMENTS



By [Ross Lydal](#) @RossLydal | 18 March 2022



Enter keywords



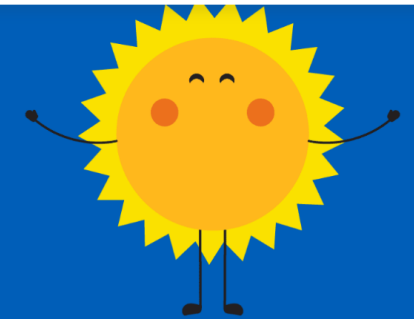
The air we breathe can have a large impact on our health.

This can affect multiple parts of the body and exposure to air pollution can cause and contribute to a wide range of medical problems.

Some members of society are more vulnerable to exposure than others, like children whose lungs are still developing, and those with pre-existing breathing conditions.

The Barts Charity Environmental Health Clinic sees children with known breathing issues, such as asthma. The clinic reviews the effects of breathing poor quality air by combining health information with measurements of how much air pollution a child is exposed to at home, when travelling and at school.

They provide families with strategies to reduce the effects of air pollution on



28 February 2024

First healthcare-targeted air pollution alert of its kind in the UK

- Mayor's new air quality alert will directly notify London's health professionals of high and very high air pollution episodes
- This is the first healthcare-targeted air pollution alert of its kind in the UK
- Clinicians will be better equipped to advise and support patients and their carers regarding the health effects of air pollution
- Nineteen high and 217 moderate pollution alerts have been issued since 2018, increasing Londoners' awareness of air pollution and enabling them to take steps to protect their health.

My air pollution plan:

Plan out the actions that you and your family can take to reduce the impact of air pollution on your health

	On all days	On high pollution days
I will use my inhaler as recommended by my GP or asthma nurse	<input type="checkbox"/>	<input type="checkbox"/>
I will treat air pollution the same way I treat other asthma triggers	<input type="checkbox"/>	<input type="checkbox"/>
We will walk, cycle or scoot to school	<input type="checkbox"/>	<input type="checkbox"/>
We will look up quieter routes to avoid roads with heavy traffic	<input type="checkbox"/>	<input type="checkbox"/>
We will turn on the extractor fan when cooking	<input type="checkbox"/>	<input type="checkbox"/>
We will swap our cleaning products to low chemical options	<input type="checkbox"/>	<input type="checkbox"/>
We will open the window when cooking	<input type="checkbox"/>	<input type="checkbox"/>
We will open the windows when cleaning	<input type="checkbox"/>	<input type="checkbox"/>
We will always turn the engine off when our car is stationary	<input type="checkbox"/>	<input type="checkbox"/>
If we paint, we will check it is labelled "low VOC"	<input type="checkbox"/>	<input type="checkbox"/>
We will leave the car at home when we can	<input type="checkbox"/>	<input type="checkbox"/>
We will ask people not to smoke in our home	<input type="checkbox"/>	<input type="checkbox"/>

This leaflet was designed in collaboration with:
children with asthma, their families, GPs and clinicians.
Thank you to Tower Hamlets Together and Global Action Plan as the original creators.



Awaab died aged just two (Image: MEN Media)

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Inside the 'disgusting' mouldy home family tried to leave before death of son, 2

Awaab Ishak died days after his second birthday. He had lived at the flat on the Freehold estate in Rochdale all his life despite his families pleas to their landlord about mould

By **Kelly-Ann Mills**, News Reporter & Stephen Topping
15:16, 5 Nov 2022



Child Death Overview Panels continue to identify a high proportion of modifiable factors in asthma deaths

The child death review process in England

Statutory process since 2008 (legislation enshrined within The Children Act 2004)

Revised guidance was issued in 2018 following recommendations from the Wood Review (2016)

The process includes babies born at pre-viable gestations (i.e. <24 weeks gestation) who show signs of life

It also includes unattended stillbirths in the community, but not terminations of pregnancy



CDR meeting: final multi-professional meeting involving practitioners *who were directly involved* in the case, for local learning and reflection

Support to the family:
- engagement
- information
- key worker

↑ Focus on the individual

↓ Focus on local and national learning

Child dies

Immediate decision making and notifications

Investigation and information gathering

Child Death Review Meeting

Child Death Overview Panel

National Child Mortality Database

CDOP: Independent, anonymised, multi-professional scrutiny by senior agency representatives (excluding though the child's *named* medical or other professionals)

NCMD thematic report: Child deaths due to asthma

- Analyses the deaths of children (0-17 years) in England who died due to asthma.
- Children who died between 1 April 2019 and 31 March 2023 (4 years), where the suspected or confirmed cause of death was asthma.

[Child deaths due to asthma, anaphylaxis and allergies](#)

Authors and advisory working group

- Sylvia Stoianova, Tom Williams, David Odd, Vicky Sleaf, James Fraser, Joanna Garstang and Karen Luyt – NCMD team
- **Jonathan Grigg – Queen Mary University of London**
- Mark L Levy – Locum GP, London
- Vibha Sharma – Royal Manchester Children’s Hospital, Manchester University NHS Foundation Trust; Lydia Becker Institute of Immunology and Inflammation, University of Manchester
- Jennifer Townsend – Children and Young People’s Transformation Programme, NHS England; Newcastle Upon Tyne Hospitals NHS Foundation Trust
- John Coveney – University Hospitals Bristol and Weston NHS Foundation Trust
- Andrew Cumella – Asthma and Lung UK
- Stephen Goldring - The Hillingdon Hospitals NHS Foundation Trust
- Lin Graham-Ray - NHS South West London; South West London ICS
- Simon Langton-Hewer - British Paediatric Respiratory Society
- Ian Sinha - Alder Hey Children’s NHS Foundation Trust; National Respiratory Audit Programme, Royal College of Physicians
- Amena Warner – Allergy UK
- Emilia Wawrzkowicz - North West Anglia NHS Foundation Trust; Cambridgeshire and Peterborough ICS



Supporting people living with allergy
#itstimetotakeallergyseriously

Acknowledgements

Supported by: Nick Cook, Brian Hoy, Kate Hayter, James Harle, Ghazala Jones, and Gaja Wright from the NCMD team.

With thanks to:

- All Child Death Overview Panels (CDOPs) and Child Death Review Professionals who submitted data for the purposes of this report and for their continued support with information to NCMD for the national analysis and learning from child deaths in England.
- Deborah Perriment (National Clinical Safeguarding Lead for Maternity, Babies, Children and Young People, NHS England)
- Vicky Gilroy and Georgina Mayes (Institute of Health Visiting)
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- Robert J. Boyle (Clinical Reader in Paediatric Allergy, Imperial College London)
- Sean Beevers (School of Public Health, Imperial College)
- NHS England for providing linked data from Hospital Episodes Statistics and data from the Medicines dispensed in Primary Care datasets.

Methodology

- Searched for “asthma” in the cause of death fields:
 - Suspected cause of death
 - Medical certificate
 - Cause of death recorded by CDOP
- 48 completed reviews
- Clinical validation of the cases not reviewed yet
- Exclusions: children with asthma but asthma was not the underlying cause of death

Child deaths due to asthma

There were 54 child deaths due to asthma between April 2019 and March 2023

15-17 year olds were the age group with the highest death rate due to asthma

The death rate was 4x higher for children from more deprived areas than less deprived

87% of the cardiac arrests occurred outside of hospital (at home or in a public place)

65% had attended an emergency department or had an emergency admission in the year before death

87% had three or more reliever inhalers dispensed in the year before death

Themes from CDOP reviews

Smoking by family members

Poor communication between and within services

Concerns about abuse or neglect

No asthma action plan in place

Poor indoor air quality

Pets in the house

Allergies

27% were born before 37 weeks gestation or with a birthweight under 2500g

All the children who died had been exposed to air pollution above WHO guidelines

- There were 54 child deaths over the 4-year period due to asthma.
- This is the equivalent of approximately 1 child death due to asthma every 4 weeks.

Area and Region

- Mortality rates were higher for children living in urban areas compared to rural areas.
- Rates differed across the regions of England, though small numbers make interpretation challenging.

Deprivation

- Death rates were four times higher for children in the most deprived areas of England compared to the least deprived.
- Poorer outcomes for children with asthma living in the most deprived areas has previously been shown, with children living in the poorest 10% four times more likely to have an emergency hospital admission than the least deprived 10%.



Previous ED attendances and emergency admissions to hospital

- Deaths were linked to HES/A&E data where possible.
- 35 (65%) children attended ED or had an emergency admission to hospital at least once in the year prior to their death.
- The ED attendances and emergency hospital admissions may reflect: the severity of the asthma and/or be due to how well the asthma was managed and controlled, or the patient compliance with therapy, e.g., inhaled corticosteroids (ICS) treatment.



Outdoor Air Pollution

- The two main components of traffic-generated pollution (the most common source of exposure in the UK) are nitrogen oxides (NO_x), most commonly nitrogen dioxide (NO₂) and particulate matter (PM).
- Home and school postcodes were run through the Imperial College of London's UK air pollution model for a single year, to derive annual mean PM_{2.5} and NO₂ exposure at the home and school address.



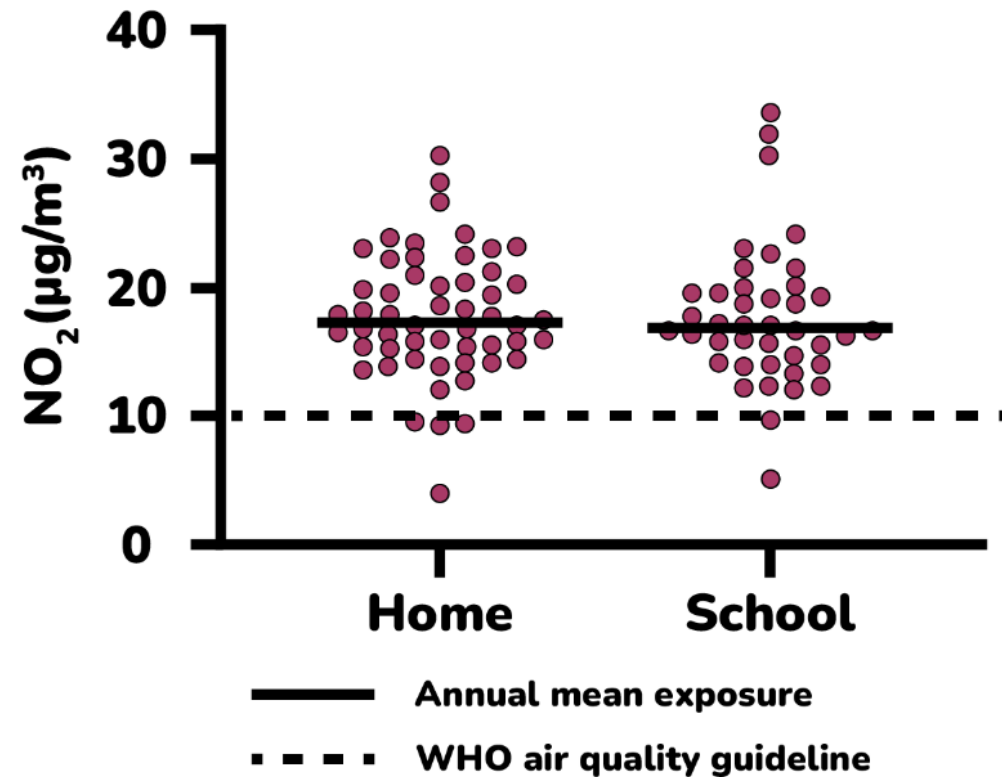
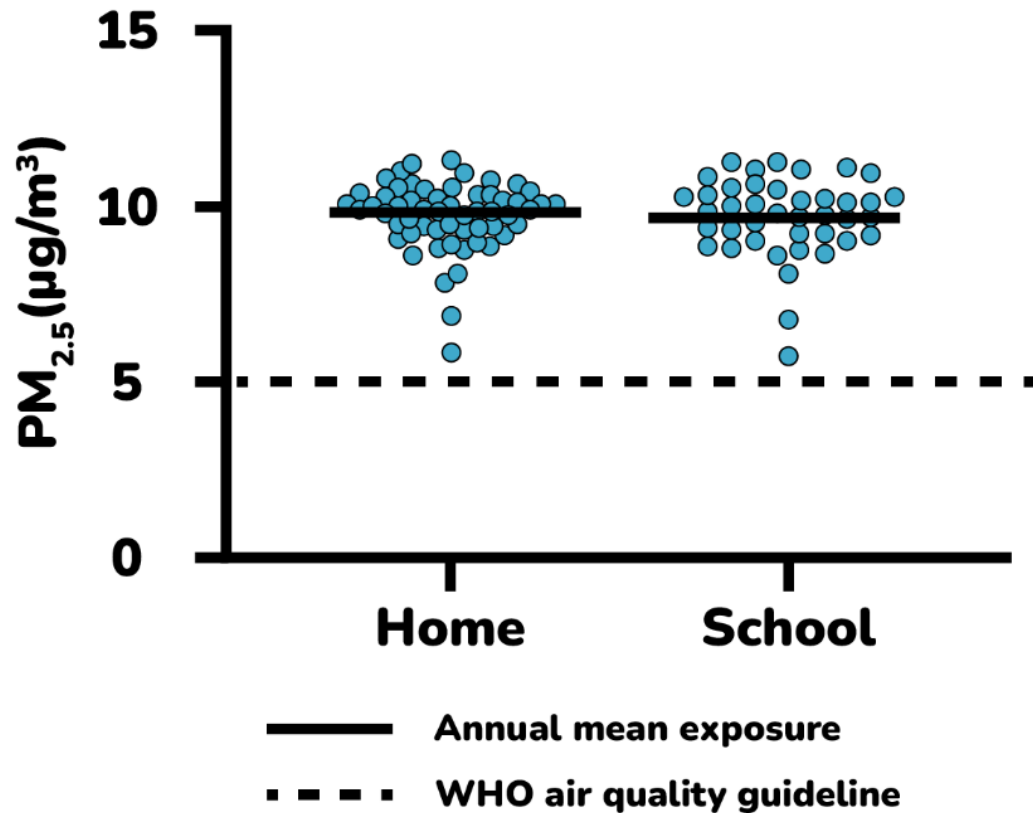
Traffic-Related Air Pollution (TRAP)

ozone

**Particulate
Matter (PM)**

**Nitrogen
dioxide**

Distribution of the annual mean exposure to PM_{2.5} and NO₂ at the home and school address of the children who died due to asthma between 1 April 2019 and 31 March 2023



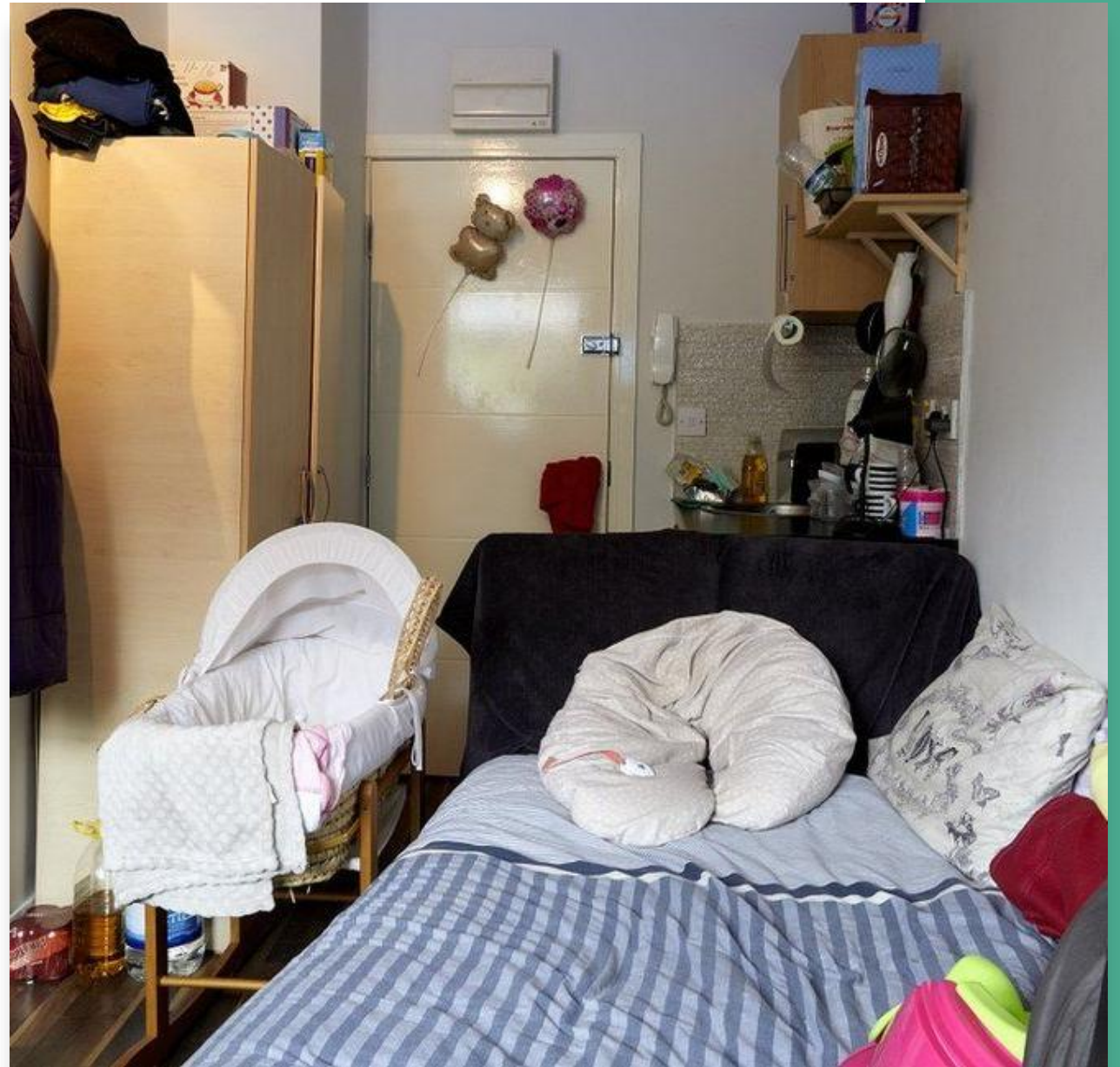
Learning from completed reviews by CDOPs

- There were 67 completed reviews, including 19 of children who died before 1 April 2019.
- Over 80% of reviews identified at least 1 modifiable factor.



Home conditions

- 7 reviews reported contributory factors in relation to poor home conditions.
- This included instances of overcrowding, excessive mould and dust, dirty, overcrowded and tobacco smoke-filled houses. Factors related to poverty and deprivation were also present including living environment deprivation, homelessness, property in poor repair, cold houses.
- 15 reviews identified pets kept in the household and in 6 reviews this was recorded as contributory factor.



Conclusions

Most of the children who died from asthma in England were exposed to long-term traffic related air pollution above the WHO air quality guideline values.

We conclude that UK exposure limits should be reduced as quickly as possible to WHO guideline values to protect children's health.



So.. What Next?



“The majority of child deaths from asthma and allergies are preventable - each death is a heartbreaking tragedy. Preventing another child dying is the responsibility of us all – this responsibility sits across our multi-agency services, within our communities and our society – it is everyone’s business.”

North Central London CDOP

Recommendations

Policy

- DH
 - Air pollution targets
- Local government
 - Asthma friendly homes

Commissioning

- NHSE
 - Home visits by asthma nurses
 - Amend Community Pharmacy Contractual framework

Education

- Department Education
 - Fund school nurses
 - Update RSE and health education statutory guidance

Medicines

- MHRA
 - Ensure all inhalers licensed in UK have dose counters

Healthcare practice

- RCGPs, RCPCH
 - Standardise 'post attack' review < 48 hours

Communication & Engagement

- **Report launch webinar**

873 registrations, 600 attended

[Stakeholder briefing: Child deaths due to Asthma or Anaphylaxis](#)

- **Podcasts (x2) and blogs**

Spotify: <https://lnkd.in/e3GcqbvM>

Apple: <https://lnkd.in/eeTQeEMu>

[Asthma, anaphylaxis and child mortality: What health visitors need to know -](#)

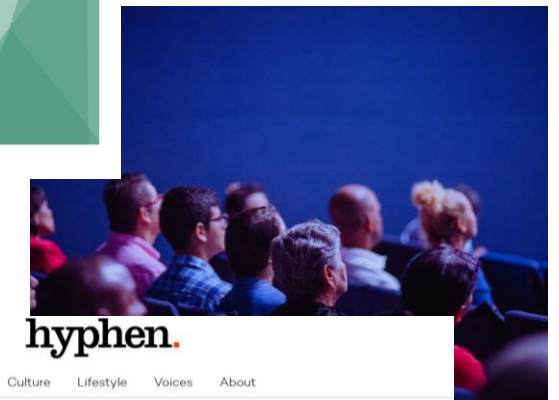
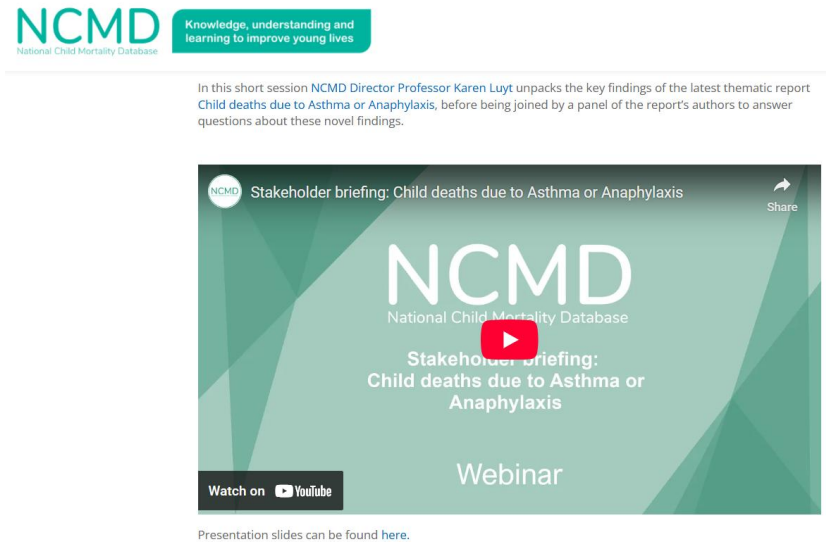
[IHV](#)

- **Conferences and events**

European Respiratory Conference 3rd April London

- **Academic publications and research collaborations**

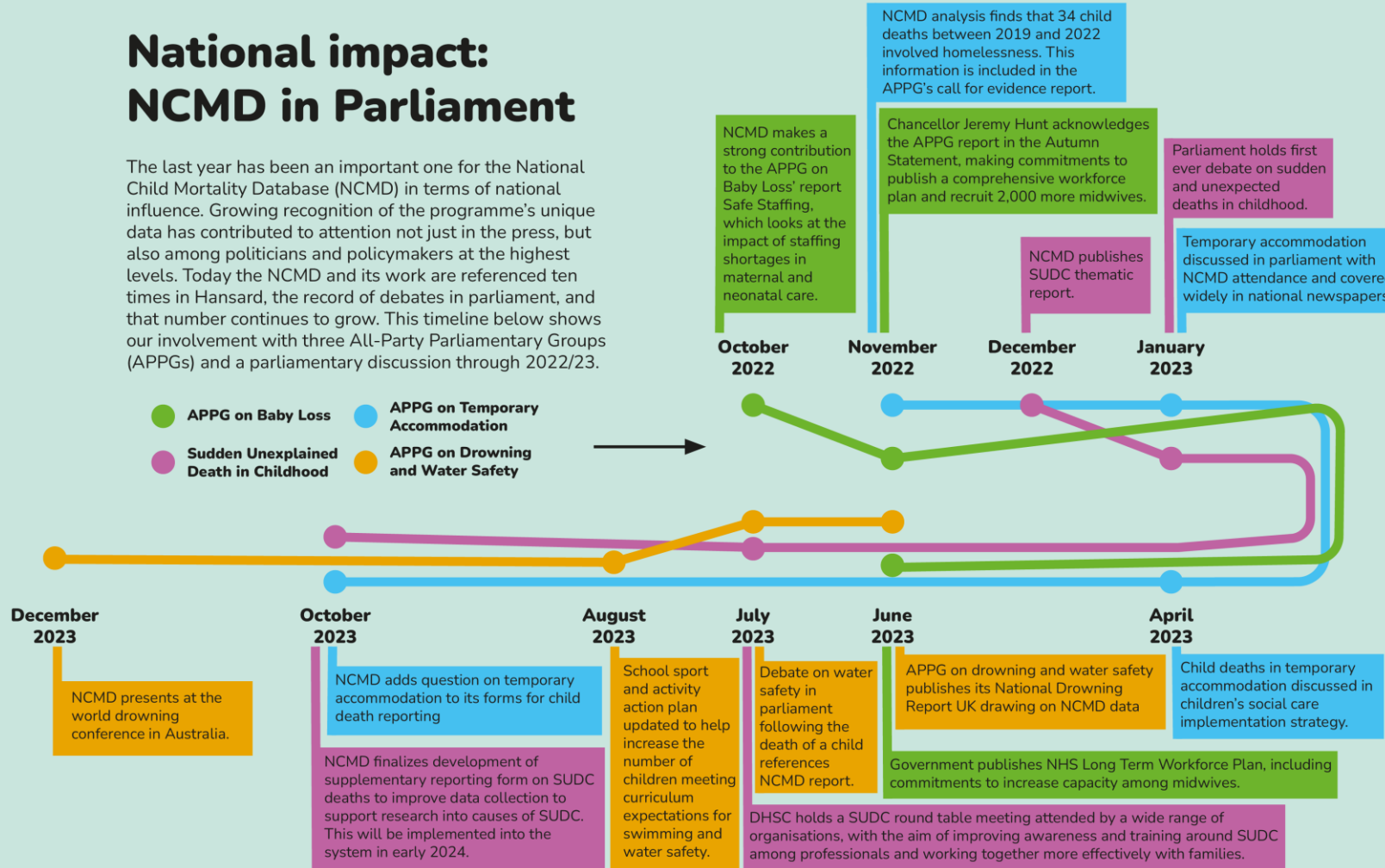
[Fatal Food Anaphylaxis in Children: A Statutory Review in England](#)



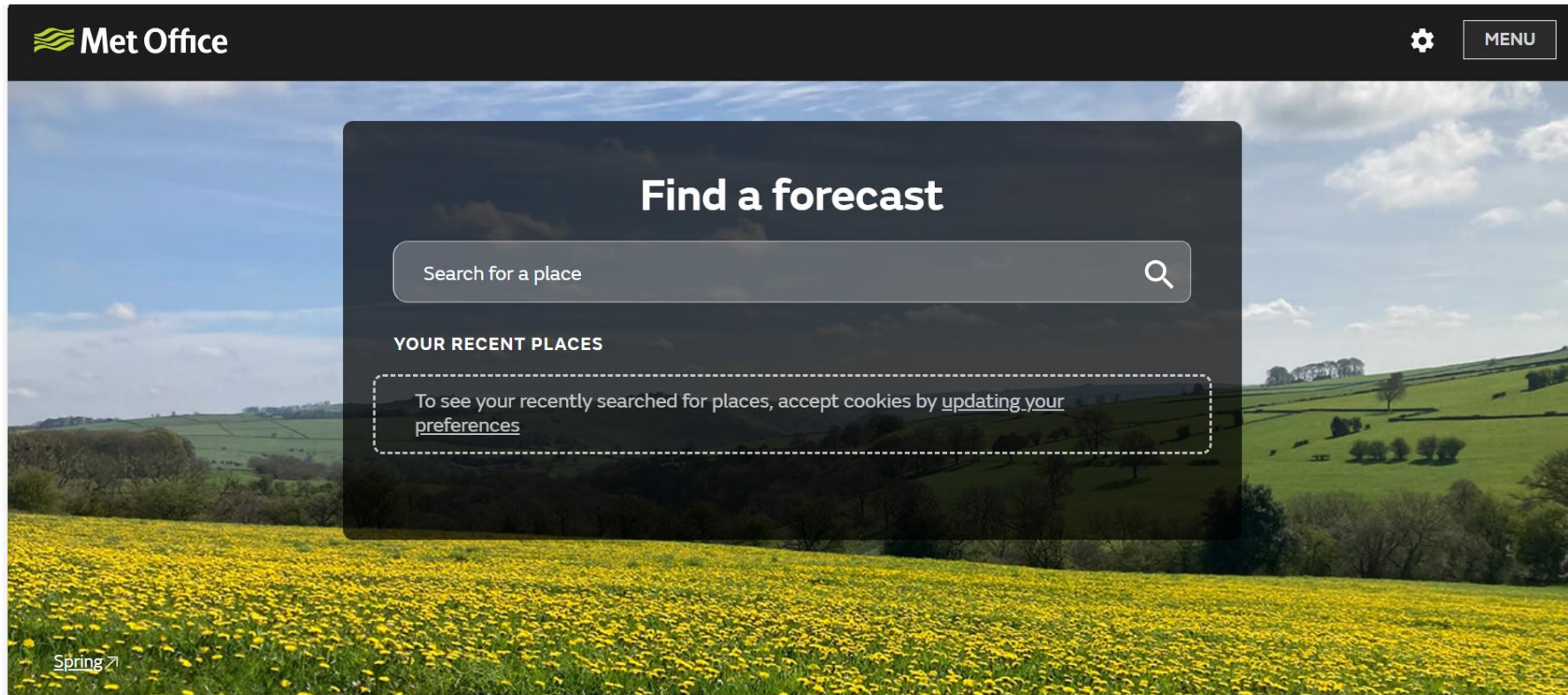
Engagement in Parliament

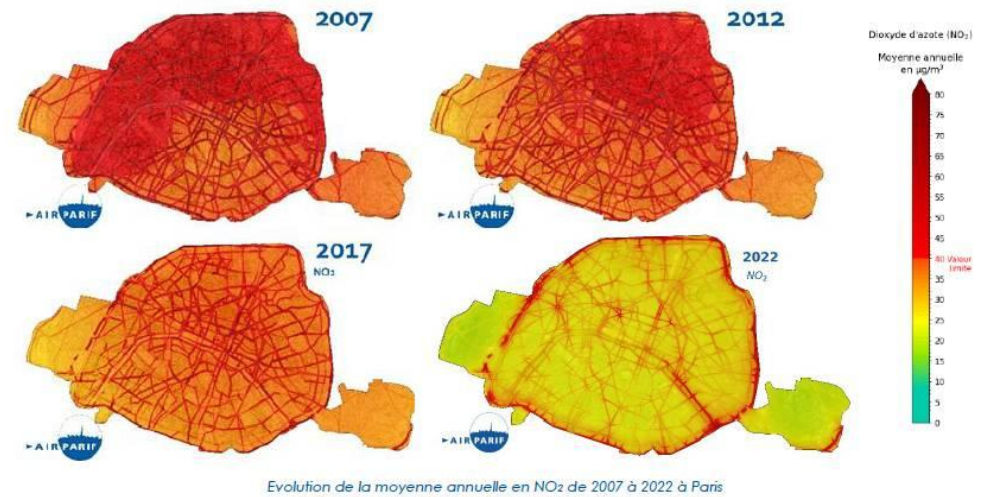
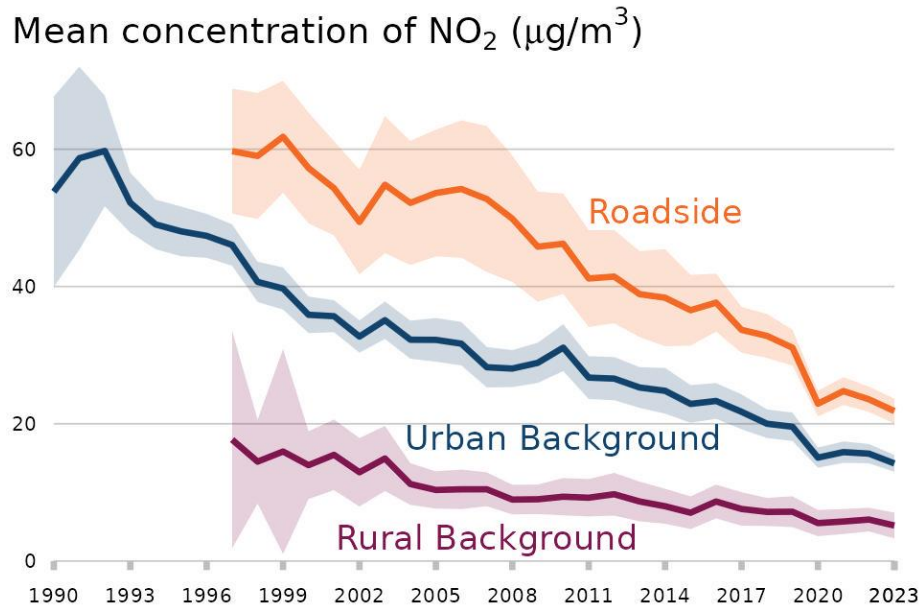
National impact: NCMD in Parliament

The last year has been an important one for the National Child Mortality Database (NCMD) in terms of national influence. Growing recognition of the programme's unique data has contributed to attention not just in the press, but also among politicians and policymakers at the highest levels. Today the NCMD and its work are referenced ten times in Hansard, the record of debates in parliament, and that number continues to grow. This timeline below shows our involvement with three All-Party Parliamentary Groups (APPGs) and a parliamentary discussion through 2022/23.



Further Research





Over the last 15 years, air pollution in Paris has decreased

Nitrogen dioxide (NO₂) - GOV.UK

nuffieldtrust Evidence for better health care Features Research and c

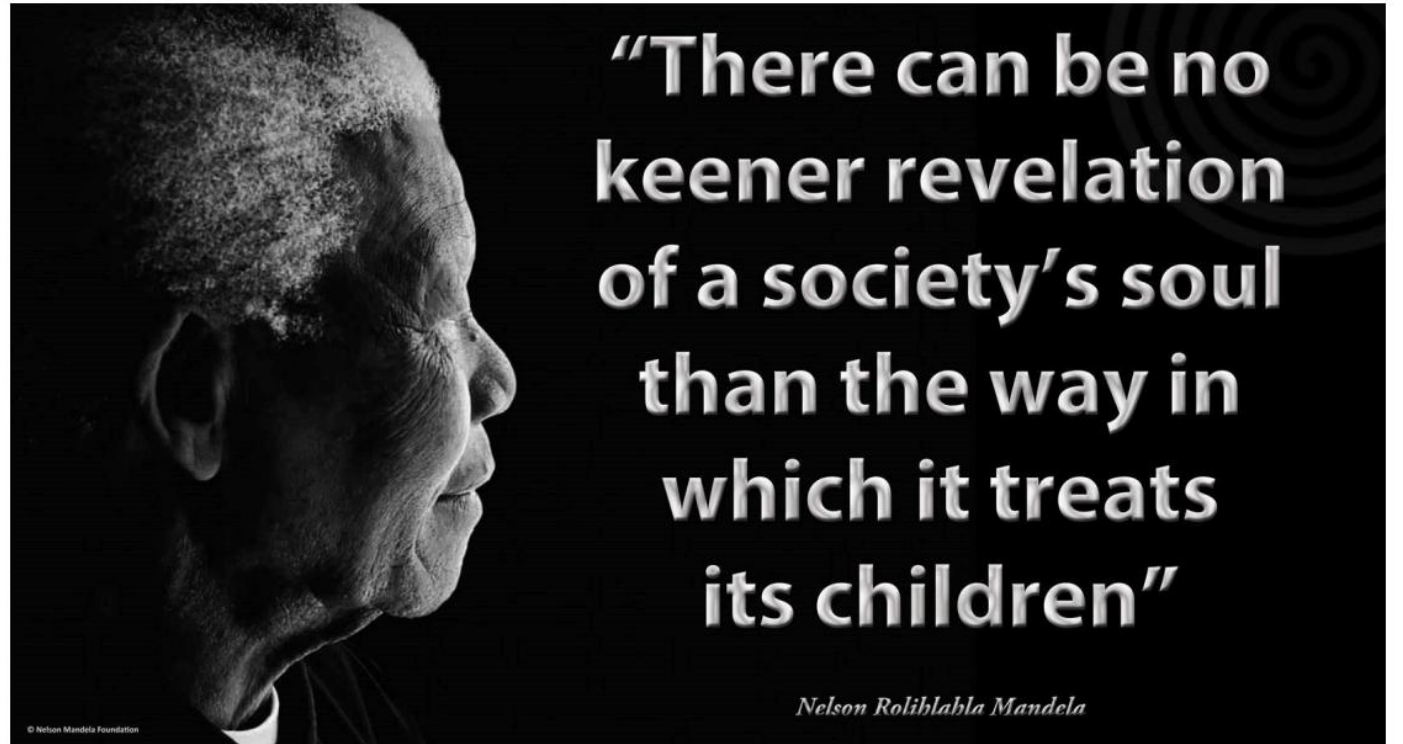
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Fewer children admitted to hospital for asthma as air quality improves

Although annual mean concentrations of PM_{2.5} at the roadside have decreased from 12.8 µg/m³ in 2009 to 7.7 µg/m³ in 2023, these findings suggest that **aligning UK air pollution policy with global goals will pave the way for further health equality for the most deprived groups.**

“Child mortality takes the temperature of a whole society. Like a huge thermometer. Because children are very fragile. It doesn’t just tell us about the health of children. It measures the quality of the whole society.”

Hans Rosling, 2018



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