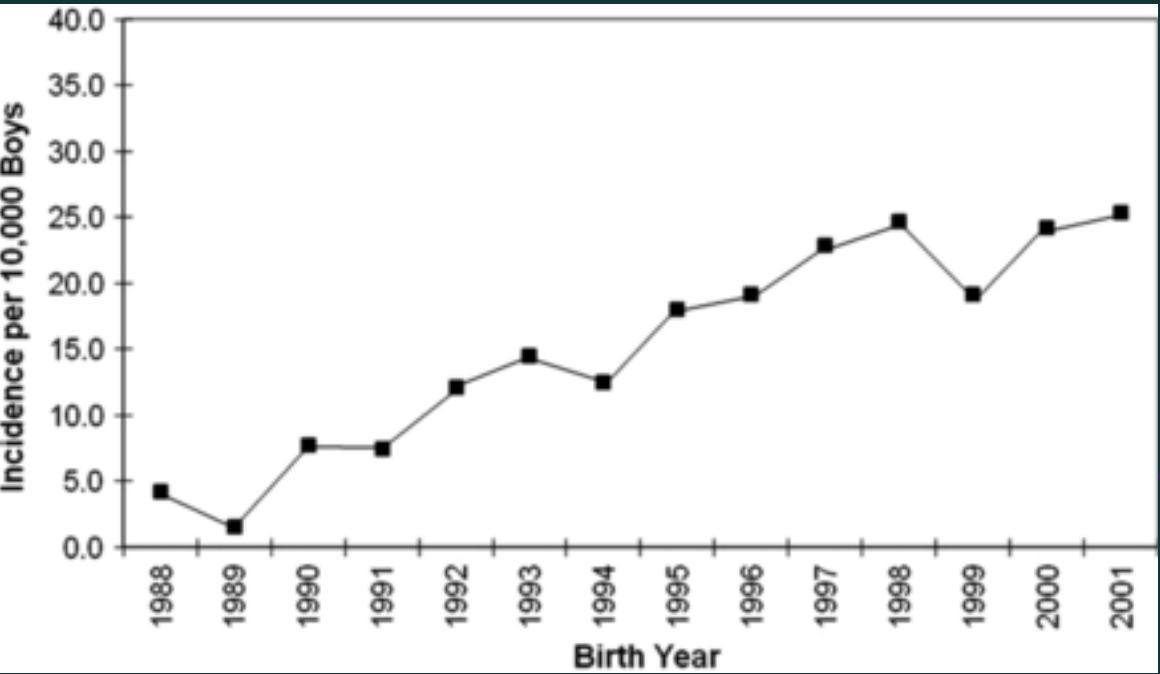


Environmental Chemicals Responsible for Autism in Newborn Babies in Urban Areas of London

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Module: Practice-Based Research | LCHS7008 | Lecturer: Dr Diola Bijlhout

Prevalence

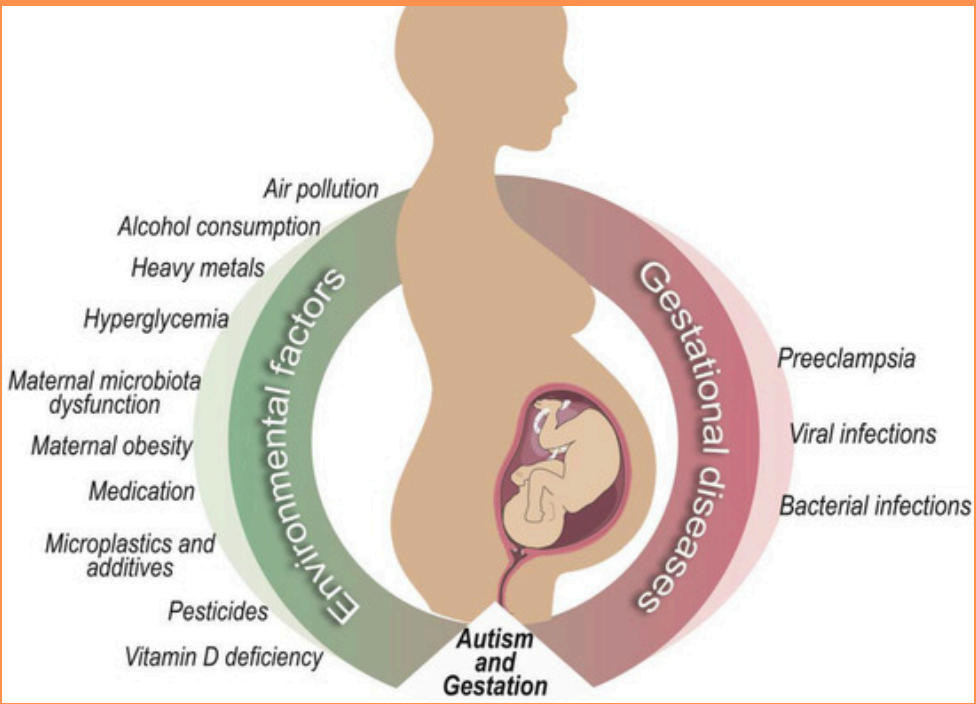
- In England in 2023/24, children requiring EHCPs whose primary need is ASD make up one-third (33%) of all EHCPs.
- Heavy metal exposure remains a measurable burden: in England during 2021-2023 there were > 500 children reported with elevated blood-lead concentrations above 5 µg/dL; London accounted for 13% of those cases, with ~7.7 cases per million children in 2015-23 on average for London.
- Urban exposures in London remain elevated: many school zones in Greater London exceed the WHO annual NO₂ guideline, indicating higher ambient pollutant exposure for children.
- ·There is evidence that many schools in the London region do not meet the World Health Organization (WHO) guideline for annual NO₂ concentration (40 µg/m³), in the context of London’s urban air-pollution environment (Marshall et al., 2021).
- ·Although direct statistics for newborns in London exposed to specific chemicals and subsequent ASD diagnoses are limited, these exposure metrics indicate a plausible burden in an urban setting (Marshall et al., 2021).



(Taylor, Jick & MacLaughlin, 2013)

Rationale

- Early brain development is highly sensitive to environmental exposures during prenatal and neonatal periods, making newborns particularly vulnerable to chemical insults (Grandjean & Landrigan, 2014).
- Epidemiological studies indicate that prenatal exposure to air pollutants such as PM_{2.5}, NO₂, and polycyclic aromatic hydrocarbons (PAHs) is associated with an increased risk of ASD (Volk et al., 2013; Dutheil et al., 2021).
- Heavy metals, including lead and mercury, are neurotoxic and can disrupt synapse formation, neurotransmitter function, and neuronal growth, contributing to ASD development (Trasande et al., 2013; UKHSA, 2023).
- Urban London’s older housing stock, legacy pollutants, industrial activity, and traffic-related air pollution can elevate chemical exposure for pregnant women and newborns (Shoari et al., 2021; Guxens et al., 2015).
- Systematic reviews and meta-analyses confirm that prenatal exposure to fine particulate matter (PM_{2.5}) increases ASD risk in children, highlighting the relevance of urban air pollution (Dutheil et al., 2021).
- Lead exposure remains a significant concern in England, with UKHSA emphasising that there is no known safe threshold, particularly for children and foetuses (UKHSA, 2023).
- Despite these findings, there is a lack of UK-specific studies directly linking urban chemical exposures to ASD in newborns, underlining the originality and necessity of research focused on London (Jin et al., 2024).
- This research humanises the topic by connecting real-life urban environmental conditions in London to early brain development impacts and ASD risk, bridging a critical gap in UK public health knowledge.



(Botelho, Silva and Borbely, 2025)

Research Aim:

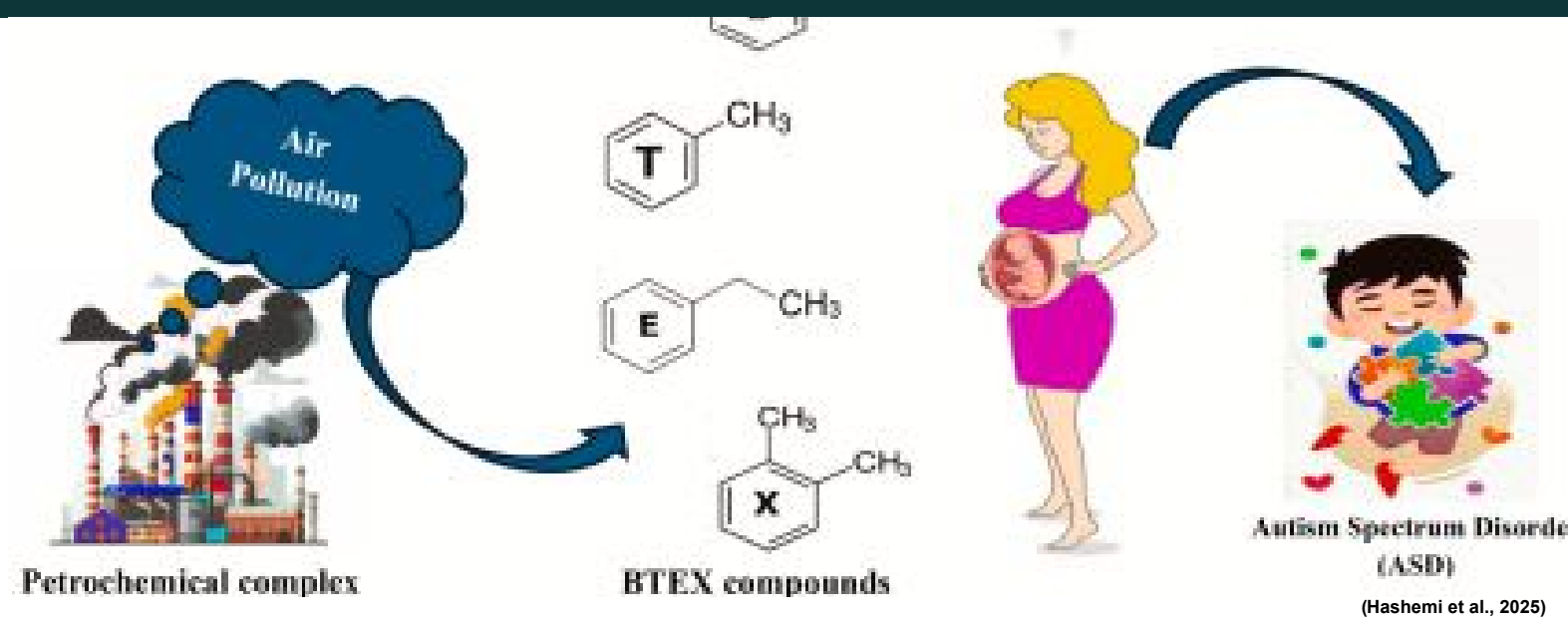
To identify and understand the environmental chemicals in urban London that are most strongly linked to the development of ASD in newborn babies and to explore how these chemicals impact early brain growth and development.

Research Question:

Which environmental chemicals in London’s urban areas are responsible for increasing the risk of Autism Spectrum Disorder (ASD) in newborn babies, and how do these chemicals affect early brain development?

Objectives

1. To identify the main environmental chemicals found in urban London that are linked to ASD in newborns.
2. To understand how exposure to these chemicals during pregnancy or soon after birth affects the baby’s brain and contributes to ASD risk.
3. To explore public-health and prevention steps that can reduce chemical exposure among pregnant women and newborns in London.



(Hashemi et al., 2025)

Research Impact:

- Awareness of modifiable environmental exposures may support earlier interventions and guidance for pregnant women and newborns in London, such as reducing indoor air pollution and careful product choices (RCOG, 2021; Tommy’s, 2025).
- Findings could help local authority and NHS antenatal programmes include exposure screening and targeted counselling, especially in higher-risk boroughs (HSE, 2025; RCOG, 2021).
- Evidence may guide policymakers on low emission zones, stricter housing regulations, and broader chemical monitoring in urban prenatal populations (Imperial College London, 2025).
- Understanding chemical risk factors can enhance early surveillance, referral pathways, and interdisciplinary collaboration among health and social care professionals (HSE, 2025; Tommy’s, 2025).
- Linking actionable chemical exposures to early brain development may contribute to ASD prevention or reduced severity at the population level (RCOG, 2021; Imperial College London, 2025).

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