**Department of Respiratory Sciences PhD studentship Project information**

**Funding Source: Self-Funded**

**Proposed project start date:** Open

**Closing date for applications:** Open

**Eligibility:** UK/EU/International

**Department/School:** Respiratory Sciences

**Supervisors:** Dr Erol Gaillard (eag15@leicester.ac.uk)

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**Project Title:** Indoor air pollution and respiratory health in children and young people

**Project Description:**

**Background and importance:**

In the UK, air pollution is the largest environmental risk to public health (1). Nearly 30% of preventable deaths in England are attributed to air pollution (2). Air pollution can cause and worsen the health of all people, but the most vulnerable populations in society are most affected. NHS England recently stated that “Health and care professionals have a vital role in supporting communities, families, and individuals to take action against reducing air pollution and the associated health impacts. Therefore, it is important that health and care professionals are equipped to provide support and advice to reduce exposure and offer measures to be taken to reduce any avoidable risks”.

The central role and responsibility for local authorities has been highlighted by the NICE guideline 149, Indoor air quality at home (3). NICE states that exposure to poor indoor air quality is linked to a range of health problems. These include respiratory conditions such as a cough, wheezing or asthma, and allergic symptoms such as a runny nose or eye irritation. NICE also states that indoor air needs to be prioritised in local strategy and plans and that local authorities must have an air quality action plan as outlined in the government clean air strategy 2019 (4). People with a pre‑existing health condition such as asthma and people who live in poverty are particularly affected. This aligns with the NHS England Core20PLUS5 approach (5).

**Proposed Intervention(s) or Service:**

The proposed intervention for this project is to quantify and identify indoor pollutants, including fungal spores and volatile organic compounds (VOCs), present in the homes of children suffering from asthma. The impact of mould on human health is recognised within the scientific community (6); however, this has been recently brought into the public consciousness by the well-publicised case of Awaab Ishak, the two-year-old boy whose death was directly attributed to his mouldy living conditions. Since this event, the government and city councils have recognised the major impact of bioaerosols in the home and their impact on health. As such, policy is required to safe guard vulnerable individuals from living in hazardous conditions due to fungal contamination. The University Hospitals of Leicester NHS Trust paediatric asthma team has been asked to draft a referral policy for re-housing children at risk from indoor mould exposure. Whilst mouldy housing needs to be addressed there is a shortage of accommodation to re-house individuals and we need to have better data to understand who is at the highest risk of indoor mould exposure. In addition, previous studies showed the impact VOCs on asthma development in children. A study determined that children had a four-fold increased risk of having asthma if they were exposed to concentrations of TVOC higher than 60 μgm-3 (7). While other studies observed an impact VOCs on the patients’ lung function, especially a decrease in FEV1/FVC ratio, and a positive association with FeNO (8). We need to have better data to understand the impact of VOCs in children suffering of asthma.

This study aims to improve our understanding of the direct impact of indoor pollutant concentrations, in particular fungal spores and VOCs, on children with asthma. We propose to collect air and dust samples in the living area and bedroom of well-characterised severe and attack-prone paediatric asthma patients, including those with fungal sensitisation. These samples will allow us to identify and quantify the fungal spores and VOCs present in the indoor environment of these at-risk individuals. By comparing bioaerosol and VOCs data from the indoor environment with the patients’ lung function, medication and attack frequency, we will explore associations between the presence and/or concentration of fungal spores and the patients’ health.

**References:**

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3. <https://www.gov.uk/government/publications/clean-air-strategy-2019>. Accessed February 2024
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6. Rumchev, K., et al., *Association of domestic exposure to volatile organic compounds with asthma in young children.* Thorax, 2004. **59**(9): p. 746-51.
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**Funding details:** Self-funded. There is no international fee waiver available. Fee Band 26 (£38,300).

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**To apply please refer to** [**https://le.ac.uk/study/research-degrees/research-subjects/respiratory-sciences**](https://le.ac.uk/study/research-degrees/research-subjects/respiratory-sciences)

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