Abstract P206 Figure 1

small particulate matter (PM_{2.5}). Daily mean data were utilised in the analysis. The effect of ambient air pollution on daily admissions for asthma was assessed using a generalised linear model in R version 3.3.1. Independent variables in the model were time, Ozone, NO, NO_x and PM_{2.5}. Fourier terms to capture any long-term trend or seasonality were also included in the model. Delayed exposure effects were investigated by fitting separate constrained lag models.

Results During the period from April 2011 to March 2016 there were 4204 admissions due to asthma exacerbations (71% female, mean age 48 years). Admission numbers increased progressively from 726 in 2011/12 to 1043 in 2015/16. Admissions were most frequent in the month of December (2.9 per day) and least frequent in August (1.5 per day). None of Ozone, NO, NO_x and PM_{2.5} or their lagged terms were found to be independent predictors of daily admissions for asthma.

Conclusion Ambient air pollution measured at a single fixed monitoring station within a city is not able to predict the frequency of admissions due to asthma. Further research on the health effects of air pollution should make use of more detailed assessments of city-wide exposure, for instance by utilising satellite imaging and geospatial mapping.

P208

EFFECTS OF PERSONAL AIR POLLUTION EXPOSURE ON ASTHMA SYMPTOMS, LUNG FUNCTION AND AIRWAY INFLAMMATION

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Introduction and objectives There is evidence that exposure to traffic-related air pollution may impact adversely on asthma and other respiratory conditions. We aimed to test the hypothesis that day-to-day variability in personal air pollution exposure has clinically important effects on asthma symptoms, lung function and airway inflammation.

Methods We recruited 31 patients with a clinical diagnosis of asthma from Leicester and the surrounding area. Participants were provided with a personal air pollution monitor (Cairclip NO₂/O₃; Cairpol, La Roche Blanche, France) which measures total oxidants in the ambient air and stores 15 min average readings. The Cairclip was attached to a belt or handbag when outdoors, and kept in close proximity to participants when indoors. We also measured exposure using modelled daily average ambient levels of NO₂ and particulate matter

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(PM_{2.5} and PM₁₀) based upon satellite imaging data, as well as directly measured ozone, NO₂ and PM_{2.5} levels from a monitoring station in central Leicester.

Participants were provided with an electronic symptom diary and peak expiratory flow metre (Micro Diary; Carefusion, Basingstoke, UK) and a portable exhaled nitric oxide monitor (NOBreath; Bedfont, Maidstone, UK), and made daily measurements using these for 12 weeks. Relationships between exposure and outcome variables were analysed using cross-correlation.

Results At a group level there were no consistent relationships between personal air pollution exposure and clinical outcomes. However, a number of individuals (n=6) manifested strong correlations between exposure and outcome variables, particularly those residing within inner-city Leicester. Figure 1 shows overlaid time series of modelled ambient NO₂ levels and exhaled nitric oxide measurements in Participant 13 (Panel A). Results of the cross-correlation analysis are shown in Panel B, indicating a strong positive correlation centred on a lag of zero days.

Conclusions Air pollution exposure appears to have a significant effect on symptoms, lung function and airway inflammation in selected patients with asthma. These individuals may have a combination of increased susceptibility and higher than average levels of exposure. Future studies should focus on understanding the genetic and epigenetic mechanisms underlying susceptibility to air pollution, as well as developing strategies to mitigate the effects of exposure in susceptible individuals.

Sleep and breathing

P209

CHARACTERISTICS OF EAST LONDON CHILDREN WITH SEVERE OBESITY REQUIRING NON-INVASIVE VENTILATION FOR SLEEP DISORDERED BREATHING

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Introduction and objectives Childhood obesity is an increasing problem leading to significant health concerns. Children are referred to our Tier 3 obesity service if they have BMI ≥ 3.5 standard deviations (SD) or BMI ≥ 3 SD with comorbidities. There are currently 120 children under the care of the service; 22 have severe sleep disordered breathing (SDB) requiring non-invasive ventilation (NIV) overnight. We sought to characterise the demographics of those with sleep disordered breathing, the extent of associated comorbidities and to assess adherence to NIV.

Methods A retrospective review of all data from patients under the care of the obesity service with SDB requiring NIV was undertaken. Adherence to NIV was assessed by patient and parent/guardian verbal report.

Results The median onset of obesity was <5 years of age. 45% of patients reported poor adherence to NIV. The majority of children had obstructive sleep apnoea (OSA) requiring CPAP. 45% of patients had also undergone adenotonsillectomy. Those requiring BiPAP support had evidence of hypoventilation. Further patient demographics and comorbidities are presented in Table 1. There were no patients with pulmonary hypertension although one had cardiomyopathy.

Conclusion There is a high level of associated comorbidities in our patient cohort – highlighting the severe medical complications already present in these young patients. This is important to note for respiratory paediatricians who may be looking after these children for SDB. Obesity services are fragmented throughout the UK and not all children will have access to an obesity service. Vitamin D deficiency is independently associated with obesity and our Results highlight the importance of screening for this. In addition a high level of non-adherence to NIV was reported, although probably underestimated. Although only 9% were known to mental health services, severe obesity is associated with mental health issues which are currently not adequately addressed by our service. NICE guidance states that Tier 3 obesity services should include a psychologist and social worker. Most services do not fulfil these requirements through lack of funding. We aim to recruit a psychologist to support this group of patients in weight loss management and NIV support.