Personal exposure to indoor air pollution for hybrid office workers in the UK – pilot study

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# ABSTRACT

The recent COVID-19 pandemic changed the working patterns worldwide with remote working and flexible hours. In many cases, employees and employers alike have favoured a hybrid working approach between the office and work from home, raising concerns about the indoor environmental quality at home and the office. Hybrid working and a change in commuting behaviours make it critical to understand the patterns of personal exposure to indoor air pollution during commuting and working time. This pilot study discusses the results from IAQ monitoring during long commute transects by train and car and during working remotely from home and in the office. Using a wearable air pollution sensor (Plume Labs, 2021), PM1, PM2.5, PM10 and NO2 were measured at 1-minute intervals during commuting (by train and car) to Lancaster University from different parts of the UK and working time (office and home). This paper reports the NO2 results from three train and four car journeys in the UK between November and January 2022.

The aim is to investigate exposure patterns to air pollutants and identify spot events of high exposure. The findings suggest that exposure to NO2 during commuting can play a critical part in hybrid workers' personal exposure to air pollutants, particularly during extended commuting times. Trains are likely to have better indoor air quality than cars mainly due to the cabin ventilation systems and the routes they follow.

While the findings cannot be generalised, they suggest that personal exposure to air pollution for hybrid workers is higher in offices and that extended commuting periods are related to higher accumulative exposure to air pollutants. Building design, neighbourhood, and town planning are necessary to provide an acceptable outdoor and indoor air quality both at home and office.

# KEYWORDS

Indoor Air Pollution; Hybrid working; Exposure Timeline; Air Quality; Urban planning