Improving air quality in UK schools: SAMHE – Schools' Air quality Monitoring for Health and Education.

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ABSTRACT

Schools' Air quality Monitoring for Health and Education – SAMHE – was started in 2022. SAMHE has used a citizen science approach to rapidly create a network of air quality monitoring in schools across the UK's four nations. More than 1,300 schools were recruited and gifted a free air quality monitor with access to the SAMHE Web App, providing pupils with visualisation of their data and interactive activities. SAMHE continues to receive data from more than 600 monitors within schools – collecting data at a rate 100,000 school data days per year – recording data every minute concerning their environment, relative ventilation rates, and indoor air quality/pollution levels. An overview of the project will be presented along with analysis of the data gathered. This has already provided revolutionary findings regarding the conditions within UK schools. These include that SAMHE classrooms typically adhere to UK guidance for classrooms (BB101, 2018) but, despite this, they exhibit low ventilation rates, 5.3 L/s/p on average, falling to 3.8 L/s/p during colder weather. With respect to pollutants, $PM_{2.5}$ is used as the core marker and the data shows that $PM_{2.5}$ in SAMHE classrooms is highly correlated (correlation coefficients of around 80%) with outdoor (reference grade) measurements made around the UK. Moreover, the data indicates an upper bound for the fraction of $PM_{2.5}$ from indoor sources as 25%, suggesting the ingress of outdoors $PM_{2.5}$ as being dominant in UK classrooms. Potential for exposure to $PM_{2.5}$ in classrooms is shown to be most significant on days with elevated outdoor concentrations; for example, days when outdoor levels exceed WHO (2021) guidance values account for 27% of potential exposure in classrooms, whilst only accounting for 6% of the total school days.

KEYWORDS

Air quality, ventilation, particulate matter $PM_{2.5}$, schools.