

New research finds infants are more exposed to harmful pollution on the way to school than on the way home

March 9 2017



Larkmead School. Credit: CC-BY-SA-2.5,2.0,1.0

Babies in prams accompanying older siblings on the school run are twice as likely to be exposed to harmful air pollution in the morning than in the afternoon, a new study has found.

The new research, published in the journal *Environmental Pollution* today, highlights the high levels exposure of babies in prams to fine and ultrafine particulate matter during the morning drop-in hours of school children compared with the afternoon drop-off hours.

The study, carried out by researchers at the University of Surrey, also revealed that the worst places for infants to be exposed was at [bus stops](#) and traffic lights when they are waiting to cross roads.

A recent WHO report states that 570,000 children under the age of 5 die every year from respiratory infections, such as pneumonia, attributable to indoor and outdoor [air pollution](#), and second-hand smoke.

Surrey researchers carried out a series of experiments using high specification air monitoring equipment located inside a pram to gauge the kind of pollutants and toxic chemicals toddlers are exposed to when accompanying older siblings during the school drop off/pick up peak times.

During the study tests, the monitoring equipment simulated the average primary school drop off/pick up, passing through a number of traffic intersections and bus stops during the drop-in (morning) and pick-up (afternoon) hours.

Primarily, the work of the research group identified that traffic intersections and bus stops emerged as pollution hotspots, with high levels of both coarse (PM_{2.5-10}) and fine (PM_{2.5}) particles.

The researchers also found that small-sized particles, including ultrafine particles, were higher on an average by about 47% (PM₁), 31% (PM_{2.5}) and 31% (PNC) during the morning than afternoon hours, reflecting the influence of traffic emissions during the morning peak hours.

Coarse particles (PM_{2.5-10}) showed an opposite trend with 70% higher concentration during afternoon than morning, indicating that re-suspension was affected by the wetness of road pavement due to overnight dew in the early mornings.

The above findings clearly suggest much higher concentrations of fine and ultrafine particles during the morning peak hours, especially at the traffic intersections and bus stops, substantiating their past research findings.

Dr Prashant Kumar, lead author and Reader at the University of Surrey, said: "Previous research has shown that young children are far more susceptible to pollution than adults, due to their immature and developing systems and lower body weight. These findings provide an insight for families who walk to and from nursery/primary schools with young children. Essentially, children could be at risk of breathing in some nasty and harmful chemical species such as iron, aluminium and silica that form together the particles of various size ranges.

"One of the simplest ways to combat this is to use a barrier between the in-pram children and the exhaust emissions, especially at pollution hotspots such as traffic intersections, so parents could use pram covers if at all possible. We are also working closely with our industrial partners to develop innovative methods to clean the air around the children in their in-pram microenvironments."

This project has been carried out under the framework of the University Global Partnership Network funded project, NEST-SEAS (Next-Generation Environmental Sensing for Local To Global Scale Health Impact Assessment).

The research was carried out in Guildford, Surrey, in the United Kingdom.

More information: Prashant Kumar et al. Exposure of in-pram babies to airborne particles during morning drop-in and afternoon pick-up of school children, *Environmental Pollution* (2017). [DOI: 10.1016/j.envpol.2017.02.021](https://doi.org/10.1016/j.envpol.2017.02.021)

Provided by University of Surrey

Citation: New research finds infants are more exposed to harmful pollution on the way to school than on the way home (2017, March 9) retrieved 15 May 2024 from <https://phys.org/news/2017-03-infants-exposed-pollution-school-home.html>

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