



## Research Summary: Comparing traffic-related ultrafine particle concentrations using three different measuring platforms in two urban cities.

By Anil Gurcan

### Background

Traffic related air pollution (TRAP) creates a mixture of complex pollutants, and ultrafine particles (UFPs) are one of these pollutants that may play a role in causing adverse health effects. UFPs are extremely small particles that can easily enter a person's lungs and transfer into the blood stream, which can lead to cardiovascular health problems. This study compares different UFP measurement methods over time to understand how a population's exposure assignment can differ with different measurement strategies.

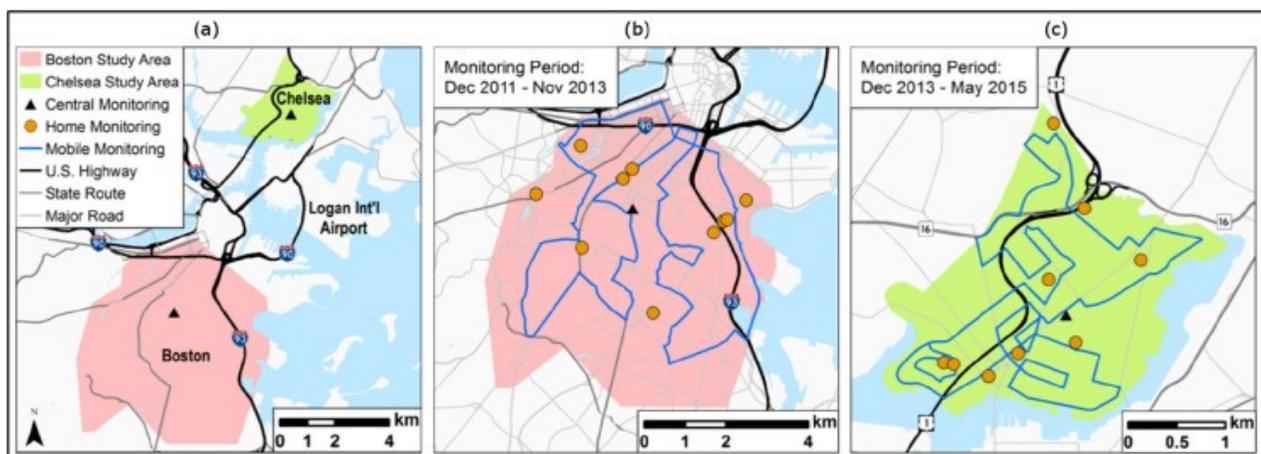


Fig. 1. (a) Location of the Boston and Chelsea study areas. (b) Boston study area; central site, 11 residences, and mobile monitoring route are shown. (c) Chelsea study area; central site, 9 residences, and mobile monitoring route are shown.

### What did we do?

Researchers measured UFP levels as particle number concentration (PNC), which is a measure of the number of particles in a specified volume of air. PNC measurements were made using three different monitoring platforms in Boston and Chelsea. Researchers used statistical models and geographical information systems (GIS) to evaluate patterns of PNCs over time. Researchers then compared the different monitoring methods with each other to understand the similarities and differences in the PNC trends within the two study areas.

## What did we find?

Researchers found PNCs were highest during the winter and lowest during summer in both Boston and Chelsea. PNC was also high during the morning and evening rush hour periods on weekdays and was generally lower during the weekends in both study areas. PNC was also found to be elevated near highways and were generally lower in residential areas with less traffic. Researchers identified the biggest factors affecting measurements from each site was wind and traffic.

## Why is it important?

Many studies have shown that traffic-related UFPs caused by burning fossil fuels are toxic, however studies of UFP effects on human health has been limited. Accurately characterizing their concentrations in study areas may lead to an improved understanding of their impact on human health.

## What can we do?

The best way to reduce exposure to traffic-related UFP is to close windows near major roadways and use central air if available. When driving, keeping the windows closed and the air on recirculation mode will reduce on-road exposure.

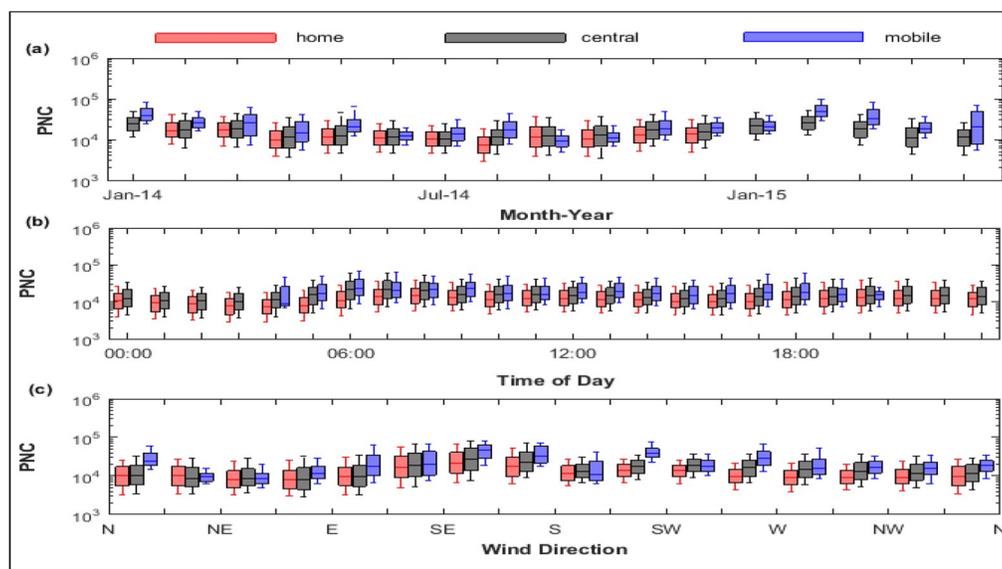


Fig. 2. Boxplots of PNC by (a) month, (b) time of day, and (c) wind direction measured at central sites (black), homes (blue), and with a mobile laboratory (red) in Chelsea.

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## To learn more about this research, please refer to the following source:

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