



Research Summary: Transferring air pollution models to new neighborhoods

By: Oliver-John Bright

Background

Ultrafine particles (UFP) are very tiny particles in traffic pollution that may negatively impact heart and blood health. Land-use regression (LUR) models are one tool that researchers use to estimate levels of air pollution for studies trying to understand the impact of traffic on health. However, creating these LUR models requires a lot of work, and very few studies have investigated whether a LUR model built for one area could be used somewhere else. This study looked at whether a LUR model of UFP that has already been made in one area can be used in an other area with similar traffic, climate, and weather.

How was it done?

As part of the Community Assessment of Freeway Exposure and Health (CAFEH) Study, UFP was measured through mobile monitoring in neighborhoods in Somerville, Dorchester, Chinatown and Malden (for more information about mobile monitoring, [see this factsheet](#)). Measurements were taken over the course of a year, during all 4 seasons. Using

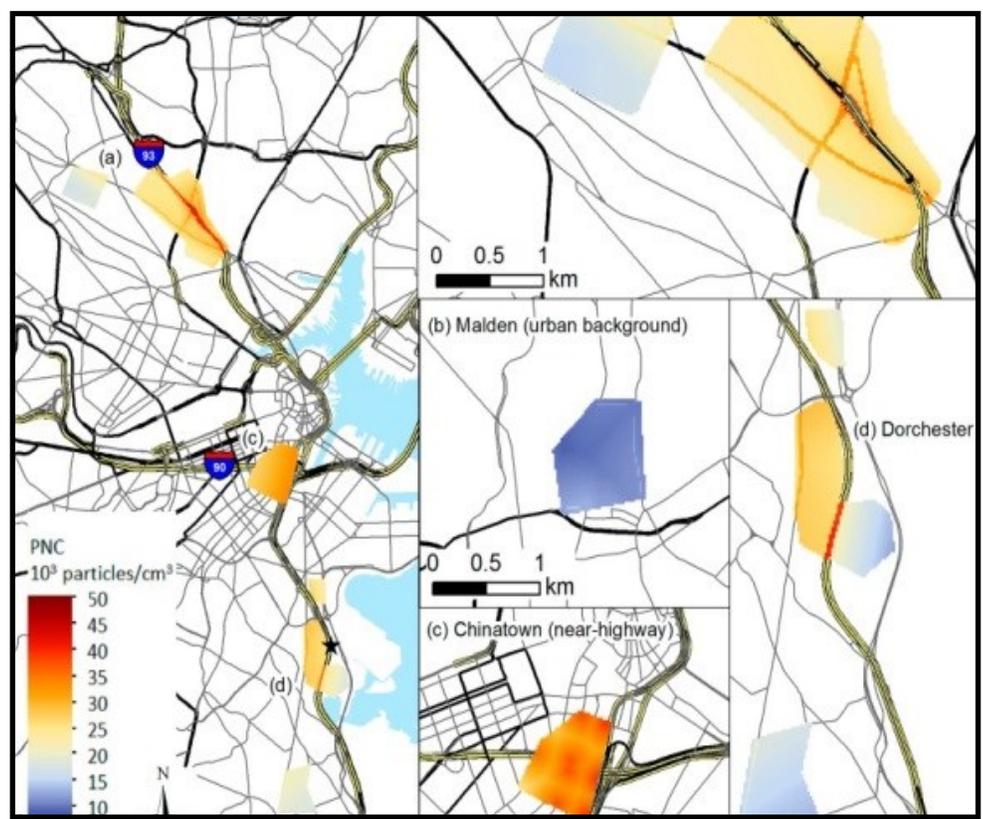


Figure 1. The predicted annual average levels of UFP in each neighborhood; the results from the Boston Area model are shown on the right.

these measurements, our team developed LUR models that estimated the levels of UFP during different times of the year for each neighborhood, as well as one for the overall Boston area. We then compared LUR models built for one neighborhood to those built for others based on their ability to predict neighborhood levels of pollution. For example, a model that was based on pollution levels in Chinatown was compared to the one built in Somerville based on its ability to predict levels of UFP in Chinatown. A LUR model built for the entire Boston area was also compared to neighborhood-level models for ability to estimate UFP levels.

What did we find?

Overall, we found that the models built for specific neighborhoods always predicted that neighborhood's levels of UFP better than any other models. However, the Boston area model was reasonably good at predicting UFP levels in individual neighborhoods.

Why is it important?

This is important because it means that researchers cannot take LUR models for one area and use them for health studies in other areas. The Boston area model acceptably predicted UFP levels in multiple neighborhoods, suggesting that more general models of wide areas can be useful in surrounding neighborhoods. Our team also identified a number of methods other researchers could use to build LUR models that are more easily transferrable from one place to another.

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

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