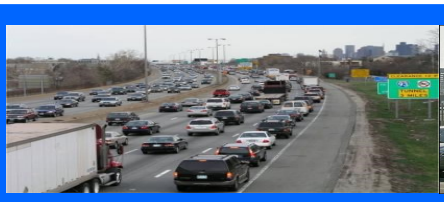
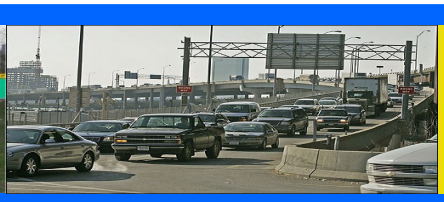

Research Summary: Traffic-Related Air Pollution in Three Urban Neighborhoods

By: Oliver-John Bright

Background

Previous research has shown that pollution from traffic can damage heart, blood, and lung health. Research is needed that can determine how traffic pollutants vary over time and distance from the highway to better understand how we can protect the public's health.

Figure 1: The research team and the mobile monitoring laboratory (converted from an RV).

How was it done?

A team of Tufts University researchers and community partners used a mobile monitoring laboratory that they converted from a Recreational Vehicle (RV) to measure pollution in each of the study neighborhoods over a year (**Figure 1**). In each neighborhood, they drove the mobile monitoring laboratory on the same route (**Figure 2, next page**) many times, making sure to measure pollutants in a variety of seasons, weather conditions, days of the week and times of the day. Each study area had a near highway neighborhood (less than 1300 ft from I-93) and an urban background neighborhood (farther than a half mile from I-93). The team measured 7 different traffic-related air pollutants: PNC, pPAH, NO, NO_x, BC, CO, and $PM_{2.5}$.

Air Pollutants Measured:

- Particles:
  - PNC: Particle Number Count (A measure of Ultrafine Particles)
  - pPAH: Particle-Bound Polyaromatic Hydrocarbons
  - BC: Black Carbon
  - $PM_{2.5}$: Particulate Matter (< 2.5 Nanometers)
- Gases
  - NO, NO_2 and NO_x: Oxides of Nitrogen
  - CO: Carbon Monoxide

What did they find?

The team found that levels of pollution were quite different for the three study neighborhoods. In Somerville, they found that levels of all pollutants were higher closer to the highway than they were farther away. In Chinatown, pollutant levels were high across the entire neighborhood and were much lower in Malden, the urban background. However, in Dorchester they found that most types of pollution were the same in both the near highway and urban background areas. The team also found that pollution levels were lower when winds were fast. Pollution was highest during the morning rush hour, when highway traffic levels were highest and winds were the lowest. Lastly, temperature was very important, leading some pollutants to

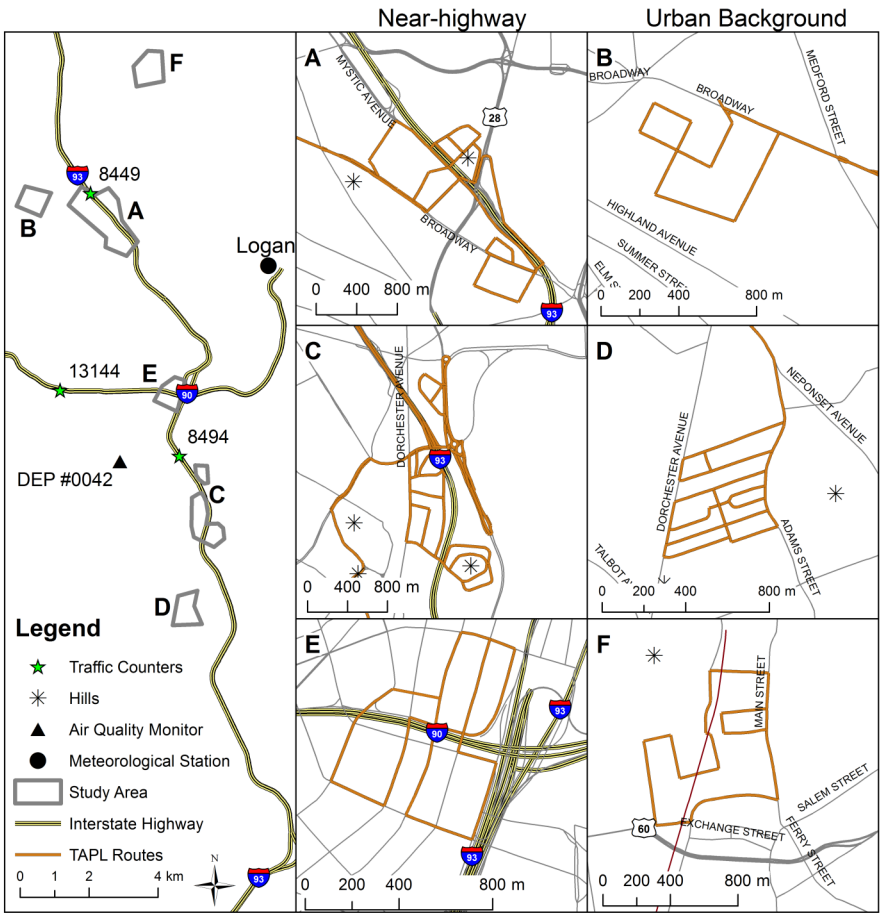

Figure 2: Mobile monitoring areas and driving routes. Somerville near-highway (**A**) and urban background (**B**); Dorchester near-highway (**C**) and urban background (**D**); Chinatown (near-highway; **E**) and Malden (urban background; **F**). Image originally published in *Atmospheric Environment,* an Elsevier journal. Full citation below.

increase and others to decrease. Because of temperature changes, PNC and $PM_{2.5}$ were highest in the winter and lowest in the summer, while the other pollutants were more stable over the entire year.

Why is it important?

This study is important because it helped to increase our knowledge and understanding of how highways contribute to air pollution levels in residential areas. This study confirmed that not only distance from the highway, but also temperature, season, and time of day affect levels of air pollution. Understanding these effects is important information for health studies investigating how air pollution impacts the health of people who live near heavy traffic. Our findings show that researchers cannot assume that near highway neighborhoods all have the same levels of pollution, even if they are near each other on the same highway.

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