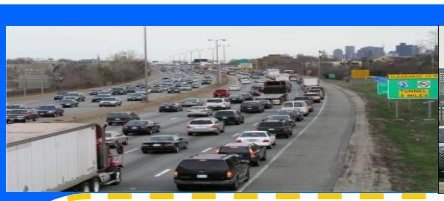
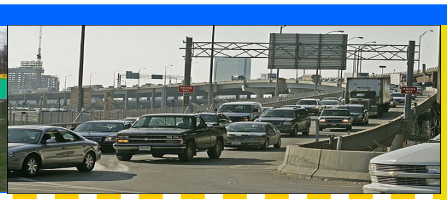




COMMUNITY ASSESSMENT OF FREEWAY EXPOSURE & HEALTH

Highway Proximity Associated with Cardiovascular Disease Risk

By Sherry Hou

Background

Air pollution caused by traffic can be harmful to human health. Pollutants from highways have a greater effect on those who live closest (less than 200m). One of these traffic pollutants is ultrafine particles (UFP). UFP are extremely small particles less than four millionths of an inch. Because of its size, UFP can easily enter a person's lungs when breathed in and pass into the blood stream. Some scientists suspect that chronic exposure to UFP may be damaging to one's cardiovascular health. People who live closer to the highway are exposed at higher concentration ~~and~~ for longer periods to potentially harmful pollutants.

How was it done?

The study collected blood samples from 260 CAFEH participants who were living in Dorchester, South Boston, and Somerville and were over the age of 40. The researchers then examined four substances in blood that are linked to cardiovascular disease (CVD): C-Reactive Protein (hsCRP), Interleukin-6 (IL-6), Tumor Necrosis Factor alpha receptor II (TNF-RII), and fibrinogen. The goal was to investigate the relationship between levels of these blood markers and how close the participants live to the highway.

The participants' addresses were mapped by a geographic information system (GIS) to figure out the distance between the participants' residence and the I-93 highway. The distance from I-93 was divided into categories of 0–50m, 50-150m, 150-250m, 250-450m, and ≥1000m (urban background).

The level of UFP was measured by an air pollution monitor in a recreational vehicle that went around the neighborhoods to measure UFP level. The CAFEH project also administered a survey to participants asking them about their physical activity, time spent outside, diet, medication, socio-economic status, and other factors that may influence the participant's exposure to UFP and CVD risk. Taking all these things into consideration, the study compared the levels of

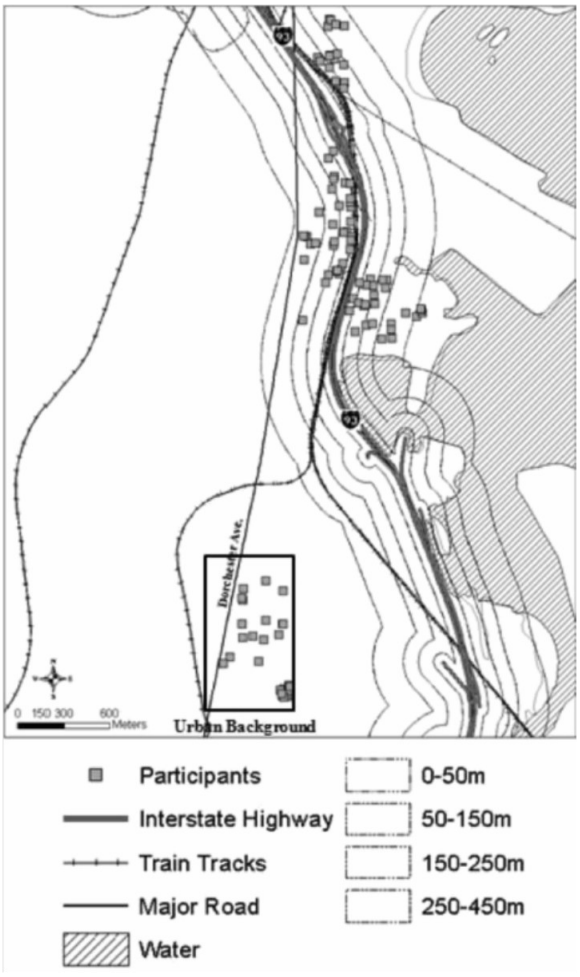
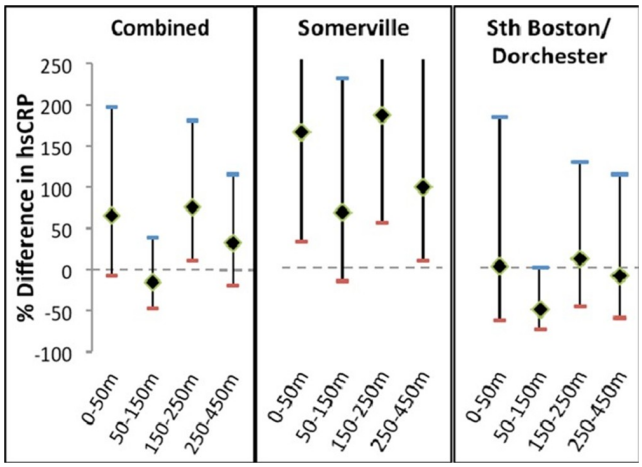


Figure 1: Distance to the highway defined by meters away from I-93. The background neighborhood in Dorchester is shown in this map being more than 1000m away from I-93.

these blood markers according to the participants distance from the highway.

What did they find?

The researchers found that there was an association between how far the participants were living from the highway and the level hsCRP and IL-6 when controlling for many other risk factors, but little or no association with fibrinogen or TNF-RII. In other words, the participants who live closer to the highway have higher levels of hsCRP and IL-6, suggesting that people who live closer to the highway may be at higher risk of developing heart diseases. When examining the levels of UFP detected surrounding the highway, the researchers also found that the UFP level was higher closer to the highway.



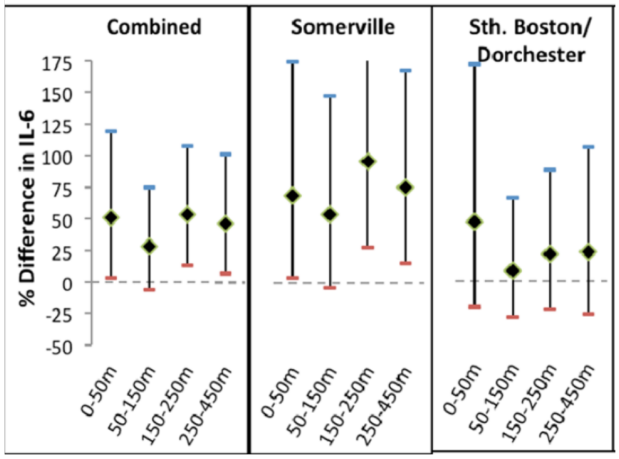


Figure 2 (left) & 3 (right): The hsCRP and IL-6 levels found next to the highway in Somerville have a more significant difference from the background neighborhood than Dorchester and South Boston. The diamond is the average level of blood marker in participants, and the lines represent the error margin.

What can you do?

If you live close to the highway, you might want to consider shutting the windows when you can and spending less time outside when traffic is heavy. Meanwhile, using public transportation will help reduce traffic pollutants. Supporting local officials and community partners who are involved in and advocate for cleaner air can also be a good way to make a difference.

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This study was funded by:

National Institute of Environmental Health

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

Brugge, D., Lane K., Padro-Martinez, L.T., Stewart, A., Hoesterey, K., Weiss, D., ... Mwamburi, M. (2013). Highway proximity associated with cardiovascular disease risk: the influence of individual-level confounders and exposure misclassification. *Environmental Health, 12*. doi:10.1186/1476-069X-12-84.