



## Research Summary: Time Activity Adjustment and Exposure to Ultrafine Particles

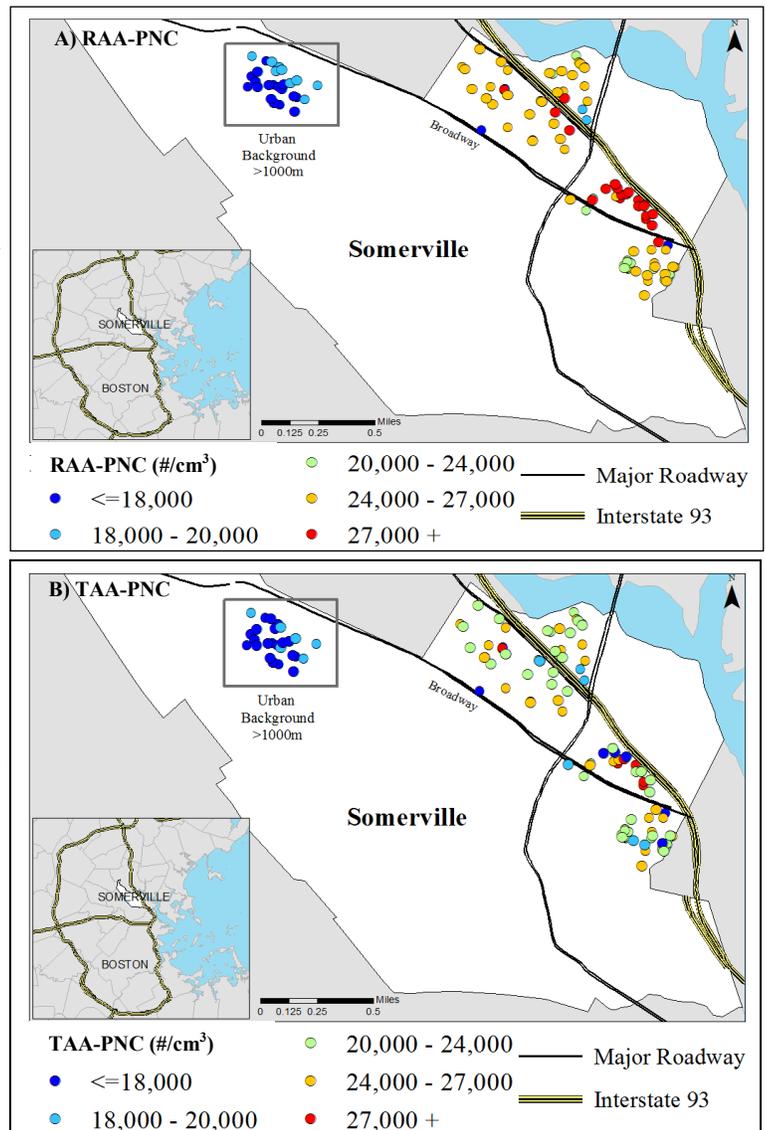
By: Oliver-John Bright

### Background

It has been shown that people who live close to highways or other major roadways with heavy traffic are at higher risk of heart and blood disease than those who live farther away. Exposure to air pollution from traffic is likely a reason for this increased risk. Levels of ultrafine particles (UFP) are higher near highways. Some other air pollutants are more evenly spread across a city. Researchers suspect that UFPs may contribute to the negative impacts of air pollution from traffic on health. However, there have not been many health studies that looked at a person's long term exposure to UFP. One of the difficulties of studying UFPs is that exposure can rapidly change based upon where the person is throughout the day. This study used personal time activity information to estimate each person's exposure to UFPs and looked for associations with risk of heart and blood problems.

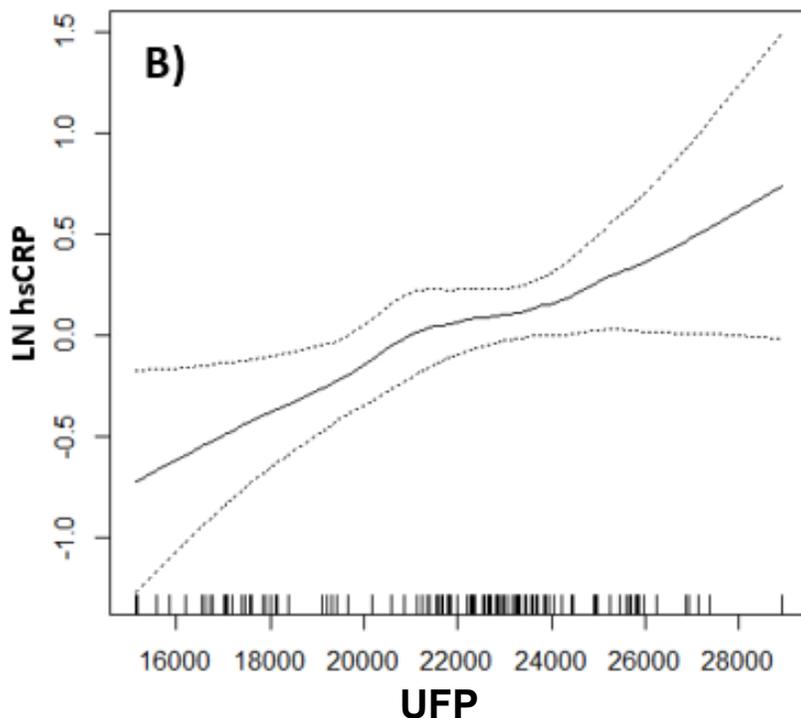
### How was it done?

Somerville residents living both near the highway and farther away were invited to participate in the Community Assessment of Freeway Exposure and Health (CAFEH) study. We asked each participant questions about how much time they spent in five different places (inside home, outside at home, at work, driving on highways, and other), as well as questions about air conditioning and window use. Many participants also gave blood. We also used a mobile laboratory (for more information, refer to another CAFEH factsheet [here](#)) to measure UFP air pollution levels around Somerville. In most air pollution studies, researchers will only estimate the average amount of air pollution outside participants' homes.



**Figure 1:** Red represents the highest exposure to UFP, while blue represents the lowest. The top map uses individual annual averages, while the bottom map uses time activity adjustment. Notice that those near the highway have much lower estimated exposures after time activity adjustment because they spend time at work away from the highway.

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**Figure 2:** A graph of the relationship between UFP exposure and CRP, a measure of risk of heart and blood problems. As exposure to UFP increases, levels of CRP and risk for heart and blood disease increases.

### What did we find?

We found that using the time activity questions helped to better understand and measure the UFP exposure of participants. Because people do not spend all of their time at home, the time activity questions helped make the estimated exposures to UFP more accurate. For instance, many participants that lived very close to the highway, where UFP levels are highest, worked in lower UFP areas resulting in lower exposures (**Figure 1**).

We also found that people who were exposed to higher levels of UFP had higher risk for heart and blood problems (**Figure 2**). If the researchers did not account for where people spent their personal time when estimating UFP exposure it would have reduced the observed impact of UFPs.

### Why is it important?

This study is important because it provides evidence that UFPs could impact the health of people living near the highways in Somerville. This research also showed the importance of understanding and accounting for where people are spending their time when estimating their exposure to air pollution. This will help to improve future studies that seek to understand the role of UFP and other pollutants in people's heart and blood health.

### For More Information, Contact:

Doug Brugge, PhD, MS

Department of Public Health and Community Medicine  
Tufts University School of Medicine  
136 Harrison Ave., Boston, MA  
Email: [dbrugge@aol.com](mailto:dbrugge@aol.com)

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

[Lane KJ, Levy JI, Scammell MK, Patton AP, Durant JL, Mwamburi M, Zamore W, Brugge D. Effect of time-activity adjustment on exposure assessment for traffic-related ultrafine particles. \*Journal of Exposure Science and Environmental Epidemiology\*. 2015.](#)