



## Research Summary: The Effect of Air Filtration on Heart and Blood Health in a Near-Highway Population

By: Jacqueline Gillis

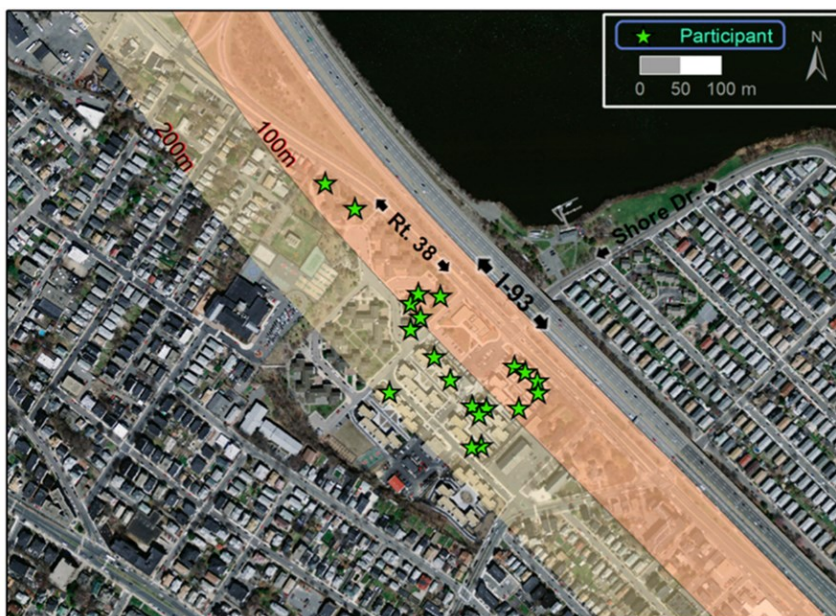
### Background

Traffic-related air pollution exposes people to ultrafine particles (UFP; particles smaller than 100 nanometers in diameter) that are believed to have a negative impact on heart and blood health. Elevated levels of UFPs near major roads and highways may explain why people living in these areas are at increased risk of heart disease. Previous studies have shown that high-efficiency particulate arrestance (HEPA) filters can reduce indoor concentrations of

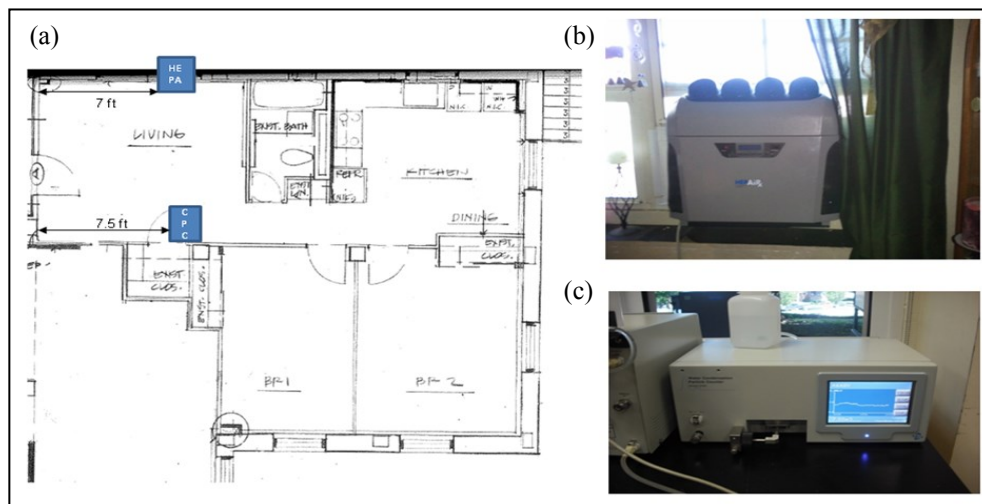
particulate matter and some associated health outcomes such as asthma, but it is less clear whether heart and blood health is also affected. Our study investigates the effectiveness of indoor HEPA filtration and its potential health benefits for people living in public housing near a busy highway in Somerville, MA.

### How was it done?

The study recruited 20 participants living in 19 different apartments bordering I-93 and Massachusetts State Highway Route 38. All 20 participants in the study were exposed to HEPA-filtered air for 21 days and sham-filtered (unfiltered) air for 21 days. A particle counter installed in each apartment continuously measured the concentration of indoor UFPs. The potential heart and blood health benefits of HEPA filtration were assessed by comparing changes in blood pressure and four factors in the blood.



**Figure 1.** Map of study area. Locations of participant apartments are labeled with stars.



**Figure 2.** (a) Floor plan of an apartment showing the location of a HEPA filter and a particle counter in a living room. (b) HEPA filter (c) Particle counter installed in a living room.

### What did we find?

UFP concentrations were lower during HEPA filtration than during sham filtration in 14 of the 19 apartments. However, these reductions were smaller than we had expected, likely the result of open windows, larger room sizes, and indoor sources of UFPs such as cooking.

We found no observed health benefits from HEPA filtration. There was only one significant change in indicators of heart and blood health between HEPA filtered and sham filtered periods, but it was in the opposite direction of what we had expected. A comparison of heart and blood health markers with actual UFP concentrations yielded similar results: decreased levels with increasing UFP concentrations.

### Why is it important?

The results of our study suggest a need for further research to find ways to make filtration a more effective intervention for near-highway populations.

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

[Padró-Martínez LT, Owusu E, Reisner E, Zamore W, Simon MC, Mwamburi M, Brown CA, Chung M, Brugge D, Durant JL. A randomized cross-over air filtration intervention trial for reducing cardiovascular health risks in residents of public housing near a highway. \*International Journal of Environmental Research and Public Health\*. 2015; 12\(7\): 7814-38.](#)