

# An Epidemiological Assessment of Individuals Biological Uptake of Particulate Air Pollution and Related Health Effects

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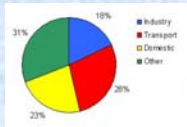
## INTRODUCTION

The effects of air pollution on health have long been of interest to scientists, doctors and policy makers. Most studies however concentrate on the results exposure to air pollution has on those whose health is already compromised in some way so as to make them more susceptible to the effects i.e. those with cardiovascular or respiratory illnesses. While there is a lot of evidence supporting the view that exposure to air pollution and in particular to the particulate fraction does indeed have an effect on health of those more susceptible sections of the population there is very little in the way of effects at an individual level or of effects on the healthy section of the population.

This study aims to show that residential exposure to air particulates has an effect at an individual level and that even healthy individuals are at risk from the effects.



»Vehicular emissions are the most common source of particulates in urban areas.



»~25% of particulate pollution in the UK being the result of road transport.

»This figure has been shown to rise to 75-80% on high pollution days.

## Objectives

»It is hypothesised that on completion of the analysis a significant difference will be seen between the levels of ultrafines in the exposed and unexposed areas and possibly between indoor and outdoor levels.

»It is also hypothesised that there will be an effect on various blood parameters in participants from the exposed areas with a lesser or possibly no effect on those in unexposed areas and that these effects may be attributable to the prolonged residential exposure to particulate air pollution.

## Materials & Methods

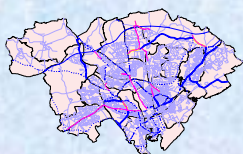
An exposure comparison study has been designed to show whether healthy individuals residing in proximity to high volumes of traffic have biological uptake of pollutants and suffer effects such as inflammatory responses, increased oxidative stress and changes in blood properties such as coagulation and viscosity.

### CARDIFF

**Exposed:** Households located on a busy roadside with high traffic flows *eg households on main access roads near the city centre*

**Unexposed:** Households located in quiet areas away from busy roads and with little passing traffic *eg households in small housing estates on the outskirts of the city*

### Exposed



### Unexposed



## Criteria for inclusion in the study

»Participants must be living in one or other of exposed or unexposed areas

»Participants to be male of ages 50-70

»Non smokers for at least three years

»No history of chest or heart disease, diabetes and/or arthritis or other prolonged illnesses

»To have been in good health for at least six weeks prior to taking part in the study

Home Visits are arranged with all eligible participants

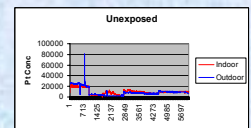
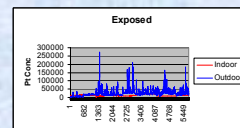
Blood and urine samples are taken from participants and tested for various factors that may indicate a reaction as a result of prolonged exposure to high levels of particulates

Environmental Measurements are taken both inside and outside the home using a TSI Ultrafine Particle Counter called a P-Trak™

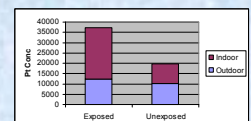
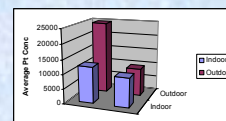


The P-Trak™ is a small handheld device with the ability to measure particles in the range of 0.02 to greater than 1 micrometer and has a concentration range of 0 to  $5 \times 10^5$  particles/cm<sup>3</sup>.

## Results



### Indoor and Outdoor comparisons of the levels of ultrafines



Comparisons of the average levels of ultrafines in exposed and unexposed

## Conclusions

Data Collection is still in its early stages and as such, although some preliminary investigation appears to suggest a clear difference in levels of ultrafines between exposed and unexposed areas, it is not possible to make draw any significant or meaningful conclusions from the data at this point

