

# DETERMINANTS OF PERSONAL EXPOSURE TO BLACK CARBON IN STOCKHOLM TRAFFIC

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## Conclusions

Ambient black carbon levels were generally lower while walking or biking along busy inner-city streets compared to travelling by bus. Choosing a more quiet, parallel street instead of cycling along a street with more traffic reduced BC levels substantially.

Hence, mode of transport, travel route and possibly timing are important factors that may reduce personal exposure to harmful air pollution.

## Introduction

Black carbon (BC) is a traffic-related combustion by-product and a harmful component of particulate matter. Several studies have shown that short duration trips in traffic may account for a large part of the total personal exposure. Thus, stationary measurements of BC only partially reflect the personal exposure, and result in an uncertainty in the exposure estimates used for assessing health effects.

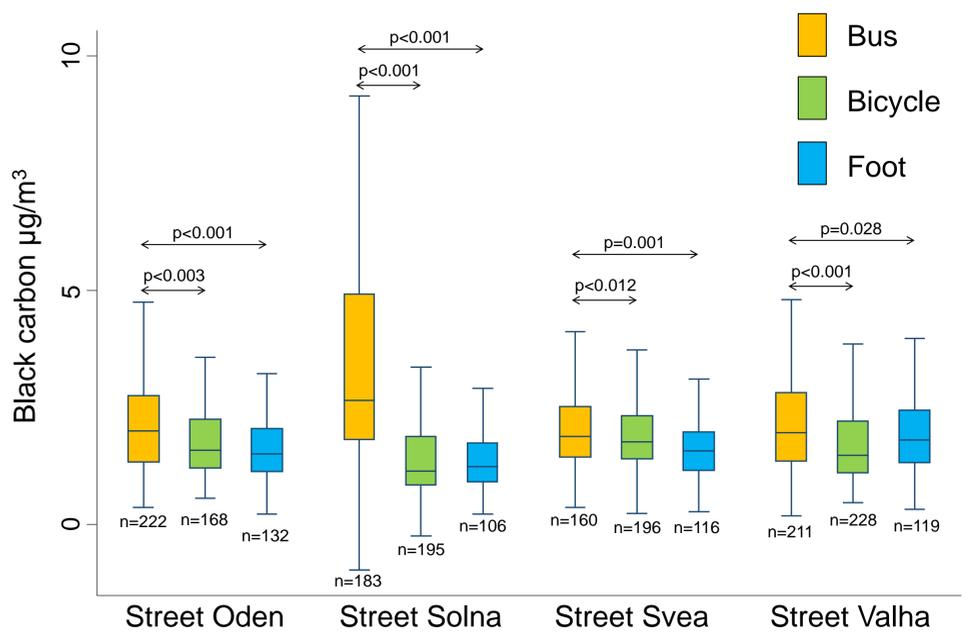
## Aim

The aim of this study was to examine personal exposure levels of BC during different modes of transport and in streets with different traffic-intensities along inner-city streets in Stockholm, Sweden.

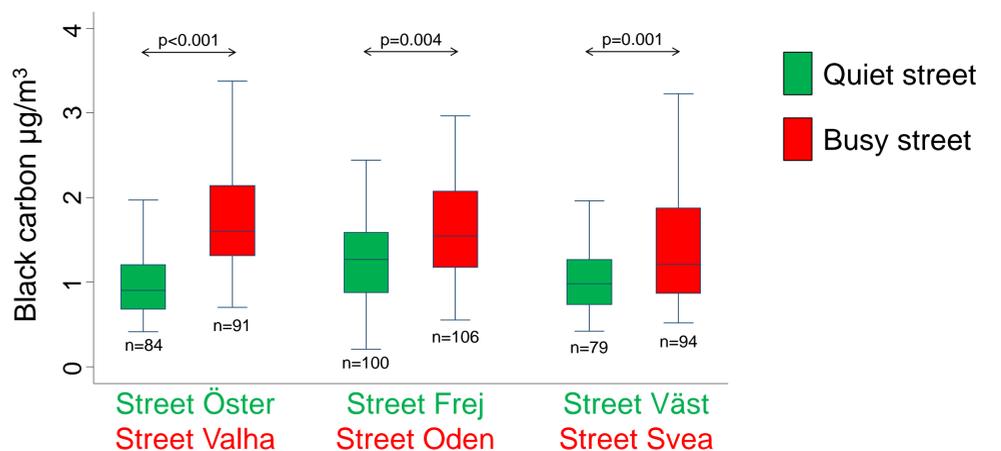
## Methods

Participants travelled by bus\*, bicycle\* or foot\*, respectively, along busy inner-city streets, carrying aethalometers with air inlet attached near the breathing zone. Measurements were undertaken 2 hours in the morning, midday and afternoon, respectively. BC was monitored continuously. In addition, measurements were performed while biking simultaneously along parallel streets, with low and high traffic intensity, respectively.

\*Average travel times: bus 10 min, bicycle 10 min, foot 25 min



**Fig 1.** BC levels ( $\mu\text{g}/\text{m}^3$ ) in ambient air during different modes of transport along busy streets. Each n-value represents the mean BC level measured during one distance along the street. Travelling by bus rendered significantly higher BC levels, compared to both cycling and walking. The p-values show pairwise differences of the means.



**Fig 2.** BC levels ( $\mu\text{g}/\text{m}^3$ ) in ambient air during cycling simultaneously along a busy and quiet, parallel street, respectively. Each n-value represents the mean BC level measured during one distance along the street. On average, BC levels were 30% lower when cycling along a more quiet street. The p-values show pairwise differences of the means.



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