

**Title:** A Prediction Method for Estimating Exposure of Sedentary Workers to Carbon Monoxide along an Urban Traffic Corridor

**Abstract:**

Vehicular traffic is the major source of air pollution in urban areas, particularly, traffic corridors. People are often exposed to high pollutant concentrations and for longer time in such areas. As a result, exposure to air pollutants due to vehicular traffic is of major concern. Exposure may be assessed with a portable monitoring device, however, unfavorable due to cost and tedious in application. In another approach, spatiotemporal air quality is combined with time-activity to quantify exposure. In this approach, estimating or measuring spatiotemporal air quality with accuracy is challenging.

In this research, a simple prediction method comprising of spatiotemporal air quality model and exposure model for estimating carbon monoxide exposure of sedentary workers has been developed. The spatiotemporal model is developed by combining a CALINE4 dispersion model and lognormal distribution model, which is further improved with a calibration factor of data from one fixed monitoring station. The exposure model has been developed by combining the estimates of the spatiotemporal model and time-activity pattern of sedentary workers. The prediction method estimates the spatiotemporal air quality and exposure in terms of probability. Also the method has been applied (a) to estimate required reduction in emission to maintain healthy air quality (b) to estimate probability of exposure in different times of the day (c) to established relationship between probability of exposure and annoyance by air pollution of the target population. The prediction method estimates spatiotemporal air quality and exposure reliably in an urban traffic corridor. The application of prediction method demonstrates the usefulness for developing various emission reduction strategies and for management related to air pollution health-risks.