Minimizing cyclists' exposure to traffic-related air pollution in urban areas

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It starts with a simple piece of clear rubber tubing connected to a small and nondescript – though expensive – oblong brown box, both attached to a bicycle frame.

The tube is used to capture the surrounding air, as cyclists travel around various routes in the city at different times of the day. The box is a condensation particle counter. Each one costs about $10,000 and serves to measure ultrafine particles (UFPs) or particles of ambient air pollution. Together with the bicycles and the students who are pedaling them, these form the tools for a novel research project designed to gather information about the exposure of cyclists and pedestrians to traffic-related pollution.

The information will eventually translate into a set of policies and guidelines for the planning and design of urban microenvironments that will minimize the exposure of cyclists and pedestrians to air pollution. The project, led by Prof. Marianne Hatzopoulou of McGill's Department of Civil Engineering, which includes an interdisciplinary team of engineers and health scientists, will receive over $450,000 over the next three years under a grant from the Collaborative Health Research Projects (CHRP) program. This research aims at reconciling the divide between urban policies that promote active transportation and health objectives which call for minimizing the exposure of Canadians to air pollution.

Prof. Hatzopoulou is among the 37 grant recipients of the 2012 CHRP

program announced by the Honourable Gary Goodyear, Minister of State (Science and Technology) at an event held today at McGill University. The CHRP program is jointly funded by the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Canadian Institutes of Health Research (CIHR).

"Even though the health benefits of cycling clearly outweigh the risks to cyclists' health, recent studies have found associations between air pollution exposure and health effects even at the low levels that characterize most Canadian cities," says Hatzopoulou. "Our focus is on the development of modeling systems and tools which can help policy-makers evaluate the effects of transportation policies on air pollution and health as well as assist the public at large in reducing their exposure."

Based on the data they collect, Hatzopoulou and her team are developing state-of-the-art models that capture the effects of changes in traffic patterns on the generation of air pollutants along with people's exposure to them. They are also working on user-friendly applications for cell phones and computers that will assist urban cyclists in selecting routes that minimize their exposure.

Although Hatzopoulou and her students are gathering data only in Montreal, the modeling techniques they are using will offer urban planners in cities around the globe the tools needed to make informed decisions about the location and layout of bicycle paths in order to reduce air pollution exposure for cyclists. Ultimately, this research should lead to a reduction in the health risks potentially associated with urban cycling.

Provided by McGill University