



## RESIDENTIAL ATTACHED GARAGE INTERVENTION STUDY: FACTSHEET

### What you need to know:

#### **Adding an exhaust fan in your garage can improve the air quality in your home**

#### Why was this study conducted?

Homes with attached garages may have higher levels of air pollutants that can affect health, such as benzene and other volatile organic compounds (VOCs). These pollutants come from vehicles or from items stored in garages, like lawnmowers, snow blowers, or chemical products (fuels, cleaners, solvents, paints) and can enter homes through doors or cracks in the wall. Homes with attached garages are common in Canada. A 2007 survey conducted by Natural Resources Canada found that 3.5 million dwellings in Canada had an attached garage.

#### What was the objective of this study?

To test whether installing an exhaust fan, which vents to the outside, in an attached garage will improve indoor air quality inside the home by preventing pollutant migration from the garage to the home.

#### How did we do the study?

Technicians installed exhaust fans, which vented to the outside, in the attached garages of 33 homes in Ottawa, Ontario. Homes with smoking occupants were not included in the study.

In the living room, attached garage, and outside, we monitored several VOCs including those that commonly come from gasoline (benzene, toluene, ethylbenzene and xylene), as well as nitrogen dioxide (NO<sub>2</sub>) and carbon monoxide (CO) which are present in engine exhaust. We also measured relative humidity, temperature, building air tightness and ventilation rates in the house and in the garage.

#### How did we evaluate the fan intervention?

To evaluate whether exhaust fans were effective, we compared pollutant levels in the home and the attached garage when the fan was running to when it was turned off.

#### What were the results?

The gasoline-related air pollutants were 43-62% lower in the living room when the exhaust fan in the garage was operating compared to when it was not. The reduction inside the attached garage was even greater (80%). Carbon monoxide levels were also reduced by 23% in the house and 61% in the garage.

This study provides evidence that an exhaust fan in an attached garage can reduce air pollutants in homes.

#### Study Citation

Mallach, G. and St-Jean, M., MacNeill, M., Aubin, D., Shin, T., Van Ryswyk, K., Kulka, R., You, H., Fugler, D., Lavigne, E. and Wheeler, A.J. (2016). Exhaust ventilation in attached garages improves residential indoor air quality, *Indoor Air*, DOI: 10.1111/ina.12321

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