

Particle emissions from laser printers might pose health concern

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Certain laser printers used in offices and homes release tiny particles of toner-like material into the air that people can inhale deep into lungs where they may pose a health hazard, scientists are reporting. Their study is scheduled for the August 1 online issue of the American Chemical Society's *Environmental Science & Technology*.

Lidia Morawska, Ph.D., and colleagues in Australia classified 17 out of 62 printers in the study as "high particle emitters" because they released such elevated quantities of particles, which the researchers believe to be toner, the ultrafine powder used in laser printers instead of ink to form text and images. One of the printers released particles into an experimental chamber at a rate comparable to the particle emissions from cigarette smoking, the report stated.

Thirty-seven of the 62 printers, on the other hand, released no particles that diminished air quality. Six released only low levels, and 2 medium levels. All printers were monitored in an open office, and the researchers recorded data on three laser printers in an experimental chamber. The study included popular models in the U. S. and Australia sold internationally under the Canon, HP Color Laserjet, Ricoh and Toshiba brand names.

Most of the printer-generated particles detected were ultrafine, Morawska said, explaining that such contaminants are easily inhaled into the smallest passageways of the lungs where they could pose "a significant health threat." Previous studies have focused on emissions of

volatile organic compounds, ozone, and toner particles from office printers and copiers. However, the research left broad gaps in scientific understanding of particle emissions and airborne concentrations of particles, the report noted.

Morawska and colleagues, who are with the Queensland University of Technology in Brisbane, initially were not trying to close that knowledge gap. “It wasn’t an area that we consciously decided to study,” Morawska said in an interview. “We came across it by chance. Initially we were studying the efficiency of ventilation systems to protect office settings from outdoor air pollutants. We soon realized that we were seeing air pollution originating indoors, from laser printers.”

The study found that indoor particle levels in the office air increased fivefold during work hours due to printer use. Printers emitted more particles when operating with new toner cartridges, and when printing graphics and images that require greater quantities of toner.

Funded by Queensland Department of Public Works and The Cooperative Research Centre for Construction Innovation, the ES&T report includes a list of the brands and models in the study classified by amount of particles emitted. As a result of the study, the scientists are calling on government officials to consider regulating emission levels from laser printers. “By all means, this is an important indoor source of pollution,” Morawska said. “There should be regulations.”

The health effects from inhaled ultrafine particles depend on particle composition, but the results can range from respiratory irritation to more severe illnesses, such as cardiovascular problems or cancer, Morawska said. “Even very small concentrations can be related to health hazards,” she said. “Where the concentrations are significantly elevated means there is potentially a considerable hazard.”

Larger particles also could be unhealthy without reaching the deepest parts of the lung. “Because they are larger,” Morawska added, “they contain more mass and can carry more toxins into the body. No matter how you look at it, there could be problems.”

Morawska said that more research on the health effects of inhaling printer-generated particles is needed. As a first step to lower risk, people should ensure that rooms in offices or houses are well ventilated to allow airborne particles to disperse.

Source: American Chemical Society

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