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## Printer particles as bad as cigarettes

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August 1, 2007

SMOKERS have been banished from the office - but another threat, potentially as dangerous, may still be lurking by the water cooler.

It is the laser printer, says Lidia Morawska, a Queensland University of Technology professor.

A study led by the physics professor found many laser printers emit clouds of ultra-fine particles that she compared with cigarette smoke and motor vehicle emissions. "They are so small you can't see them."

Although her team has yet to analyse their chemistry, she warned that such small particles "can get deep into the lungs", leading to respiratory and cardiovascular problems. Some particles were potential carcinogens.

Professor Morawska said that of about 40 models of laser printers her team had tested, 13 were "high emitters" of particles from the toner. All were relatively new. Office photocopiers failed to produce similar particles.

The emissions were detected when the researchers, undertaking a joint project with the Queensland Department of Public Works, began studying the efficiency of office air ventilation and filtration systems.

They discovered concentrations of microscopic particles five times higher than outdoor levels often produced by traffic.

Using an electronic sniffer they traced the emissions to the office laser printers. "Concentrations were considerably higher than outdoors by a busy road. We didn't expect the emissions could be so high."

Concerned by the discovery, staff in her university office checked their own printers, and those found to be high emitters were relocated away from people.

She now wants to conduct another study, looking at the chemistry of the particles, and called for rules to regulate emissions from office equipment.

"Governments regulate emission levels from outdoor devices, such as motor vehicles, power stations and factories, so why not printers?"

Bill Physick, a CSIRO atmospheric air quality scientist, said the danger created by ultra-fine particles only began to be appreciated in the 1990s.

"While large particles get trapped in the hairs of the nose or only go partially down into the respiratory system, ultra-fine particles are so small they can get to the very lowest reaches of the lungs," Dr Physick said.

"The current thinking is that it's other toxic chemicals, which adhere to the ultra-fine particles,

that could be the source of the health problems."

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