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Nanoparticle link to China deaths

Friday, August 21, 2009

Seven young mainland women suffered permanent lung damage and two of them died after working for months without proper protection in a paint factory using nanoparticles, Chinese researchers reported.

They said the study is the first to document health effects of nanotechnology in humans, although animal studies in the past have shown nanoparticles can damage the lungs of rats.

"These cases arouse concern that long-term exposure to nanoparticles without protective measures may be related to serious damage to human lungs," Yuguo Song from the occupational disease and clinical toxicology department at Chaoyang Hospital in Beijing wrote in the European Respiratory Journal.

But a US government expert said the study was more a demonstration of industrial hazards than any evidence that nanoparticles pose more of a risk than other chemicals.

Nanotechnology is an important industry. One nanometer is one-billionth of a meter and nanoparticles measure between 1 and 100 nanometers. It is used in products like sporting goods, tires, electronics, cosmetics and surface coatings and has a projected annual market of around US\$1 trillion (HK\$7.8 trillion) by 2015.

"Their tiny diameter means that they can penetrate the body's natural barriers, particularly through contact with damaged skin or by inhalation or ingestion," Song wrote.

The researchers said the seven women had worked for between five and 13 months in a factory spraying paint on polystyrene boards before they developed breathing difficulties and rashes on their faces and arms. The women breathed in fumes and smoke that contained nanoparticles while working in the factory, they added.

According to the paper, doctors found the women had excess fluids in the cavities surrounding their lungs and hearts, conditions that impair breathing and heart function.

Their lung tissues and fluids contained nanoparticles about 30 nanometers in diameter - matching particles that health protection officials later found in materials used in the factory.



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Two of the women died within two years of working. The condition of the other five women has not improved even though they are no longer handling such materials.

It is impossible to remove nanoparticles once they penetrate lung cells, Song wrote.



Allen Chan, a chemical pathologist at the Chinese University of Hong Kong who is not connected to the study, said the findings are significant.

"These findings are important because they provide concrete evidence that these materials are harmful and protection must be given to workers," he said.



But Clayton Teague, who heads the National Nanotechnology Coordination Office at the White House Office of Science and Technology Policy, noted that the women who were sickened on the job were spraying a paste containing nanoparticles in a very small, unventilated room, and wore gauze masks only occasionally.

He said in the United States, the National Institute for Occupational Safety and Health has developed extensive safety training for nanotechnology workers and a proactive risk-management system to help companies maximize worker safety.

"From what we know, this tragedy could have been avoided by proper industrial hygiene techniques," Teague said.

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