Air pollution linked to several new causes of hospital admissions

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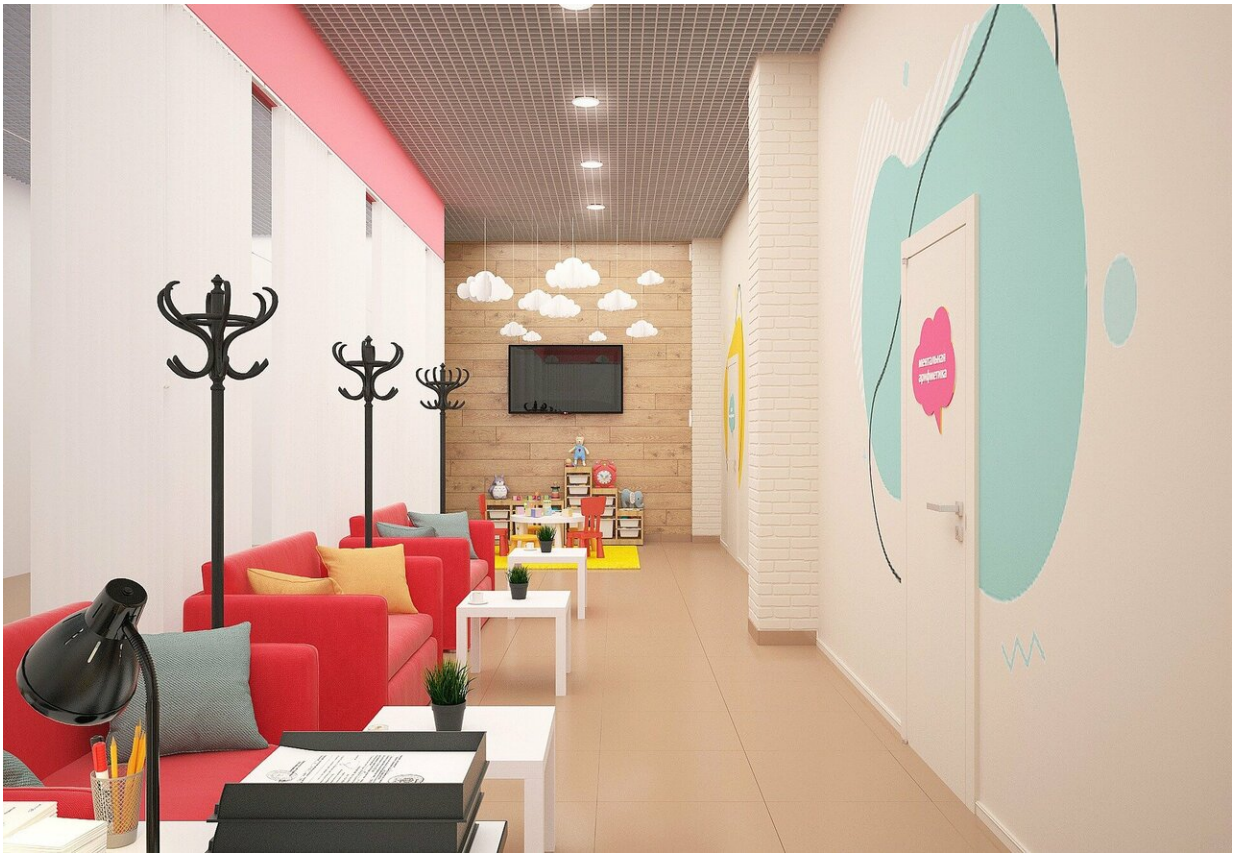

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Short term exposure to fine particulate matter in the air (known as PM2.5) is associated with several newly identified causes of hospital admissions, even at levels below international air quality guidelines,

finds a US study published by *The BMJ* today.

The study also confirms several previously established causes of hospital admission associated with short term exposure to PM2.5 including heart and lung diseases, diabetes, Parkinson's disease, and diabetes.

As such, the researchers suggest that the World Health Organization (WHO) air quality guidelines need revising.

A research team at the Harvard Chan School of Public Health analysed more than 95 million Medicare hospital insurance claims for adults aged 65 or older in the United States from 2000 to 2012.

Causes of hospital admission were classified into 214 mutually exclusive disease groups and these were linked with estimated daily exposure to PM2.5 based on data from the US Environmental Protection Agency.

The researchers then estimated the increased risk of admission and the corresponding costs associated with a 1 ug/m^3 increase in short term exposure to PM2.5 for each disease group.

They found that each 1 ug/m^3 increase in PM2.5 was associated with 2,050 extra hospital admissions, 12,216 days in hospital, and $31m (£24m, €28m) in care costs for diseases not previously associated with PM2.5 including sepsis, kidney failure, urinary tract and skin infections.

What's more, these associations remained even when the analysis was restricted to days when the PM2.5concentration was below the WHO air quality guideline, suggesting that they need updating, say the researchers.

The researchers point to some study limitations, such as being unable to fully capture costs after discharge, or take account of other factors that could trigger hospital admission, such as smoking, alcohol consumption,

and drug use.

However, strengths include the large sample size over a 13-year period and results that remained similar after further analyses, suggesting that they are robust.

As such, they say this study "discovered several new causes of hospital admissions associated with short term exposure to PM2.5 and confirmed several already known associations, even at daily PM2.5 concentrations below the current WHO guideline."

Economic analysis suggests that "even a small increase in short term exposure to PM2.5 is associated with substantial economic effect," they add.

"Our knowledge of the health effects of PM is still lacking in many areas," say researchers at the University of Southampton in a linked editorial.

However, they explain that these newly associated diseases represent around a third (31-38%) of the total PM2.5 associated effect, suggesting that current figures for PM2.5 associated illness "might be considerable underestimates."

They call for more research to uncover new disease associations and explore potential causative mechanisms. "Clearly, there is still much to learn, but we should not mistake knowledge gaps for paucity of evidence," they write. "The sooner we act, the sooner the world's population will reap the benefits."

More information: Short term exposure to fine particulate matter and hospital admission risks and costs in the Medicare population: time stratified, case crossover study, *BMJ* (2019). DOI: 10.1136/bmj.l6258 ,