

Explainer: how a dust storm, and hazardous air quality, can harm your health

Written by Mark Patrick Taylor, Professor of Environmental Science, Macquarie University

A major dust storm [swept through Sydney and regional New South Wales](#) this week. Red skies over Broken Hill on Wednesday night and Sydney on Thursday resembled those seen during intense bushfire activity and the massive 2009 dust storm.

The NSW government updated its [air quality index](#) to “hazardous”. [People were advised](#) to stay indoors unless it is essential to go outside, minimise strenuous physical activity and seek emergency medical assistance if they experience breathing difficulties, chest pains, or if other serious health concerns arise.

The hazardous air quality warning arose because fine dust levels were high relative to [Australian air quality standards](#). Air quality levels of PM10 – particles at or less than 10 microns (μg) – were more than twice the Australian standard, of $50 \mu\text{g}/\text{m}^3$ measured over a 24-hour period, on Friday morning. They remained high throughout the day.

Perhaps of greater concern are the smaller PM2.5 dust particles, which were above the Australian standard of $25 \mu\text{g}/\text{m}^3$ at St Marys in Sydney’s west on Friday morning. Fine PM2.5 dust particles can penetrate deep into the lungs and cause respiratory difficulties. Short-term exposures aggravate asthma, increasing the number of [emergency department visits](#), as well as causing wheezing and breathing difficulties.

Even for those not affected by asthma, exposure can cause coughing, a sore throat and a runny nose. Elevated dust exposure can also aggravate heart conditions. For example, increased short-term exposure to both PM10 and PM2.5 has [been linked to](#) increased death and hospitalisation rates due to heart disease, arrhythmias (palpitations) and stroke.

The city of Newcastle is experiencing much worse conditions. On Friday morning PM10 levels were four times the Australian standard of $50 \mu\text{g}/\text{m}^3$ due to additional smoke particles from local bushfires. Throughout the day PM2.5 levels in Newcastle have remained just below the maximum acceptable upper value of $25 \mu\text{g}/\text{m}^3$.

Fine dust particles are usually too small to see individually but high concentrations make them

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visible as a brown haze. Even as the dust begins to clear, the unseen fine particles outside or even inside your house can still present a health risk.

Read more: [*We can't afford to ignore indoor air quality – our lives depend on it*](#)

It's advisable to use any prescribed relieving medications and seek medical advice if symptoms do not improve. For those who own an air conditioner, it may be appropriate to use it as long as the fresh air intake is closed and the filter is clean, preventing particles from being drawn into the home.

It is also important to keep an eye on air quality, which can be done in real-time via the NSW government's [air quality monitoring network](#) .

The previous major dust storm in 2009 was made of predominantly natural elements – aluminium, silicon and iron. These originate [from desert soils](#) and did not contain significant concentrations of [toxic elements](#) .
The current dust storm is likely similar in composition.

While there is some evidence the source and composition of dust has health implications, the most critical factor is the size of the particles. Evidence shows there is [no safe level of fine PM2.5 dust](#) .

Dust storms like this and the one in 2009 are unlikely to present a long-term health risk. However, they are concerning in the short term, especially for the elderly, people with pre-existing respiratory conditions and children, who breathe more air per kilogram of body mass than adults.

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A [health impact assessment](#) of the 2009 dust storm showed marked increases in emergency admissions for asthma and respiratory conditions but no significant increase in cardiovascular (heart and vessel) hospital admissions. The age groups most affected were those known to be most vulnerable – people older than 65 and those aged five and younger.

Read more: [***Toxic chemicals and pollutants affect kids' brain development***](#)

A similar situation is being experienced in California, [where wildfires](#) are causing high concentrations of dust and smoke in the air and significant concerns about [human health](#).

Australia generally enjoys good air quality, which is not the case for many [lower- to middle-income countries](#)

. According to the World Health Organisation (WHO), more than [600,000 children died](#) in 2016 due to air pollution.

Air quality is a global public health issue. Around 91% of the world's population live in areas where the WHO's fine particle (PM2.5) guidelines are not met.

For those concerned about dust, Macquarie University's [DustSafe program](#) will provide information on the dust in your home free of charge.

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