

Cancer risk from diesel fumes in underground mines prompts fears of industrial health disaster

By [Claire Moodie](#)

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Photo: [Chris Davis believes diesel fumes in underground mines could be one of the biggest health disasters since asbestos. \(ABC: Selina Bryan\)](#)

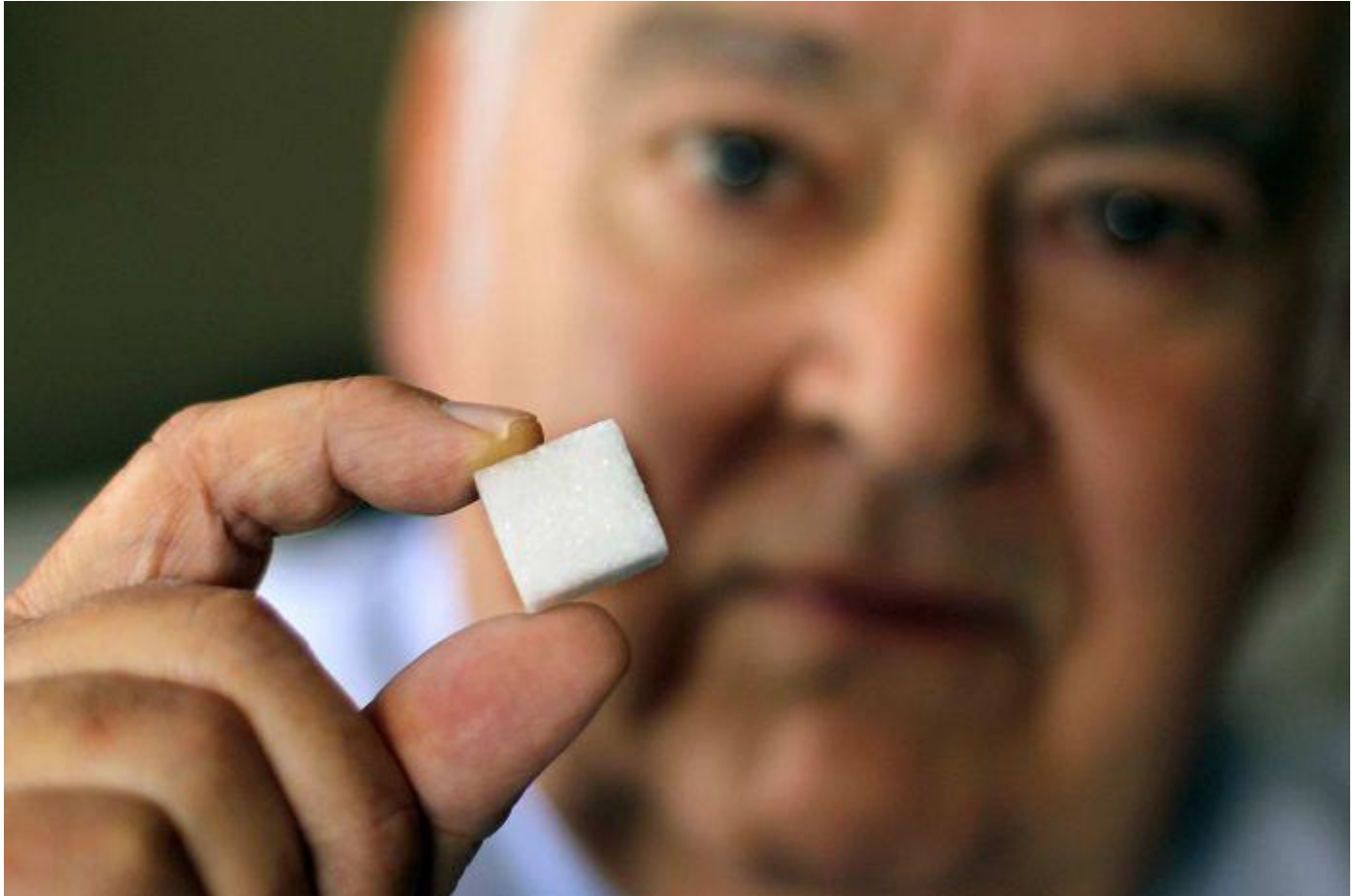
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Chris Davis arrives at his presentation to the mining industry armed with a box of sugar cubes, but there's nothing sweet about his message.

The former mining engineer is speaking out about what he believes is one of the biggest occupational health threats since asbestos — the diesel machinery exhaust fumes churned out by heavy machinery in many of Australia's underground mines.

"There are millions of nano diesel particles in the size of a sugar cube, coming from the exhaust of every diesel engine," he said.



[Photo: Chris Davis uses a sugar cube to demonstrate the dangers of diesel pollution. \(ABC News: Claire Moodie\)](#)

"And every breath you take underground, you are inhaling nano diesel particulates on a massive scale."

Nano diesel particulate matter (nDPM) is so small it is described as being less than a hundredth of the width of a human hair.

But Mr Davis, who is part of a West Australian-based working group set up to investigate the risk, said there was increasing evidence of its harmful effects.

The tiny particles can reach deep into the body and stay there for months.

"There is an ethical imperative to do what is right for society and we shouldn't endanger society just to make a quid," Mr Davis said.



[Photo: The use of diesel-powered machinery in underground mining has steadily increased since the 1960s. \(AAP: Unity Mining\)](#)

Pollution 100 times the levels of a city street

Mr Davis has been presenting the latest research to mining executives and occupational health staff in Western Australia and Queensland, placing a sugar lump on each delegate's chair as a prop to try to quantify the invisible threat.

He then hits them with the stats.



[Photo: Chris Davis says there are millions of nano diesel particles in an area the size of a sugar cube coming from diesel engine exhausts. \(ABC News: Claire Moodie\)](#)

He said even with exhaust emission control processes that reduce most of the toxic pollutants, recent testing at a WA mine found levels of up to a million nano diesel particulates per cubic centimetre.

Mr Davis said that was about 100 times more than people would inhale if they were walking down a busy city street.

He also cited a recent WA study highlighting the [high risk of lung cancer among miners working in confined spaces underground.](#)

"Every mine that uses diesel underground is chronically affecting the long-term health of its workers," Mr Davis said.

Miners tested for damaged DNA

The West Australian Department of Mines, Industry Regulation and Safety has also raised concerns.

Together with the Mineral Research Institute of WA, it has funded a major new study of underground workers at the Sunrise Dam gold mine, 1,000 kilometres north-east of Perth.



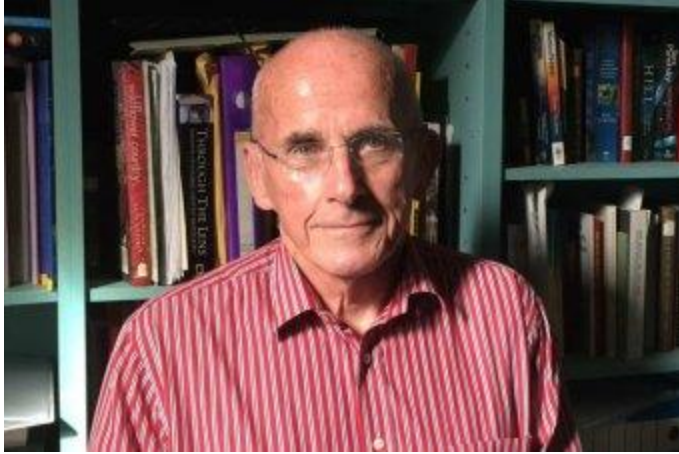
[Photo: AngloGold Ashanti's Sunrise Dam mine, near Laverton, agreed to take part in the study. \(Tony McDonough/AngloGold Ashanti Australia Ltd\)](#)

A total of 100 workers, including 80 who work underground, have provided blood and urine samples to test for damage to their DNA from diesel fumes.

Their breathing capacity has also been monitored.

Bill Musk, a respiratory physician at Perth's Sir Charles Gairdner hospital, is part of the team assessing the results, which are likely to be finalised by early 2019.

"The particles when they get into the smallest parts of the lung, the air sacs of the lung, can get absorbed into the system and circulate in the blood," Professor Musk said.



[Photo: Bill Musk says particles can circulate in the blood after getting into the lung's air sacs. \(ABC News: Claire Moodie\)](#)

"The World Health Organisation (WHO) has classified diesel and silica as cancer-causing agents and so the more of them that you get, the more likely you are to develop a cancer."

A clinical professor of Medicine and Population Health at UWA, he has specialised in the investigation and treatment of occupational lung diseases, including the asbestos-related condition mesothelioma.

He said it was not yet understood whether DNA damage can be inherited.

"We know from our other studies from miners at Wittenoom that there is a familial association with mesothelioma," he said.

"If you've got a first-degree relative with mesothelioma, after allowing for your asbestos exposure, your risk is doubled.

"So that's where the issues about studying DNA become important."

Four alternatives to protect workers

Currently there is no legal limit in Australia for exposure to diesel emissions, but there are guidelines which recommend an average exposure of 100 micrograms per cubic metre of the larger, diesel particulates.

Until recently, there was no way of measuring the finer nanoparticles.

But Mr Davis said given measuring technology was now available, the mining industry could no longer afford to be complacent.

He urged the industry to explore its options, including ditching diesel altogether.



[Photo: Canadian miner Goldcorp hopes to slash energy costs and diesel fumes with its all-electric underground mine in Ontario. \(Flickr: Goldcorp Inc\)](#)

He pointed to Goldcorp, in Canada, which is building the world's first all-electric underground gold mine in Ontario.

"They can use better filtration, better ventilation, shut the mine down or go electric, those are the alternatives," he said.



[Photo: Goldcorp's all-electric mine is due to go into production next year. \(Flickr: Goldcorp Inc\)](#)

The Chamber of Minerals and Energy declined to comment on the risk of nano diesel particulate matter.

But the Department of Mines, Industry Regulation and Safety said mining companies had to control workers' exposure to diesel emissions under 14 regulations.

These include providing adequate ventilation and airflow where diesel units are being operated.

The act also sets limits for maximum exhaust emissions of oxides of nitrogen and carbon monoxide.

Director of Mines Safety Andrew Chaplyn said in a statement that the department continued to advocate and promote a risk-based, systematic approach towards managing diesel emissions.