Source: *The Straits Times*, pB3
Date: 5 November 2026

Longer-term health risks of haze need greater attention

The impact of air pollution on individuals and public health burden may be more wide-ranging.

Seow Wei Jie

The thick, choking smoke that blanketed large parts of South-east Asia since August appears to have dissipated in Singapore in recent days, with the arrival of rain and a shifting of the winds.

While we can breathe a bit easier and put away the N95 masks for the moment, questions remain: What damage does the haze do to our health, particularly if it recurs every year?

We know that it can cause ill effects in the short term, particularly among vulnerable individuals. But what about longer-term exposure and the associated societal health costs?

Much of the health concern focuses on fine particulate matter, known as PM2.5, that we inhale, even on seemingly clear days. These particles measure 2.5 micrometres or less in diameter, roughly 30 times smaller than the width of a human hair. Due to their tiny size, they can penetrate deep into the lungs and can affect other parts of the body.

Short-term exposure to high PM2.5 levels can irritate the eyes and airways, causing coughing and breathing difficulties. A recent Singapore study found that an increase in daily PM2.5 from 15 to 25 micrograms per cubic metre was associated with about 3% more emergency department visits for asthma and chronic obstructive pulmonary disease over the next two days.

Other local studies have linked short-term air pollution exposure to heart attacks. A 2019 study led by researchers from Singapore General Hospital examined nearly 54,000 heart attacks in Singapore between 2010 and 2015. It found that every 30-unit increase in the Pollutant Standards Index (PSI) was associated with a 4% higher incidence of heart attacks.

At a regional level, two studies based on mathematical modelling estimated that between 44,000 and 100,000 premature deaths could be attributed to the severe haze in 2015, which affected Indonesia, Malaysia and Singapore.

While the estimates differ largely because they used different assumptions about how pollution affects mortality, the studies led by researchers from Harvard University in 2016 and the University of Leeds in 2020 reached the same broad conclusion: When millions of people are exposed, even small increases in individual health risk can translate into a substantial public health impact.

Separately, several studies published in 2026 using the UK Biobank, a vast repository of health data on people in Britain, have raised questions about possible links between prolonged breathing of polluted air, brain health and dementia.

One study, published in April 2026 in the Journal of Nutrition, Health & Aging, tracked some 490,000 people who were exposed to varying levels of air pollution over a period of nearly 14 years. Among these, those with the highest exposure to PM2.5 had a 14% greater risk of developing dementia than those with the lowest exposure.

To be sure, more research is needed, in part because findings from overseas studies may not be directly applicable to Singapore because smoke composition and exposure patterns differ across regions.

Determining whether intermittent haze exposure, as opposed to constant exposure, contributes to chronic disease later in life also remains an important unanswered question.

But what is clear is that our search for answers is becoming more urgent with climate change. The impact of El Nino on the 2026 haze may have intensified its effects, but it would be wrong to assume it is a one-off phenomenon.

Hotter temperatures and longer dry spells are fuelling bigger and more intense wildfires around the world, even as drought and land degradation increase the likelihood of huge clouds of smoke, bearing microscopic debris, blowing across borders.

BEYOND HEALTH

The burden of haze is not limited to its direct effects on health. When air quality worsens, the consequences ripple through workplaces, schools and households, creating costs that are often less visible than hospital admissions. Outdoor workers may need to adjust their schedules, parents may face childcare disruptions and businesses may lose productivity.

Household budgets are affected as money has to be spent on purchasing air purifiers and masks. One study estimated that the 2015 haze cost Singapore some $1.83 billion, equivalent to about 0.45% of its gross domestic product at the time. The estimate included healthcare costs, productivity losses, effects on businesses and tourism, and spending on protective measures. Like the haze itself, the effects can be hard to contain, resulting in a wider economic and social burden.

WHAT SHOULD WE DO?

When air quality deteriorates, the immediate priority is to reduce unnecessary exposure. Singapore's one-hour PM2.5 readings help guide decisions about outdoor activities, while the 24-hour Pollutant Standards Index forecast and accompanying health advisories support planning for the following day.

People should follow official guidance, particularly for prolonged or strenuous outdoor activities. Those with existing heart or lung conditions, older adults, children and pregnant women should also take additional precautions.

Employers also have a responsibility to protect outdoor workers. Haze does not affect everyone equally. An office worker who can remain indoors is likely to experience much lower exposure than a construction worker spending hours outside.

But individual precautions can go only so far. Tackling the root of the problem by preventing the vegetation and peatland fires responsible for the haze is essential. This requires sustained regional cooperation, responsible land management and effective fire prevention.

The 100,000 premature deaths associated with the 2015 haze may be an estimate, but the broader message is clear: Haze affects health, even if the full extent of long-term risks is still to be fully determined.

The choking smoke may dissipate by year's end and the air purifiers stored away, but the health consequences could be latent and do not disappear so easily.

Understanding and preventing the wider consequences of haze will require sustained attention long after the smoke has gone. Better understanding the long-term effects of repeated haze exposure may be one of the most important public health challenges facing South-east Asia.

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