

#BeatAirPollution
#BreatheLife

Standing up for clean air

By Danielle Millar and Caradee Wright

Caradee Wright

Clean air is as vital to life on earth as clean water, and the suffering and deaths from polluted air are preventable. Air pollution reduction and control must become a priority for everyone.

Industrialisation, rural-urban migration and urban planning under apartheid have all played a role in contributing to air pollution in South Africa. Historically, low-cost residential areas were designated close to industrial zones, and the continued influx of people to these urban and industrial areas gave rise to informal dwellings in their vicinity. Poor service delivery in these settlements means that people living there may still rely on traditional solid fuels such as wood, coal and paraffin for cooking and heating, and often dispose of waste by burning it. These practices generate smoke that results in household air pollution.

Poor air quality has long been known to have a negative impact on human health. According to World Health Organisation (WHO) statistics, the death rate attributed to household air pollution in South Africa in 2016 was 34 per 100 000 people. This estimate was calculated considering acute (short-term) and chronic (long-term) respiratory diseases linked to air pollution exposure, such as lower respiratory infections, respiratory cancers and Chronic Obstructive Pulmonary Disease, as well as cardiovascular diseases – ischaemic heart disease and stroke – for which air pollution is a risk factor.

Apart from household air pollution, people living in urban areas may also be exposed to high levels of ambient air pollution, generated by outdoor fires, vehicles, coal-

fired power plants, industrial facilities and waste sites. But ambient air pollution can also occur in rural areas, due to natural sources such as dust storms and veld fires.

In an effort to address ambient air pollution in South Africa, National Ambient Air Quality Standards for pollutant levels were set in accordance with the National Environmental Management: Air Quality Act (NEMAQA). Many areas currently exceed the standards, however, with air pollution hotspots typically coinciding with

centres of industry and large populations. These areas include three National Air Quality Priority Areas – Vaal Triangle Airshed, Highveld and Waterberg-Bojanala – that were declared because they exceed the standards and also cross provincial boundaries.

Ambient monitoring data collected by national, provincial and municipal authorities to assess compliance with the standards is made publicly available through the South African Air Quality Information System (SAAQIS). The SAAQIS website (<https://saaqis.environment.gov.za/>), as well as its associated Android and iOS apps, includes a simplified Air Quality Index that allows members of the public to understand how measured concentrations of pollutants translate to air quality and health effects.



sandra374, Pixabay

Umoya ohlanzekile ubalulekile kwizinto eziphila emhlabeni njengoba kubaluleke amanzi, futhi ukuhlupheka nokufa okubangelwa umoya oncolile kunga vimbeka. Ukunciphisa nokuvimbela umoya oncolile kufanele kube yinto ehamba phambili kuwo wonke umuntu.

Translation by Zamantimande Kunene

South Africa's standards are not as strict as the WHO's air quality guidelines; in fact, 91% of the world's population lived in places that did not meet the WHO guidelines in 2016. Globally, the main source of air pollution is caused by the utilisation and burning of biomass and fossil fuels for power, heat, transport and food production.

One air pollutant of major concern is particulate matter (PM), a complex combination of tiny solid particles and liquid droplets of organic and inorganic substances suspended in the air. The key components of PM are nitrates, ammonia, sulphates, sodium chloride, black carbon, water and mineral dust. Particles with a diameter of 10 micrometres (equivalent to 0.01 mm) or less are known as PM₁₀ and can affect human health as their small size means they easily penetrate and lodge in the lungs. Even more dangerous are particles with a diameter of 2.5 micrometres or less – known as PM_{2.5} – as they can penetrate the lung barrier and enter the bloodstream. Chronic exposure to these particles increases the risk of developing multiple respiratory and cardiovascular diseases and conditions.

Scientific evidence shows that air pollution affects human health at every stage in our lifespan, including as unborn babies. The most vulnerable to pollution-induced damage are the young, elderly and otherwise health-compromised individuals. In children and adolescents, lung growth and brain development is slowed because of air pollution. In adults, there is increasing evidence of pollution contributing to dementia and neurodegeneration. Apart from the previously mentioned respiratory and cardiovascular effects, air pollution aggravates or increases susceptibility to conditions such as asthma, allergies, diabetes, eczema and skin ageing. Indeed, evidence is mounting that air pollution causes premature deaths of at least five million people per year.

- For more information on air pollution, see the World Health Organisation's online portal: <https://www.who.int/airpollution/en/>

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Urban settlement issues

Science-policy statement on air pollution and health

The National Academies of Sciences and Medicine from South Africa, Brazil, Germany and the United States have joined forces to issue an urgent call to action on harmful air pollution. At a ceremony at the United Nations (UN) headquarters in New York on 19 June 2019, the academies handed over a science-policy statement, titled *Air Pollution and Health*, to senior UN representatives and high-level diplomats from the four countries.

In the statement, the five academies call for a new global compact – or agreement – to improve collaboration on the growing problem, and for governments, businesses and citizens to take action to reduce air pollution. They appeal for emissions controls in all countries, as well as proper monitoring of key pollutants, especially PM_{2.5}.

The global economic burden of disease caused by air pollution across 176 countries in 2015 was estimated to be US\$3.8 trillion. The academies note that public and private investments in measures to reduce air pollution do not match the scale of the problem, and highlight the need for increased funding to confront the issue. The measures could also help to reduce climate change and contribute to meeting the goal of limiting average global warming to 1.5°C.

The academies invite other science academies, research institutes, universities and individual scientists worldwide to join the initiative and to strengthen research and science-policy activities in the area of air pollution and health.

The statement is available online at: www.air-pollution.health.



ASSAf Executive Officer, Prof. Himla Soodyall (left), and MRC scientist Dr Caradee Wright (right) with Prof. Jacqueline McGlade, former Chief Scientist to the UN Environment Programme, at the handover ceremony for the *Air Pollution and Health* science-policy statement at the UN headquarters in New York.